PROJECT MANUAL

Rhode Island College
Fogarty Research Laboratory, INBRE
Providence, Rhode Island

Brewster Thornton Group Architects, LLP

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State of Rhode Island Board of Education, Rhode Island College, and State of Rhode Island

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GENERAL

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G0.1	Legend, General Notes, Common Abbrev., & Drawing List
G0.2	Code Summary & Egress Plan

ARCHITECTURAL

Dwg. No	Drawing Title
A1.1	Demo Plan, Finish Plan, Floor Plan, & Reflected Ceiling Plan
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Dwg. No	Drawing Title
P1.1	Partial First Floor Plan Plumbing

FIRE PROTECTION

Dwg. No	Drawing Title
FP1.1	Fire Protection Floor Plans

MECHANICAL

Dwg. No	Drawing Title
M0.0	Mechanical Legend, General Notes & Details
M1.0	Mechanical Floor Plans & Wiring Diagram
M2.0	Mechanical Details

ELECTRICAL

Dwg. No	Drawing Title
E0.0	Electrical Symbol Legend and Notes
E1.0	Demolition and New Electrical Plan
E2.0	Schedule & details and Overall Keyplan

END OF SECTION

00 31 00 – AVAILABLE INFORMATION

PART 1 - GENERAL

1.1 EXISTING CONDITIONS

A. Certain information relating to existing surface and subsurface conditions and structures is available to bidders but will not be part of the Contract Documents, as follows:

. None.

B. Asbestos Abatement Plan

. A copy of this document is found following in Section 00 3126.

. The documents indicate areas of asbestos found during testing.

C. RIC Network Operations Campus Standards Guide for Project Teams: Technology (Data & Telephony) Infrastructure.

. A copy of this document is found following this section.

. This document indicate contractor required telecommunication installation needed to properly install data indicated on the drawings, per RIC standards.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

Rhode Island College Network Operations Campus Standards Guide for Project Teams: Technology (Data & Telephony) Infrastructure

User Guide

The following information has been provided by the Rhode Island College Network Operations to ensure consistent application of campus network and telephony provision across projects. This document is to be used by Design Teams as the basis of design for IT and Security for all RIC Projects.

In some cases, the Campus Standards presented here may run counter to industry standards. If this is the case, or if there are any questions, concerns or suggestions regarding the implementation of these Standards, the Design Team shall prepare a memo and submit for review and approval of the deviation from this document.

Early Project Meeting

In the early design phases of the project, the Project Team (including the engineer) shall meet with Network Operations to review project requirements and existing infrastructure.

Demolition of Existing

Project documents shall require contractors to provide a list of jack designations for legacy cables which are removed as part of the project. All cables shall be removed from the front of the patch panel to the faceplate.

Substitutions

The substitution of products or deviations from the standards and acceptable parts set forth in this document is explicitly prohibited without prior written approval from RIC Capital Projects and Network Operations.

Use of Standard Specifications

This Use Guide is to be used in conjunction with the Standard Specifications that are provided to Project Teams:

- Campus Standard Access Control, Security and Indication System Specification
- Video Surveillance Systems Specification

The College requires that these specifications, as well as those for communications, be independent from the electrical specifications. In cases where a disparity exists, an RFI must be submitted for clarification.

Components Covered in this Document

The following topics are covered in this Guide. For electronic versions of this document, you can click on the headings below to jump to the specific section.

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Contractor Guidelines

Responsibilities

- Contractor is responsible for attaining all local and state permits, and inspections, and all related fees.
- Contractor shall provide weekly project status updates. If needed the frequency of these updates may increase at the discretion of the RIC project manager.
- Contractor shall provide specification sheets of all products to be used on project. The submittal must be approved by RIC project manager before any work is started on project.
- Contractor is responsible to remove all construction debris from project.
- At project start contractor must provide proof of license for all technicians working on campus. The documentation should include a photo copy of each technician's license. Contractor will provide (2) copies of the documentation. One copy will be for the college, and the other will be kept at contractor's onsite operations center.

Qualifications

- Any contractor offering a proposal for a Rhode Island College Telecommunication installation must meet the minimum requirements listed below. Contractors must provide hard copy documentation of their qualifications with their submittal.
- Contractor must be a certified installer of any cable, or electronic systems installed under project scope. A copy of certification must be provided.
- Contractor must have a Minimum of 10 years of experience in the communication structured cabling business.
- Contractor must supply 3 references for communications projects of similar size and scope.
- Contractor shall hold proper state telecommunications, and if needed electrical licenses.
- Contractor shall use RIC approved subcontractors for any part of project. The subcontractor will need to furnish all information requested above.

Installation Requirements

General

- Telecommunication system installed must meet National Electrical Code, and ANSI/TIA guidelines.
- If there is a question on code requirements refer to the official inspecting the installation for ruling.
- Contractor shall be responsible to install conduit raceway for certain locations. In RI electrical licenses are required to run raceway rated for 120-600v even if they are containing low voltage cables.
- Cables shall be plenum rated where required.
- Contractor is responsible for any faceplates needed for custom or modular furniture. Coordinate with General Contractor when ordering.
- All telecommunications cables installed shall be labeled in accordance with ANSI/TIA 606-C Class 4 requirements.
- Contractor shall provide hard copy of: (1) a 15 year Panduit Certification Plus warranty, (2) 25 year Mohawk Channel/Mate warranty, or (3) Corning LANscape Solutions NPI 25-year extended warranty on all installed copper and fiber optic links. This warranty shall provide a complete system warranty to guarantee premium end to end performance. The college does not require the warranty to include the patch cables, only the building's structure cable system.

Conduits and Pathways

- Contractor shall install/replace pull strings in raceways and conduits. All pull strings to be labeled in accordance with ANSI/TIA 606-C.
- Conduit sleeves installed through an in-accessible area shall have an additional empty conduit installed for future installations.
- Conduits sealed with fire stop shall be sealed in a manner that allows them to be accessed for additional cabling.
- Conduits providing pathways for telecommunication system cables including wall/floor sleeves shall not exceed 40% fill ratio.
- Fully pipe vertical risers when passing through spaces which are not for the sole use of Network Operations.
- Vertical risers shall be supported at each floor to limit gravity tension and potential issues with the cabling on upper levels.

Outside Plant

The telecommunications outside plant consists of cable, conduit, manholes, poles, etc. required to provide signal paths from the closest point of presence to the new facility, including free standing frames or backboards, interconnecting hardware, terminating cables, lightning and surge protection modules at the entrance facility. The work consists of providing, testing and making operational cabling, interconnecting hardware and lightning and surge protection necessary to form a complete outside plant telecommunications system for continuous use.

- To provide route diversity conduit banks must maintain a 10’ separation when providing dual entrances.
- Contractor shall install fiber optic and phone cable listed in specification.
- Contractor shall leave 6’ service loops when entering or leaving any manhole or building location.
- All fiber connections are to be fusion spliced onto connector housing pigtail modules. Use Corning splice and connector housings as specified.
- Contractor shall use MaxCell Innerduct when installing cables in outside duct banks.

Grounding and Bonding

- The Telecommunications Main Grounding Busbar (TMGB) shall be located in the Telecommunications Entrance Facility (TEF). TMGB shall be a minimum of 6.3 mm (0.25in) thick by 100 mm (4 in) wide and variable in length. The TMGB shall be bonded to building steel, and grounded to (E0) of the main electrical service.
- A Telecommunications Grounding Busbar (TGB) shall be located in each telecommunications space. The TGB will be grounded to the TMGB.
- The gauge of the connecting ground cable, known as the Telecommunications Bonding Backbone (TBB) will follow ANSI/TIA-607-C guidelines.
- Route the TBB to each TGB in as straight a path as possible. The TBB shall be installed as a continuous conductor, avoiding splices.
- The metallic components are bonded to the TGB with a grounding (bonding) conductor using two-hole lugs. Code requires all clamp and compression connections to be UL 486A listed.
- All components of the telecommunication system that are metal shall be grounded. This includes, but is not limited to racks, ladders, enclosures, equipment such as patch panels, routers, and switches, surge protection devices, and metallic cable tray.
- The telecommunications grounding system is to follow all ANSI/TIA-607-C guidelines.

Documentation

- All provisioned links must be tested and results provided in testing documents.
- Data links must use TDR/OTDR verification. Non-category voice circuits shall be pair tested.
- Testing document shall include a record of test frequencies, cable type, conductor pair and cable/outlet label ID, measurement direction, and technician name(s). The test equipment name, manufacturer, model number, serial number, software version, and last calibration date will also be provided. An annual calibration cycle is required for all test equipment used on the project unless the manufacture requires a more frequent cycle.
- Contractor shall provide pair sheets for all telephone riser and outside plant cables.
- Rhode Island College may request that a 5% random field re-test be conducted. If findings contradict the documentation submitted by the contractor, Rhode Island College may request a 100% re-test at no additional cost.
- Documentation will be submitted within (10) working days of project completion.
- As-built drawings are to include all cable routes, and outlet locations. The numbering used in the installation shall identify outlet locations. Any numbering, icons, and drawing conventions shall stay consistent throughout the document. The owner may provide paper or electronic floors plans on which as-built construction information can be added.
- Upon completion of the installation, contractor shall provide 1 full set of documentation in electronic and paper format to be approved by RIC. When approved, 2 additional sets of documentation shall be provided by contractor upon request.

BDF & IDF Configuration

All projects are required to provide patch panels sufficient to accommodate the jacks specified. At a minimum, one 48 port patch panel with wire management must be provided. Only with specific written permission may designers rely on legacy or preexisting patch panel space.

If the existing rack space is insufficient for mounting the required patch panels, a new rack must be provided through the project. This determination shall be made during the early design walk through with RIC Network Operations and the Project Team.

Location

Building Distribution Facility (BDF) location shall be designed/sized to serve the entire building based on the assessment results. This closet is to be centrally located so as to ensure that all copper voice and data cable sheath lengths out to the outlets are less than 90 m (295 ft).

If a central location fulfilling these requirements is not possible this closet shall interconnect with one or more Intermediate Distribution Facility (IDF) closets via distinct, dedicated 6 strand OM3 multimode and 6 strand single-mode fiber optic backbone cables, 4 CAT 6A data risers and at least 50 twisted pair voice riser cables (final count to be no less than one voice pair per serviced room). In smaller buildings, where only one telecommunications closet is required, the BDF will also function as the IDF.

Each room shall be designed and located to minimize the potential for water entry.

BDF/IDF closets shall not contain nor share space with breaker panels or other mechanical/electrical/life safety equipment which services other areas of the building. No other utilities shall pass through the BDF or IDF, except for building sprinkler systems. The BDF/IDF shall not be used as a personnel pathway through which physical access is granted to other spaces.

The BDF or IDF shall not have doorsills or center posts. The door shall be 7 feet high by 3 feet wide, lockable, and open outward. Closets shall have door access/intrusion detection installed and integrated with existing panels. If such panels are not present in the building, doors and frames shall be designed and piped for door alarms or future electric locksets and access control system readers. All door access/intrusion detection work must be done by factory certified technicians. All closets not provisioned with door access shall be keyed to SFIC Medeco BDF spec.

Sizing Requirements

For new construction or substantial layout changes, closet size requirements are based on distributing telecommunications services to one individual work area per 100 sq. ft. of occupied floor space.

The total serving area is calculated using only the faculty/staff/student-occupied floor space. Minimum telecommunications closet (BDF or IDF) sizes are shown in the table below:

IF THE SERVING AREA IS	THEN THE CLOSET MUST BE AT LEAST
Less than 5,000 sq. ft.	Negotiated with Network Operations, generally not less than 8 ft. x 8 ft.
Between 5,000 sq. ft. and 8,000 sq. ft	10 ft. x 12 ft.
Larger than 8,000 sq. ft.	12 ft. x 16 ft

Power Requirements

Without exception, if emergency/backup generator power is available in the building it shall be provided to all BDF (and IDF(s) if present) outlets. At least 1x NEMA 5-15 120VAC duplex outlet must be installed on each wall. 1x NEMA 5-15 120VAC, and 1x NEMA L6-30 outlet (240 or 208VAC, building dependent) shall also be located on the data rack itself.

Interior Design

Ceilings

False ceilings are not permitted in the BDF or IDF. Rooms shall have all dropped ceilings and supporting grids removed. Minimum ceiling height shall be 10'-0" unless approved by the Owner's Representative.

Walls

All walls of the closet shall be lined with rigidly installed wall-to-wall framing of 3/4 inch trade size AC grade plywood, 8 feet high. All surfaces (including the unexposed side) of the plywood shall be painted with a white latex nonconductive fire-retardant overcoat. (Exception is only the exposed side shall be painted if plywood is mounted on a 30 minute rated or greater wall.) All areas and equipment above the plywood including the ceilings shall be painted. Color shall be white. Room shall not have windows or be provided with shades to provide visual security of the equipment from the outside.

Layout

Allow a minimum clear working space of 4 feet from front and 3 feet from rear of data racks to the wall. Distances may have to be increased to account for specialized equipment or cross-connect fields mounted on the wall as applicable. One Type W drop shall be installed for phone mounting.

HVAC

BDF/IDF rooms shall have active cooling whenever possible. Thermal capacity shall be no less than 2x expected initial heat load. The temperature of the room shall be kept between 64º F and 75º F. Relative humidity in the telecommunications room shall be kept between 30% and 55%. Ventilation shall accomplish one air change per hour (minimum). All HVAC systems must be energized by emergency power. No other facility HVAC shall be present in room.

Lighting

Overhead lighting shall be provided directly over the front and rear sides of the rack. Lighting intensity shall be at least 50 foot candles at 3 ft. above the floor. Light fixtures shall be chain hung at 6 inches above the cable tray.

Rack and Wire Management

Cable tray shall be installed around the circumference of the room to provide a service loop at or above top of rack height. Ladder rack shall be used to support cabling from tray to vertical rack. All cable trays and ladder racks shall be grounded.

The following components are to be specified for patch panels and wire management. Shall a vertical rack be required, Network Operations will work with the project team to determine rack size and final placement. Ortronics Mighty Moe is the allowable rack manufacturer and Panduit the allowable patch panel manufacturer.

Velcro tape is the only approved method for bundling and/or fastening cables to management. All racks shall be grounded.

7' Tall Rack Configuration

OR-MM10716	Mighty Moe 10 Cable Management Rack 7'
OR-MM10VMD712	Vertical 12" Cable Management for MightyMo10 7' high
OR-MM6VMD706	Vertical 6" Cable Management for MightyMo6 7' high

8' Tall Rack Configuration

OR-MM10816	Mighty Moe 10 Cable Management Rack 8'
OR-MM10VMD812	Vertical 12" Cable Management for MightyMo10 8' high
OR-MM6VMD806	Vertical 6" Cable Management for MightyMo6 8' high

Wall Mounted Rack

NOTE: use of this rack must be approved in writing by Network Operations

PZC12P	Panduit Wall Mounted Rack 12 RU Perforated Door
OR-MM6HMF2RU	Mighty Moe 2U Horizontal Management
OR-MM6HMF4RU	Mighty Moe 4U Horizontal Management

Patch Panel

CPPLA48WBLY	Mini-Com Angled Modular faceplate 48 port

Building Vertical and Horizontal Cable Management

Cooper B-Line flextray cable management (Size and style to be approved by RIC PM before installation)

CMDSAQLCZEI	MINICOM LC MODULE OM3 (50-Micron) MM FIBER

Utility Demarcation and Connection Standards

The following methods of termination and mounting are specified as the only permissible methods in BDF/IDF closets. Deviations from the parts and materials listed below must be approved in writing by Network Operations.

CATV System

Contractor shall install CATV system to support all coaxial cables installed. System needs to be balanced and all jacks need to have 0db to 5db signal strength at outlet location. RIC project manager must approve all final levels. Coordinate with Network Operations to determine whether or not the backhaul will be accomplished over copper coax or fiber optic distribution layers.

BIDA-100A-30	Blonder Tongue Broadband Indoor Distribution Amplifier
DGT SERIES	Blonder Tongue digital ready tap
ORR1000	QFRF Optical Rackmount Receiver
DA1000-34-2W	QRFP Broadband Indoor Distribution Amplifier
89-044(50 count)	Ideal OmniCONN compression F connector

Fiber Optics

All fiber splices and terminations will be fusion spliced with insertion loss <0.1dB. Mechanical splices regardless of insertion loss will not be accepted. Bulk attenuation losses shall not exceed 0.5db/km at 1310 nm and 1550 nm for single-mode fiber.

Fiber Connection Housings

Sized as needed for 1.5x fiber count.

CCH-01U	CAP 48 LC CONNECTORS (NOTE: must be approved in writing by Network Operations)
CCH-02U	CAP 96 LC CONNECTORS
CCH-04U	CAP 288 LC CONNECTORS

Fiber Closet Termination

CCH-CS12-A9-P00RE	LANscape CLOSET CONNECTOR HOUSING PIGTAIL SPLICE CASSETTE 12 SM LC
CCH-CS12-E4-P00TE	LANscape CCH PIGTAIL SPLICE CASSETTE 12 MM 50u (OM3) LC

Fiber Outside Plant, Intrabuilding and Station Fiber Cable

012ZUF-T4101D20	FREEDM LOOSE TUBE 12 STRAND SM OS2 RISER
024EWP-T4101D20	FREEDM LOOSE TUBE 24 STRAND SM OS2 PLENUM
012TUF-T4191D20	FREEDM LOOSE TUBE 12 STRAND MM OM4 RISER
024TWP-T4190D20	FREEDM LOOSE TUBE 24 STRAND MM OM4 PLENUM
006E61-31131-24	FAN-OUT TIGHT-BUFF CABLE RISER 6 STRAND SM OS2, 2.9mm Subunits
006T61-31190-24	FAN-OUT TIGHT-BUFF CABLE RISER 6 STRAND MM OM4, 2.9mm Subunits
006E68-31331-29	FAN-OUT TIGHT-BUFF CABLE PLENUM 6 STRAND SM OS2, 2.0mm Subunits
006T68-31190-29	FAN-OUT TIGHT-BUFF CABLE PLENUM 6 STRAND MM OM4, 2.9mm Subunits
002T61-31331-24	FAN-OUT TIGHT-BUFF CABLE RISER 2 STRAND MM OM2, 2.0mm Subunits
002T68-31331-29	FAN-OUT TIGHT-BUFF CABLE PLENUM 2 STRAND MM OM2, 2.0mm Subunits

Phone Outside Plant Protection and Cross Wire Punchdown

All new construction high count voice will be terminated at the rack in Cat5e patch panels. All outside plant protection must be properly grounded.

DPA485E88TGY	DP5e Patch Panel (use pins 4,5 "blue pair" only)
or	
VP24382TV25Y	PANDUIT 24 PORT RJ21 TO RJ45 VOICE PATCH PANEL
Vendor preference	Male/Male 25 PAIR AMPHENOL RJ21 LENGTH AS NEEDED
Circa 100pr protection	
1880ECA1-100	100 PAIR PROTECTION CAN 110 PUNCHDOWN
4B1FS-240	240VDC gold black protection modules

Standard Outlet Types and Jack Configurations

Labeling Standards

The following are acceptable component labels for MINICOM faceplates. These shall be incorporated in the project documents.

C125X030FJJ	Panduit labels for single gang boxes
C379X030FJJ	Panduit labels for double gang boxes
LJSL4-Y3	Panduit 8x11 sheet wire labels

Drop Labels

Installer will consult with Network Operations to determine drop label syntax.

Cable Standards

Unless otherwise noted, cable standards are as follows:

Voice and Data:	Copper Cable, Cat6, 4-Pair, 23 AWG, U/UTP, CMR, 1000ft/305m. Refer to the Outlet Configurations for color designations. Terminate to BDF/IDF.
Coaxial:	RG 6/U Quad Shield Coaxial Cable, 18 AWG
Access Points:	Copper Cable, Cat6A, 4-Pair, 23 AWG, U/UTP, CMR, 1000ft/305m. Cables are to be Violet. Terminate to BDF/IDF.
Cat6 for AV:	Copper Cable, Cat6, 4-Pair, 23 AWG, U/UTP, CMR, 1000ft/305m Cables are to be Orange. Terminate to sister location and not to BDF/IDF.
Outdoor Cable:	4 Pair #24 AWG LAN-Trak OSP LT44169 Cat6 Outdoor UTP (Suitable For Duct & Aerial Lashing)
Low Voltage Power:	Low voltage power cable.14/2 speaker, 16/2 stranded, 18/3 stranded, and 16/2 with stranded ground. Vendor preference. Riser or Plenum rated.

Plenum and Riser Ratings

The Model Numbers listed below are for Riser Rated cabling. Design Teams shall be responsible for substituting Plenum Rated cabling where required by code. Model numbers for the Plenum Rated Cabling conversions are as follows:

M58280	Mohawk CAT6, Color White
M58281	Mohawk CAT6, Color Blue
M58283	Mohawk CAT6, Color Yellow
M71003	Coaxial RG-6U CMP Rated
M59154	Mohawk CAT6A, Color Violet
M59152	Mohawk CAT6, Color Orange

Mohawk/Panduit category cable preapproved substitutes

NOTE WELL: all other substitutions must be approved in writing by RIC Network Operations

Mohawk PN	Panduit PN
M58291	PUR6C04WH-U
M58280	PUP6C04WH-U
M58292	PUR6C04BU-U

M58281	PUP6C04BU-U
M58294	PUR6C04YL-U
M58283	PUP6C04YL-U
M58885	PUR6C04VL-U
M58875	PUP6C04VL-U
M58298	PUR6C04OR-U
M58288	PUP6C04OR-U

Surface Raceway and Boxes

In general, the campus follows the following surface mounted raceway standards. Exceptions will be granted with advanced written approval from the RIC Project Manager.

LD10IW10-A	Panduit LD-10 Surface Raceway
JB1DIW-A	Panduit 1-gang deep surface mount box
JBP2DIW	Panduit 2-gang deep surface mount box

Floor Boxes and Accessories

In general, the campus offers the following options for floor boxes and accessories. All floor box selections (including which comply with model numbers from Wiremold) shall be approved by the RIC Project Manager prior to design.

RFB4-CI-1	4-Compartment floor box (Cast Iron for on-grade)
RFB4	4-Compartment floor box
RFB11-0G	11-Compartment floor box (coated for on-grade)
RFB11	11-Compartment floor box
	GFCI "Decora", Duplex plate, and/or accessories

Outlet Configurations

Notes Applicable to All Outlet Types

Unless specifically indicated:

- All cables are to “home run” from the jack to the BDF or IDF.
- Outlet configurations call out 2 jacks per cable run, accounting for the termination at the outlet and at the punchdown/closet location.
- **In some cases, RIC standard jack locations may run counter to industry standards. If this is the case, the engineer shall prepare a memo to the Project Manager indicating any deviations and the College will review.**
- Unless specifically noted, cable color shall match jack color.

Room Types

Room Type	Required Drops	Occupancy/Usage	Wireless
Multipurpose, utility or undefined	1x Type 3 drop near power outlet	Room that could be used as office, classroom space, or location of a printer in the future. All rooms with power outlets default to this type.	Coverage from centrally placed AP
Small Office (<100ft^2)	1x Type 3 drop by fixed desk	One desk with seating for visitors, fixed non-movable desk space	Coverage from centrally placed AP

Medium Office (~100-150ft^2)	2x Type 3 drop, each placed on opposing walls near power outlet	One desk with additional desk space for student worker and/or visitors	Coverage from centrally placed AP
Large Office (>150ft^2)	Place Type 0 and Type 2 drops as needed near each power outlet	Variable, could be multiple desk/cubicle space	No more than 30 clients per AP, place AP as needed
Conference / Seminar	1x Type W, and at least one of the following types: AV2, Type 1	Under 20, possible alternate usage via additional drops	No more than 30 clients per AP, place AP as needed
Computer Lab	1x Type W, and drop types appropriate for computer placement (Type 4, Type Floor4 etc...)	Various, depends on lab	At least one AP per 60 seats
Small Classroom (20-30 desks)	1x Type W, and at least one appropriate drop for AV needs	20 to 30	AP centrally located in room
Medium Classroom (30-60 desks)	1x Type W, and at least one appropriate drop for AV needs	30 to 60	AP centrally located in room, one AP per 20 to 25 seats
Large Classroom, Lecture Hall	1x Type W, and at least one appropriate drop for AV needs	60 to 160	AP centrally located in room, one AP per 20 to 25 seats
Auditorium	1x Type W, and at least one appropriate drop for AV needs	160 and greater	Wireless design needed

Outlet Configurations Available

Click on the outlet type below to see details of that configuration.

Type Name	Use
Type 0	Copier Locations
Type 1	For work spaces requiring data/voice/CATV
Type 2	Provide at reception desk or other shared desking areas
Type 3	Most common office drop type, typically two per office
Type 4	Computer labs or student computer stations
Type AP	Above ceilings for wireless access point units.
Type AV2-F	
Type AV2-W	
Type AV-TV	
Type C	Interior Camera Locations
Type CO	Exterior Camera Locations
Type DS	Within BDF where Door Access (DSX) Control Units and Bosch Main Panels are located
Type EP	Emergency Phone Locations
Type Floor-4	Typically used in computer labs or cubical offices.
Type Floor-8	Typically used in computer labs or cubical offices.
Type HVAC	Data connections provided for the Building Automation System, BAS.
Type PROJ	
Type TV	Not for TV with Room AV connections (e.g. for digital signage only)
Type USB	
Type W	Wall phone locations

In some cases, RIC standard jack locations may run counter to industry standards. If this is the case, the engineer shall prepare a memo to the Project Manager indicating any deviations and the College will review.

TYPE 0

Description:

1 Voice Outlet for Phone
1 Copper Data Outlets for Computer

Use:

Copier Locations

Cables:

Voice 1	1	M58291	Mohawk CAT6, Color White
Data 1	1	M58292	Mohawk CAT6, Color Blue

Jacks:

Voice 1	2	CJ688TGWH	MINICOM TGS6 Plus Jack White
Data 1	2	CJ688TGBU	MINICOM TGS6 Plus Jack Blue

Housing:

Faceplate	1	CCBEIWY	Single Gang Executive Faceplate Frame
Active Insert	1	CHSRE2IW-X	MINICOM 2 Position Sloped 1/2 Insert
Blank Insert	2	CMBIW-X	MINICOM Single Port Blank Insert

Options/Modifications:

Type 0s: Add a panic button connection (Refer to Access Control & Security Specification)

Delete

1	CHB2IW-X	MINICOM 1/2 Blank Insert

Add

1	PSL-DCPLRX-IW	Panduit RJ45 Lock-in Devices
1	CJ5E88TGIG	Panduit Mini-Com TX-5e Jack Module (Gray)
1	TBD	RJ45 End (In BDF at security panel)
1	TBD	22-4 Stranded Plenum Cable w/Red Stripe (Terminate to Security Panel)

In some cases, RIC standard jack locations may run counter to industry standards. If this is the case, the engineer shall prepare a memo to the Project Manager indicating any deviations and the College will review.

TYPE 1

Description:

1 Voice Outlet for Phone
2 Copper Data Outlets for Computer
1 Coaxial RG-6U cable for CATV

Use:

For work spaces requiring data/voice/CATV

Cables:

Voice 1	1	M58291	Mohawk CAT6, Color White
Data 1	1	M58292	Mohawk CAT6, Color Blue
Data 2	1	M58294	Mohawk CAT6, Color Yellow
CATV	1		Coaxial RG-6U

Jacks:

Voice 1	2	CJ688TGWH	MINICOM TGS6 Plus Jack White
Data 1	2	CJ688TGBU	MINICOM TGS6 Plus Jack Blue
Data 2	2	CJ688TGYL	MINICOM TGS6 Plus Jack Yellow
CATV	1	CMFIW	MINICOM RG-6 F-Type Insert

Housing:

Faceplate	1	CBEIW-2GY	Double Gang Executive Faceplate Frame
Active Insert	2	CHSRE2IW-X	MINICOM 2 Position Sloped 1/2 Insert

Options/Modifications:

Type 1s: Add a panic button connection (Refer to Access Control & Security Specification)

Delete

1	CHB2IW-X	MINICOM 1/2 Blank Insert

Add

1	PSL-DCPLRX-IW	Panduit RJ45 Lock-in Devices
1	CJ5E88TGIG	Panduit Mini-Com TX-5e Jack Module (Gray)
1	TBD	RJ45 End (In BDF at security panel)
1	TBD	22-4 Stranded Plenum Cable w/Red Stripe (Terminate to Security Panel)

TYPE 2

Description:

2 Voice Outlets for Phone
2 Copper Data Outlets for Computer

Use:

Provide at reception desk or other shared desking areas

Cables:

Voice 1	1	M58291	Mohawk CAT6, Color White
Voice 2	1	M58291	Mohawk CAT6, Color White
Data 1	1	M58292	Mohawk CAT6, Color Blue
Data 2	1	M58294	Mohawk CAT6, Color Yellow

Jacks:

Voice 1	2	CJ688TGWH	MINICOM TGS6 Plus Jack White
Voice 2	2	CJ688TGEI	MINICOM TGS6 Plus Jack Electric Ivory
Data 1	2	CJ688TGBU	MINICOM TGS6 Plus Jack Blue
Data 2	2	CJ688TGYL	MINICOM TGS6 Plus Jack Yellow

Housing:

Faceplate	1	CCBEIWY	Single Gang Executive Faceplate Frame
Active Inserts	2	CHSRE2IW-X	MINICOM 2 Position Sloped 1/2 Insert

Options/Modifications:

None

In some cases, RIC standard jack locations may run counter to industry standards. If this is the case, the engineer shall prepare a memo to the Project Manager indicating any deviations and the College will review.

In some cases, RIC standard jack locations may run counter to industry standards. If this is the case, the engineer shall prepare a memo to the Project Manager indicating any deviations and the College will review.

TYPE 3

Description:

1 Voice Outlet for Phone
2 Copper Data Outlets for Computer

Use:

Most common office drop type, typically two per office

Cables:

Voice 1	1	M58291	Mohawk CAT6, Color White
Data 1	1	M58292	Mohawk CAT6, Color Blue
Data 2	1	M58294	Mohawk CAT6, Color Yellow

Jacks:

Voice 1	2	CJ688TGWH	MINICOM TGS6 Plus Jack White
Data 1	2	CJ688TGBU	MINICOM TGS6 Plus Jack Blue
Data 2	2	CJ688TGYL	MINICOM TGS6 Plus Jack Yellow

Housing:

Faceplate	1	CCBEIWY	Single Gang Executive Faceplate Frame
Active Inserts	2	CHSRE2IW-X	MINICOM 2 Position Sloped 1/2 Insert
Blank Insert	1	CMBIW-X	MINICOM Single Port Blank Insert

Options/Modifications:

Type 3s: Add a panic button connection (Refer to Access Control & Security Specification)

Delete

1	CHB2IW-X	MINICOM 1/2 Blank Insert

Add

1	PSL-DCPLRX-IW	Panduit RJ45 Lock-in Devices
1	CJ5E88TGIG	Panduit Mini-Com TX-5e Jack Module (Gray)
1	TBD	RJ45 End (In BDF at security panel)
1	TBD	22-4 Stranded Plenum Cable w/Red Stripe (Terminate to Security Panel)

In some cases, RIC standard jack locations may run counter to industry standards. If this is the case, the engineer shall prepare a memo to the Project Manager indicating any deviations and the College will review.

TYPE 4

Description:

4 Copper Data Outlets for Computer

Use:

Computer labs or student computer stations

Cables:

Data 1	1	M58292	Mohawk CAT6, Color Blue
Data 2	1	M58294	Mohawk CAT6, Color Yellow
Data 3	1	M58292	Mohawk CAT6, Color Blue
Data 4	1	M58294	Mohawk CAT6, Color Yellow

Jacks:

Data 1	2	CJ688TGBU	MINICOM TGS6 Plus Jack Blue
Data 2	2	CJ688TGYL	MINICOM TGS6 Plus Jack Yellow
Data 3	2	CJ688TGRD	MINICOM TGS6 Plus Jack Red
Data 4	2	CJ688TGBL	MINICOM TGS6 Plus Jack Black

Housing:

Faceplate	1	CCBEIWY	Single Gang Executive Faceplate Frame
Active Inserts	2	CHSRE2IW-X	MINICOM 2 Position Sloped 1/2 Insert

Options/Modifications:

None

TYPE HVAC

Photo

Description:

1 Voice Outlet for Phone
1 Copper Data Outlets

Use:

Data connections provided for the Building Automation System, BAS.
****Coordinate location and finalize requirements with Siemens**
****Coordinate Power requirements with Siemens and Power Drawings**
****Coordinate IP addresses for Siemens with Facilities through RIC Project Manager**

Cables:

Voice 1	1	M58291	Mohawk CAT6, Color White
Data 1	1	M58292	Mohawk CAT6, Color Blue

Jacks:

Voice 1	2	CJ688TGWH	MINICOM TGS6 Plus Jack White
Data 1	2	CJ688TGBU	MINICOM TGS6 Plus Jack Blue

Housing:

Faceplate	1	CCBEIWY	Single Gang Executive Faceplate Frame
Active Insert	1	CHSRE2IW-X	MINICOM 2 Position Sloped 1/2 Insert
Blank Insert	2	CMBIW-X	MINICOM Single Port Blank Insert

Options/Modifications:

None

In some cases, RIC standard jack locations may run counter to industry standards. If this is the case, the engineer shall prepare a memo to the Project Manager indicating any deviations and the College will review.

TYPE DS

Photo

Description:

1 Copper Data Outlet

Use:

For use in BDF/IDF to provide network connection to DSX and Bosch Security head ends. A dedicated Type-DS shall be run to each DSX headend and/or Bosch Panel
****Cable shall be terminated to male plug with 2' coiled at the top of the DSX/Security head unit. This will be directly plugged into the unit by the Access and Security vendor.**
****Coordinate with Power requirements, see Access Control Section**

Cables:

Data 1	1	M58292	Mohawk CAT6, Color Blue

Jacks:

Data 1	2	CJ688TGBU	MINICOM TGS6 Plus Jack Blue

Housing:

Options/Modifications:

None

In some cases, RIC standard jack locations may run counter to industry standards. If this is the case, the engineer shall prepare a memo to the Project Manager indicating any deviations and the College will review.

TYPE EP

Photo

Description:

1 Voice Outlet for Phone
1 Copper Data Outlets for Computer

Use:

Connection for Emergency Phones. Refer to information in the Access Control Section.
****Coordinate Camera Provisions**
****Coordinate Power Requirements.**

Cables:

Voice 1	1	M58291	Mohawk CAT6, Color White
Data 1	1	M58292	Mohawk CAT6, Color Blue

Jacks:

Voice 1	2	CJ688TGWH	MINICOM TGS6 Plus Jack White
Data 1	2	CJ688TGBU	MINICOM TGS6 Plus Jack Blue

Housing:

Faceplate	1	CCBEIWY	Single Gang Executive Faceplate Frame
Active Insert	1	CHSRE2IW-X	MINICOM 2 Position Sloped 1/2 Insert
Blank Insert	2	CMBIW-X	MINICOM Single Port Blank Insert

Options/Modifications:

None

TYPE W

Photo

Description:

1 Voice Outlet for Wall Mounted Phone.
Design Team shall ensure a minimum 12" wide spacing (6" on either side of the center of the jack) is provided so that wall mounted phones are not in conflict with other utilities, door clearances, furnishings, fixtures, equipment, etc.
**** Coordinate exact placement normally by podium and in BDF/IDF**

Use:

Wall phone locations

Cables:

Voice 1	1	M58291	Mohawk CAT6, Color White

Jacks:

Voice 1	1	KWP6PY	Keystone Wall Jack Cat6 for IP/Wall Phone

Housing:

Faceplate	1	CCBEIWY	Single Gang Executive Faceplate Frame
Active Inserts	2	CHSRE2IW-X	MINICOM 2 Position Sloped 1/2 Insert

Options/Modifications:

None

In some cases, RIC standard jack locations may run counter to industry standards. If this is the case, the engineer shall prepare a memo to the Project Manager indicating any deviations and the College will review.

TYPE AP

Photo

Description:

2 Augmented Copper Data Outlets for Wireless Access Point

****Cable left in coil and terminated with jacks (no faceplate or junction box), exact placement will be done at AP install by Network Operations.**

Use:

Above ceilings for wireless access point units.

Cables:

Data 1	1	M58693	Mohawk Cat 6A Color Violet (Augmented)
Data 2	1	M58693	Mohawk Cat 6A Color Violet (Augmented)

Jacks:

Data 1	2	CJ6X88TGVL	MINICOM TX6A 10GIG Jack Violet
Data 2	2	CJ6X88TGVL	MINICOM TX6A 10GIG Jack Violet

Housing:

N/A	1	1040-AP315	Oberon WAP enclosure (Aruba 315, suspended ceiling)
N/A	1	1042-AP315	Oberon WAP enclosure (Aruba 315, hard ceiling)

Options/Modifications:

None

In some cases, RIC standard jack locations may run counter to industry standards. If this is the case, the engineer shall prepare a memo to the Project Manager indicating any deviations and the College will review.

TYPE C

Photo

Description:

2 Copper Data Outlets for Security Cameras

**** Cable left in coil and terminated with jacks. Coordinate exact placement w/RIC.**

Use:

Interior camera locations

Cables:

Data 1	1	M58292	Mohawk CAT6, Color Blue
Data 2	1	M58294	Mohawk CAT6, Color Yellow

Jacks:

Data 1	2	CJH688TGGR	MINICOM TGS6 Plus Jack Green
Data 2	2	CJH688TGGR	MINICOM TGS6 Plus Jack Green

Housing:

N/A

Options/Modifications:

None

TYPE CO

Photo

Description:

2 Copper Data Outlets for Security Cameras

1 Copper 16/2 stranded power cable for heater/blower

**** Coordinate exact placement with RIC.**

**** Must provide junction box test point with terminated jacks inside of building before exiting to exterior.**

Use:

Exterior Camera locations.

Cables:

Data 1	1	M58292	Mohawk CAT6, Color Blue
Data 2	1	M58294	Mohawk CAT6, Color Yellow

Jacks:

Data 1	2	CJH688TGGR	MINICOM TGS6 Plus Jack Green
Data 2	2	CJH688TGGR	MINICOM TGS6 Plus Jack Green

Housing:

N/A

Options/Modifications:

None

In some cases, RIC standard jack locations may run counter to industry standards. If this is the case, the engineer shall prepare a memo to the Project Manager indicating any deviations and the College will review.

TYPE USB

Photo

Description:

1 Copper Data Outlet for AV Use

****All cables will run from wall mounted smart board to AV box location in room**

Use:

Describe when and where this should be used, typically

Cables:

AV Use	1	M58298	Mohawk CAT6, Color Orange
	**Terminated to Sister Location Type AV2-W or AV2-F (not BDF/IDF)		

Jacks:

AV Use	2	CJH688TGGR	MINICOM TGS6 Plus Jack Green (USB)
	**1 mounted in Sister Location Type AV2-W or AV2-F (not BDF/IDF)		

Housing:

Wall box	1	TBD	Recessed "TV Box" 2 Gang
Faceplate	1	CBEIW-2GY	Double Gang Executive Faceplate Frame
Active Insert	4	CHSRE2IW-X	MINICOM 2 Position Sloped 1/2 Insert
Blank Insert	1	CMBIW-X	MINICOM Single Port Blank Insert
Blank Insert	1	CHB2IW-X	MINICOM 1/2 Blank Module Insert

Options/Modifications:

None

TYPE TV

Photo

Description:

2 Copper Data Outlets for Computer

1 Coaxial RG-6U cable for CATV

**** Coordinate exact placement**

Use:

Describe when and where this should be used, typically

NOTE: Not for TV with Room AV connections (e.g. for digital signage only)

Cables:

Data 1	1	M58292	Mohawk CAT6, Color Blue
Data 2	1	M58294	Mohawk CAT6, Color Yellow
CATV	1	M71006	Coaxial RG-6U

Jacks:

Data 1	2	CJ688TGBU	MINICOM TGS6 Plus Jack Blue
Data 2	2	CJ688TGYL	MINICOM TGS6 Plus Jack Yellow
CATV	1	CMFIW	MINICOM RG-6 F-Type Insert

Housing:

Faceplate	1	CFPL3IWY	Single Gang Mini-Com Vertical Faceplate Accepts (3)
Active Insert	2	CHSRE2IW-X	MINICOM 2 Position Sloped 1/2 Insert
Blank Insert	1	CMBIW-X	MINICOM Single Port Blank Insert

Options/Modifications:

None

In some cases, RIC standard jack locations may run counter to industry standards. If this is the case, the engineer shall prepare a memo to the Project Manager indicating any deviations and the College will review.

TYPE AV-TV

Photo

Description:

4 Copper Data Outlets for AV Use
2 Copper Data Outlets for Computer
1 Coaxial RG-6U cable for CATV
**** Coordinate exact placement**
****Coordinate with electrical installer to provide power for duplex outlet**

Use:

For use in locations where TVs may also be used as monitors

Cables:

Data 1	1	M58292	Mohawk CAT6, Color Blue
Data 2	1	M58294	Mohawk CAT6, Color Yellow
AV Use	4	M58298	Mohawk CAT6, Color Orange
	**Terminated to Sister Location Type AV2-W or AV2-F (not BDF/IDF)		
CATV	1	M71006	Coaxial RG-6U

Jacks:

Data 1	2	CJ688TGBU	MINICOM TGS6 Plus Jack Blue
Data 2	2	CJ688TGYL	MINICOM TGS6 Plus Jack Yellow
AV Use	8	CJ688TGOR	MINICOM TGS6 Plus Jack Orange
	**4 mounted in Sister Location Type AV2-W or AV2-F (not BDF/IDF)		
CATV	1	CMFIW	MINICOM RG-6 F-Type Insert

Housing:

Wallbox	1	TBD	Recessed “TV Box” 2 Gang
Faceplate	1	CBEIW-2GY	Double Gang Executive Faceplate Frame
Active Insert	4	CHSRE2IW-X	MINICOM 2 Position Sloped 1/2 Insert
Blank Insert	2	CMBIW-X	MINICOM Single Port Blank Insert
Blank Insert	2	CHB2IW-X	MINICOM Blank Module Insert

Options/Modifications:

None

In some cases, RIC standard jack locations may run counter to industry standards. If this is the case, the engineer shall prepare a memo to the Project Manager indicating any deviations and the College will review.

TYPE PROJ

Photo

Description:

3 Copper Data Outlets for AV Use
1 Copper Data Outlets for Computer
**** Coordinate exact placement**
****Coordinate with electrical installer to provide power for duplex outlet**

Use:

For use in projector locations

Cables:

Data 1	1	M58292	Mohawk CAT6, Color Blue
AV Use	3	M58298	Mohawk CAT6, Color Orange
	**Terminated to Sister Location Type AV2-W or AV2-F (not BDF/IDF)		

Jacks:

Data 1	2	CJ688TGBU	MINICOM TGS6 Plus Jack Blue
AV Use	6	CJ688TGOR	MINICOM TGS6 Plus Jack Orange For HDMI
	**3 mounted in Sister Location Type AV2-W or AV2-F (not BDF/IDF)		
VGA	2	15M6P1	HUBBELL VGA Connector
	**1 mounted in Sister Location Type AV2-W or AV2-F (not BDF/IDF)		

Housing:

Wallbox	1	TBD	Recessed “TV Box” 2 Gang
Faceplate	1	CBEIW-2GY	Double Gang Executive Faceplate Frame
Active Insert	4	CHSRE2IW-X	MINICOM 2 Position Sloped 1/2 Insert

Options/Modifications:

None

In some cases, RIC standard jack locations may run counter to industry standards. If this is the case, the engineer shall prepare a memo to the Project Manager indicating any deviations and the College will review.

TYPE AV2-W

Photo

Description:

1 Voice Outlet for Phone
5 Copper Data Outlets for Computer
1 Coaxial RG-6U cable for CATV
4 16/2 Speaker cables run to ceiling mounted speakers

Use:

**** Coordinate exact placement**
****Coordinate with electrical installer to provide power for duplex outlet**
****See Options/Modifications below for changes based on room requirements**

Cables:

Voice 1	1	M58291	Mohawk CAT6, Color White
Data 1	1	M58292	Mohawk CAT6, Color Blue
Data 2	1	M58292	Mohawk CAT6, Color Blue
Data 3	1	M58292	Mohawk CAT6, Color Blue
Data 4	1	M58294	Mohawk CAT6, Color Yellow
Data 5	1	M58294	Mohawk CAT6, Color Yellow
CATV	1	M71006	Coaxial RG-6U
Speakers	4	TBD	16/2 Speaker cables run to ceiling mounted speakers

Jacks:

Voice 1	2	CJ688TGWH	MINICOM TGS6 Plus Jack White
Data 1	2	CJ688TGBU	MINICOM TGS6 Plus Jack Blue
Data 2	2	CJ688TGYL	MINICOM TGS6 Plus Jack Yellow
Data 3	2	CJ688TGRD	MINICOM TGS6 Plus Jack Red
Data 4	2	CJ688TGBL	MINICOM TGS6 Plus Jack Black
Data 5	2	CJ688TGBU	MINICOM TGS6 Plus Jack Blue
CATV	1	CMFIW	MINICOM RG-6 F-Type Insert
Speakers	2	CMBPBIWY	MINICOM Speaker Binding Post Black, L+R
	2	CMBPRIWY	MINICOM Speaker Binding Post Red, L+R

Housing:

Wall Box	1	TBD	3 Gang Low Voltage box
	1	TBD	2 Gang Low Voltage box
Frame	3	CFG6IW	GFCI "Decora" Module Frame 6 Position
Faceplate	1	TBD	3 Gang Decora Wall Plate
	1	CBEIW-2GY	Double Gang Executive Faceplate Frame
	1	CMDBIW-X	MINICOM Module Base
Active Insert	4	CHSRE2IW-X	MINICOM 2 Position Recessed 1/2 Insert
Blank Insert	2	CMBIW-X	MINICOM Single Port Blank Insert
Blank Insert	5	CHB2IW-X	MINICOM Blank Module Insert

TYPE AV2-W, Continued

Options/Modifications:

AV2-WS: Add a panic button connection (Refer to Access Control & Security Specification)

Delete

1	CHB2IW-X	MINICOM 1/2 Blank Insert

Add

1	PSL-DCPLRX-IW	Panduit RJ45 Lock-in Devices
1	CJ5E88TGIG	Panduit MINICOM TX-5e Jack Module (Gray)
1	TBD	RJ45 End (In BDF at security panel)
1	TBD	NEED SECURITY WIRE INFO, run back to ___

AV2-W-PROJ: Modifications for connecting with Type PROJ

Delete

4	CMBEIW-X	MINICOM Blank Module Insert

Add

1		18/3 Cable run to powered screen
1	CMBRS485RD	MINICOM BAS Connector Module Red

Install and Connect Components Provided in Sister Location Type PROJ

(3 MINICOM TGS6 Plus Jack Orange For HDMI)
(3 Mohawk CAT6, Color Orange)
(1 HUBBELL VGA Connector)
(1 HUBBELL 50' ISTATION Cable For VGA or appropriate length)

AV2-W-USB: Modifications for connecting with Type USB

Delete

1	CMBEIW-X	MINICOM Blank Module Insert

Install and Connect Components Provided in Sister Location Type USB

(1 MINICOM TGS6 Plus Jack Green)
(1 Mohawk CAT6, Orange)

AV2-W-AVTV: Modifications for connecting to Type AVTV

Delete

4	CMBEIW-X	MINICOM Blank Module Insert

Install and Connect Components Provided in Sister Location Type USB

(4 MINICOM TGS6 Plus Jack Orange)
(4 Mohawk CAT6, Orange)

In some cases, RIC standard jack locations may run counter to industry standards. If this is the case, the engineer shall prepare a memo to the Project Manager indicating any deviations and the College will review.

TYPE AV2-F

Photo

Description:

1 Voice Outlet for Phone
6 Copper Data Outlets for Computer
1 Coaxial RG-6U cable for CATV
4 16/2 Speaker cables run to ceiling mounted speakers

Use:

**** Coordinate exact placement**
****Coordinate with electrical installer to provide power for duplex outlet**
****See Options/Modifications below for changes based on room requirements**

Cables:

Voice 1	1	M58291	Mohawk CAT6, Color White
Data 1	1	M58292	Mohawk CAT6, Color Blue
Data 2	1	M58292	Mohawk CAT6, Color Blue
Data 3	1	M58292	Mohawk CAT6, Color Blue
Data 4	1	M58294	Mohawk CAT6, Color Yellow
Data 5	1	M58294	Mohawk CAT6, Color Yellow
Data 6	1	M58294	Mohawk CAT6, Color Yellow
CATV	1	M71006	Coaxial RG-6U
Speakers	4	TBD	16/2 Speaker cables run to ceiling mounted speakers

Jacks:

Voice 1	2	CJ688TGWH	MINICOM TGS6 Plus Jack White
Data 1	2	CJ688TGBU	MINICOM TGS6 Plus Jack Blue
Data 2	2	CJ688TGYL	MINICOM TGS6 Plus Jack Yellow
Data 3	2	CJ688TGRD	MINICOM TGS6 Plus Jack Red
Data 4	2	CJ688TGBL	MINICOM TGS6 Plus Jack Black
Data 5	2	CJ688TGBU	MINICOM TGS6 Plus Jack Blue
Data 6	2	CJ688TGYL	MINICOM TGS6 Plus Jack Yellow
CATV	1	CMFIW	MINICOM RG-6 F-Type Insert
Speakers	2	CMBPBIWY	MINICOM Speaker Binding Post Black
	2	CMBPRIWY	MINICOM Speaker Binding Post Red

Housing:

Floor Box	Refer to Floor Box and Accessories Section, above.		
Frame	6	CF1064IWY	Panduit Duplex module frame 4 Position
Faceplate	1	TBD	3 Gang Decora Wall Plate (must be approved in writing)
	1	CBEIW-2GY	Double Gang Executive Faceplate Frame
	3	CFG6IW	GFCI “Decora” Module Frame 6 Position (must be approved in writing)
	1	CMDBIW-X	MINICOM Module Base (2 MINICOM Spaces)
Active Insert	4	CHSRE2IW-X	MINICOM 2 Position Recessed 1/2 Insert
Blank Insert	2	CMBIW-X	MINICOM Single Port Blank Insert
Blank Insert	5	CHB2IW-X	MINICOM Blank Module Insert

TYPE AV2-F, Continued

Options/Modifications:

AV2-F-PROJ: Modifications for connecting with Type PROJ

Delete

4	CMBEIW-X	MINICOM Blank Module Insert

Add

1	TBD	18/3 Cable run to powered screen
1	CMBRS485RD	MINICOM BAS Connector Module Red

Install and Connect Components Provided in Sister Location Type PROJ

(3 MINICOM TGS6 Plus Jack Orange For HDMI)
(3 Mohawk CAT6, Color Orange)
(1 HUBBELL VGA Connector)
(1 HUBBELL 50' ISTATION Cable For VGA or appropriate length)

AV2-F-USB: Modifications for connecting with Type USB

Delete

1	CMBEIW-X	MINICOM Blank Module Insert

Install and Connect Components Provided in Sister Location Type USB

(1 MINICOM TGS6 Plus Jack Green)
(1 Mohawk CAT6, Orange)

AV2-F-AVTV **Modifications for connecting to Type AVTV**

Delete

4	CMBEIW-X	MINICOM Blank Module Insert

Install and Connect Components Provided in Sister Location Type USB

(4 MINICOM TGS6 Plus Jack Orange)
(4 Mohawk CAT6, Orange)

In some cases, RIC standard jack locations may run counter to industry standards. If this is the case, the engineer shall prepare a memo to the Project Manager indicating any deviations and the College will review.

TYPE Floor-4

Photo

Description:

4 Copper Data Outlets for Computer

****Coordinate with electrical installer to provide power and duplex outlets**

Use:

Typically used in computer labs or cubical offices.

Cables:

Data 1	1	M58292	Mohawk CAT6, Color Blue
Data 2	1	M58294	Mohawk CAT6, Color Yellow
Data 3	1	M58292	Mohawk CAT6, Color Blue
Data 4	1	M58294	Mohawk CAT6, Color Yellow

Jacks:

Data 1	2	CJ688TGBU	MINICOM TGS6 Plus Jack Blue
Data 2	2	CJ688TGYL	MINICOM TGS6 Plus Jack Yellow
Data 3	2	CJ688TGRD	MINICOM TGS6 Plus Jack Red
Data 4	2	CJ688TGBL	MINICOM TGS6 Plus Jack Black

Housing:

Floor Box	Refer to Floor Box and Accessories Section, above.		
Frame	1	CF1064IWY	Panduit Duplex module frame
Faceplate	1	CCBEIWY	Single Gang Executive Faceplate Frame
Active Inserts	2	CHSRE2IW-X	MINICOM 2 Position Sloped 1/2 Insert

Options/Modifications:

None

In some cases, RIC standard jack locations may run counter to industry standards. If this is the case, the engineer shall prepare a memo to the Project Manager indicating any deviations and the College will review.

TYPE Floor-8

Photo

Description:

8 Copper Data Outlets for Computer (labs, etc)

****Coordinate with electrical installer to provide power and duplex outlets**

Use:

Typically used in computer labs or cubical offices.

Cables:

Data 1	1	M58292	Mohawk CAT6, Color Blue
Data 2	1	M58292	Mohawk CAT6, Color Blue
Data 3	1	M58292	Mohawk CAT6, Color Blue
Data 4	1	M58292	Mohawk CAT6, Color Blue
Data 5	1	M58294	Mohawk CAT6, Color Yellow
Data 6	1	M58294	Mohawk CAT6, Color Yellow
Data 7	1	M58294	Mohawk CAT6, Color Yellow
Data 8	1	M58294	Mohawk CAT6, Color Yellow

Jacks:

Data 1	2	CJ688TGBU	MINICOM TGS6 Plus Jack Blue
Data 2	2	CJ688TGYL	MINICOM TGS6 Plus Jack Yellow
Data 3	2	CJ688TGRD	MINICOM TGS6 Plus Jack Red
Data 4	2	CJ688TGBL	MINICOM TGS6 Plus Jack Black
Data 5	2	CJ688TGBU	MINICOM TGS6 Plus Jack Blue
Data 6	2	CJ688TGYL	MINICOM TGS6 Plus Jack Yellow
Data 7	2	CJ688TGRD	MINICOM TGS6 Plus Jack Red
Data 8	2	CJ688TGBL	MINICOM TGS6 Plus Jack Black

Housing:

Floor Box	Refer to Floor Box and Accessories Section, above.		
Frame	2	CF1064IWY	Panduit Duplex module frame
Faceplate	1	CCBEIWY	Single Gang Executive Faceplate Frame
Active Inserts	2	CHSRE2IW-X	MINICOM 2 Position Sloped 1/2 Insert

Options/Modifications:

None

00 31 26 – EXISTING HAZARDOUS MATERIAL INFORMATION

PART 1 - GENERAL

1.1 HAZARDOUS MATERIALS

A. Asbestos Abatement Plan and Procedures – dated 2/6/2020

B. Contractor is responsible for the proper removal of all hazardous materials indicated on the plan including all testing and filing required by the State.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

Silva Environmental & Associates, Inc.
Environmental, Asbestos / Lead Consultants

ASBESTOS ABATEMENT PLAN AND PROCEDURES

FOR

RHODE ISLAND COLLEGE

600 MT. PLEASANT AVE
PROVIDENCE, RI 02908

FOGARTY LIFE SCIENCE BUILDING

ROOMS 122, 125 AND 126 – PLASTER WALLS JOINT COMPOUND

OWNER/CONTACT:

JARED K. JACKSON
MANAGER CONSTRUCTION PROJECTS
600 MT. PLEASANT AVE
PROVIDENCE, RHODE ISLAND 02908

PREPARED BY:

SILVA ENVIRONMENTAL & ASSOCIATES, INC.

M. FRANK SILVA, PRESIDENT
INDUSTRIAL HYGIENIST
45 TRANSIT STREET, WARWICK, R.I. 02889
TEL: 401-732-3976

R.I. CERTIFICATION NO.:
APD-00085, AI-00085, AMP-00085

JOB NO.: 57464

February 6, 2020

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3. Pre-Abatement Air Samples

Section I. Introduction

This abatement plan is to facilitate the removal of ACBM wall plaster with joint compound from rooms 122, 125 and 126 of Fogarty Life Science Building, 600 Mt. Pleasant Ave, Providence, is being submitted for approval by the Rhode Island Department of Health as specified in Rules and Regulations for Asbestos Control (R23-24.5-ASB) dated January, 1986, Subpart C.1.2 and amended September 2012.

1.1 Project Description

The abatement calls for the removal of seven hundred seventy square feet **(770 sqft.)** total **square footage** for the project, wall plaster with joint compound from the rooms; 122, 125 and 126.

The removal of approximately (46 sqft) of wall plaster around the **cove base**

The removal of approximately (4 sqft) of wall plaster from around the **door frames**

The removal of approximately (720 sqft) of walls between the rooms to be removed

Ceiling tile tracks to be cleaned

See annotated site plans on Exhibit I. All asbestos abatement activity shall follow the RI Rules & Regulations for Asbestos Control **(Sec. B.8.2 & B.8.3.)**

GENERAL NOTE

We believe that the quantities of materials described above to be approximately correct, however the contractor is responsible for the removal of all identified material type regardless of stated quantities.

All abatement work will be performed by a State of Rhode Island licensed asbestos abatement contractor.

RHODE ISLAND DEPARTMENT OF HEALTH
NOTARIZED CERTIFICATION OF ASBESTOS ABATEMENT PLAN

Facility: RI College – Fogarty Life Science Building

Address: 600 Mt. Pleasant Ave

City/Town: Providence Zip: 02908 Amendment Phase No: _____

Abatement Plan Written By: M. Frank Silva Certification No: APD-00085

Summary of specific waivers/variances being requested:

Type of Asbestos Abatement (X) Removal ( ) Enclosure ( ) Encapsulation
( ) Demolition( ) Glovebag ( ) Asphalt Roofing
( ) Other (specify) _____

Is this plan being submitted in response to a Notice of Violation and/or a Notice of Requirement to Submit an Asbestos Abatement Plan? ( ) Yes (X) No

If yes, Indicate Notice/Building Evaluation No(s): _____

Contractor: To be selected License No: LAC-

Estimated Starting Date: ASAP

Pre-Abatement Sampling Information

Bulk Samples Collected By: M. Frank Silva Certification No: AI-00085

Bulk Samples Analyzed By: ProScience Analytical Certification No: AAL-093

Air Samples Analyzed By: Silva Environmental Certification No: PCM-00084

Clearance Air Sampling Information

Air Samples to be Collected By: Silva Environmental

Air Samples to be Analyzed By: Silva Environmental Certification No: PCM-00084

CERTIFICATION

I certify that: this asbestos abatement plan is prepared and submitted under the provisions of Section 23-24.5-6 of the RI Asbestos Control Act and Parts A and C of the RI Rules and Regulations for Asbestos Control; all abatement/management activities performed in conjunction with this plan must be in compliance with the specifications prescribed in this plan (when approved) and the most current revision of all applicable federal and state regulations; and the asbestos abatement/management activities described in this plan must be performed by a RI licensed asbestos abatement contractor.

Certified by: _____ Title: _____
(Signature of Building Owner or Agent)

_____ Date: _____
(Typed/Printed Name of Certifier)

Subscribed and sworn before me this _____ day of _____, 20_____

_____ My Commission Expires: _____
(Notary Public)

AFFIX NOTARY SEAL HERE

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Health

Office of Occupational & Radiological Health

APPLICATION FOR APPROVAL OF AN ASBESTOS ABATEMENT PLAN

1. Building Owner's Name:

   RI College/Jared K. Jackson

Application Prepared By:

M. Frank Silva

RI certification No: APD-00085

Telephone No: (401) 732-3976
(Area code, No., Ext.)

2. Building Owner's Mailing Address and Telephone Number:

   Street: 600 Mt. Pleasant Ave

   City/Town: Providence, RI

   Zip: 02908

   Telephone No.: (401) 456-8779
   (Area Code, No., Ext.)

3. Person to be contacted regarding this application:

   Name: Mr. Jared K. Jackson
   Telephone No: (401) 456-8779
   (Area Code, No., Ext.)

4. Location where abatement work will be performed:

   Name (if applicable): Fogarty Life Science Bldg. Rooms 122, 125 and 126

   Street: 600 Mt. Pleasant Ave

   City/Town: Providence Zip: 02908

---

5. Is this application being submitted in response to a "Notice of Requirement to Submit an Asbestos Abatement plan"? ( ) Yes (X) No

If Yes, what is the due date for submittal of Abatement plan? _____
(Mo.) (Day) (Yr.)

Evaluation Number on the Notice: _____

---

6. Contractor who will be performing abatement work (if selected):

   Name: To be selected R.I. License No.: LAC-_____

7. Estimated Completion Date of Abatement Work: **Three Days from start day**
(Month) (Day) (Year)

8. Type of Asbestos Abatement: **(Check all that apply)**

(X) Removal

( ) Enclosure

( ) Encapsulation

( ) Demolition

( ) Operations and Maintenance Only

( ) Other (Specify) _____

9. Type of Building:

(X) School
( ) Privately Owned Building
( ) Publicly Owned Building
( ) Residence
(X) Other (Specify) University

10. Building Access:

( ) Public Access (≥ 25% of Building Area)
(X) Limited Public Access (< 25% of Building Area)
( ) No Public Access

11. Bulk Sample Collection and Analysis:

A). Person collecting bulk samples:

Name M. Frank Silva RI Certification No.: AI - 00085

B). Sampling Methodology:

( ) EPA AHERA Sampling requirements [40 CFR 763.86].

(X) EPA's Asbestos Containing Material in School Buildings: A Guidance Document (EPA-405/2-78-014) or Guidance for Controlling Asbestos Containing Materials – 1985 Edition (EPA-560-5-85-024)

( ) Other (Specify) _____

C). Laboratory performing the analysis of the bulk samples

Name: **ProScience Analytical** RI Certification No.: AAL- 093

D). Analytical Methodology:

(X) EPA Interim Method for the Determination of Asbestos in Bulk Insulation Samples [PLM method only].

( ) Other (Specify) _____

12. Pre-Abatement Air Sample Collection and Analysis:

A). Person collecting pre-abatement air samples:

Name: M Frank Silva Affiliation: Silva Environmental

B). Laboratory performing analysis of pre-abatement air samples.
Name: Silva Environmental RI Certification No.: PCM-00084

C). Methodology used in the collection and analysis of pre-abatement samples:

(X) NIOSH Method 7400 [Most Current Revision]

( ) OSHA 29 CFR 1926.1101 – Appendix A & B

( ) Other (Specify) _____

---

13. A. Indicate how the regulated asbestos containing material (RACM) will be removed from the abatement site. If a hauler or broker will be used to transport the RACM to a disposal site, they must also be identified.

The materials shall be containerized and transported to an authorized facility

B. Provide the name and location of the authorized asbestos waste facility to which the removed material will be transferred for disposal (if known).

Not known at the present time

---

14. Person designated as compliance monitor for abatement work.

Name: Silva Environmental

Affiliation: Silva Environmental

15. In-Process & Clearance Air Sampling:

    A. Describe on an attachment the type, number and location of air samples that will be collected outside the work area during the abatement project.

    B. Describe on an attachment the plan of action to be followed if the Indoor Non-Occupational Air Exposure Standard for Asbestos (0.01 fibers per cubic centimeter) is exceeded outside the work area during the abatement project.

    C. Describe on an attachment the type, number and location of air samples that will be collected as part of the final clearance testing.

    D. Describe on an attachment the plan of action to be followed if the Indoor Non-Occupational Air Exposure Standard for Asbestos (0.01 fiber per cubic centimeter) is exceed during final clearance testing.

See Section IV

---

16. A separate and fully completed Form ASB-16A must be submitted for each area to be abated. List below the entry in Item 1 from each attached ASB-16A.

    Wall Plaster With Joint Compound

---

17. I certify that this plan was prepared by me and I am responsible for its content.

    Signature: _____ Date 2/06/2020
    (Month) (Day) (Year)

    Affiliation: Silva Environmental

---

18. ASBESTOS ABATEMENT PLAN APPLICATION FEE:

( ) Operation & Maintenance Only	$ 75
( ) Up to One (1) NESHAP Unit	$ 75
(X) Between One (1) & Ten (10) NESHAP Units	$ 300
( ) Between Ten (10) & Fifty (50) NESHAP Units	$ 600
( ) Over Fifty (50) NESHAP Units	$ 900

Please waive the filing Fee

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Department of Health

Office of Occupational & Radiological Health

APPLICATION FOR APPROVAL OF AN ASBESTOS ABATEMENT PLAN

SUPPLEMENTAL INFORMATION: AREA DESCRIPTION AND PROPOSED REMEDY

BUILDING LOCATION: RI College - 600 Mt. Pleasant Ave Providence

INSTRUCTIONS: All items on this form must be addressed. All references to attachments must be clearly identified. All attachments must be marked with the specific item numbers on this form to which they pertain.

(1) Area Location/Identification (Room Name/No., Evaluation Number, etc.):

Wall Plaster With Joint Compound

(2) Attach a description of each type (e.g. pipe, ceiling, etc.) of regulated asbestos containing material (RACM) in this area, including condition, location, quantity and asbestos content. Attach a copy of the laboratory report(s) for all samples. (NOTE: All laboratory reports must include the name of the building(s) and the location(s) of the sample(s).

See Exhibit II

(3) Attach a current scale drawing of this area, showing direction of North and East, which has been clearly annotated to show the type, location and quantity of all RACM in this area. This drawing must include a legend which acts as a guide to the scale, symbols and nomenclature used in the drawing. If a master plan or multiple drawings are provided, indicate the specific location(s) and drawing number(s) which depict this area. The location of the decontamination chamber must also be so indicated on the appropriate drawing(s).

See Exhibit I

(4) PROPOSED REMEDIES:

A). Attach a description of the interim Operations and Maintenance Plan that will be implemented in accordance with C.1.2 (b).

(4) PROPOSED REMEDIES (cont.):

B). Will any portion of this area be abated by use of B.8 work procedures?

(X) Yes ( ) No

If Yes, indicate below which RACM in this area will be abated by use of the following B.8 work procedures:

B.8.2 & B.8.3	[REMOVAL	**Wall Plaster With Joint Compound**
B.8.2 & B.8.4	[ENCAPSULATION]	_____
B.8.2 & B.8.5	[ENCLOSURE]	_____
B.8.6	[DEMOLITION]	_____
B.8.7	[GLOVE BAG]	_____
B.8.8	[ASPHALT ROOFING]	_____

C). Are you requesting any waivers to the above selected B.8 procedure for any of the abatement activities in this area?

( ) Yes (X) No

If yes, attach a detailed description of the waivers requested you are proposing to utilize. All items must be keyed to the specific section(s) of the regulations for which waivers are requested .

Are you proposing alternative procedures under B.11 for any of the abatement activities in this area?

( ) Yes (X) No

If yes, attach a detailed description of the alternate procedures requested you are proposing to utilize. Alternate procedures must include a justification for not following specific section(s) of the regulations and be as protective of public health.

D). Will any RACM remain in this area after abatement?

( ) Yes ( ) No (X) Beyond scope of inspection

If Yes, attach a description of the RACM that will remain and the details of the on-going Operations and Maintenance Plan that will be implemented in accordance with C.1.2(b).

AGENCY USE ONLY

Section II Plan of Action

2. 1 Barriers and Maintenance

All polyethylene barriers inside the work place, in the worker decontamination enclosure system and at critical barriers installed (i.e. barrier tape) to show the work area, shall be inspected continuously while asbestos removal work is in progress.

Any damage and/or defects in the barrier system shall be repaired immediately upon discovery.

If any time during the abatement activities, after barriers have been erected, visible material is observed outside of the work area or damage occurs to barriers; WORK SHALL STOP IMMEDIATELY. Repairs must be made to the barriers and debris and/or residue shall be cleaned up using appropriate HEPA vacuuming, as well as, wet mopping procedures or other appropriate methods as determined by the project I.H, before work resumes.

If at any time, during abatement activity, air samples collected outside of the work area, indicate fiber concentrations greater than the RIDOH Non-Occcupational Exposure Limit (N.O.E.L.) of 0.01 f/cc, work shall stop Immediately, all barriers shall be inspected and repaired, any visible debris shall be cleaned up using appropriate HEPA vacuuming, as well as, wet mopping procedures or other appropriate methods as determined by the project I.H, before work resumes.

2. 2 Description of ACBM

1.1 Project Description

The abatement calls for the removal of seven hundred seventy square feet **(770 sqft.)** total **square footage** for the project, wall plaster with joint compound from the rooms; 122, 125 and 126.

The removal of approximately (46 sqft) of wall plaster around the **cove base**

The removal of approximately (4 sqft) of wall plaster from around the **door frames**

The removal of approximately (720 sqft) of walls between the rooms to be removed

Ceiling tile tracks to be cleaned

See annotated site plans on Exhibit I. All asbestos abatement activity shall follow the RI Rules & Regulations for Asbestos Control **(Sec. B.8.2 & B.8.3.)**

Note: If during the removal any suspect ACM is discovered, that is not contained in this abatement plan, that suspected ACM must be assumed to contain asbestos unless proper sampling and laboratory analysis results are negative for the presence of asbestos.

Section III Interim Operations and Maintenance Plan

1) The occupants, staff, and maintenance staff at the RI College Fogarty Life Science Building, have been made aware of the location of all visible, accessible, identified ACBM. The maintenance staff and all other staff have been instructed in proper procedures to perform their job functions without disturbing the ACBM. The staff has also been instructed to notify their supervisor and building management whenever any change in the ACBM is noted. The supervisor will visually confirm any reported changes in the ACBM. The supervisor will immediately isolate the area, deny access to everyone except properly trained and equipped personnel, and notify Building Managers whenever friable material has been disturbed. The Management of the Facility will notify their Environmental/Asbestos Consultants to determine the proper course of action to address the disturbed friable ACBM.

2) The staff will be monitoring the ACBM on an on-going basis. They have been instructed to notify their supervisor about any changes to the identified ACBM. The supervisor will visually confirm the changes reported by the staff. The supervisor will maintain a file detailing any changes to the ACBM as reported to him by staff and visually verified by the supervisor. This file will include the date that the changes were first reported and any actions taken.

3) The building managers have been supplied with a listing of the location and category of all identified ACBM. The building owners will inform all occupants and staff about the location of the identified ACBM.

4) All outside service personnel and all visitors to the building will be informed about the location and category of the identified ACBM utilizing the listing document.

5) In addition to the training provided to the staff regarding the proper procedures to be used when working near or on the identified ACBM (OSHA Class IV) to avoid any ACBM fiber release, the monitoring of the material on an on-going basis, and the documentation of any changes in the identified ACBM, the material has been assessed for condition and potential for damage. The material has also been ranked for priority using those assessments.

6) The identified, accessible, friable, ACBM will be identified, labeled, and prioritized for repair/removal. Any areas that contain damaged or significantly damaged friable ACBM will be posted and only properly trained and equipped individuals will be allowed to access the area until such material can be appropriately repaired/removed.

Section IV. Air Sampling

4. 1 A minimum of one (1) in-process, compliance air sample will be collected outside of the containment area, each day for the duration of the asbestos abatement project. These samples will be collected at random locations adjacent to the abatement work area.

4. 2. Final air clearance for all abatement areas will be conducted by the Project I.H. Prior to any sample collection a visual inspection will be performed by the project I.H. to insure that the asbestos control work area (NPE) is free of any accumulations of dirt, dust or debris. Following the completion of the visual inspection, the I.H. will collect a minimum of three (3) clearance air samples per NPE. The air sample collection, using aggressive methods, will follow N.I.O.S.H. 7400 (most recent version). These samples will be analyzed utilizing Phase Contrast Microscopy (PCM). . When the air sampling results are at or below the RI DOH Non-occupational exposure limit (NOEL) of 0.01 f/cc the area will be ready for re-occupancy.

Note: Should any of the final samples indicate a higher value, the Contractor shall take appropriate actions as directed by the project I.H. to re-clean the area. After the area has successfully met the visual clearance criteria the Project I.H. shall repeat the final clearance air sampling. This process will be repeated until the samples meet the clearance criteria of 0.01 f/cc.

EXHIBIT I

ANNOTATED SITE PLANS

1 FIRST FLOOR PLAN

SCALE: N.T.S.

RHODE ISLAND COLLEGE
600 Mount Pleasant Avenue | Providence, Rhode Island | 02908

PREPARED BY:
URBAN DESIGN GROUP
530 Wood Street | Bristol, Rhode Island | 02809 | 401-254-2032

BUILDING # 22
JOHN E. FOGARTY LIFE SCIENCE BUILDING

DATE: 07-01-2011

SHEET #: 22.1

EXHIBIT II

BULK SAMPLES

CERTIFICATE OF ANALYSIS

ProScience Analytical Services, Inc

M. Frank Silva
Silva Environmental & Associates, Inc.
45 Transit St.
Warwick, RI 02889

January 28, 2020

Dear M. Frank Silva,

The enclosed analytical results have been obtained by using EPA 600/R-93/116 or EPA 600/M4-82-020. Calibrated Visual Estimate (CVE) is used by ProScience for the determination of the percentage of asbestos and other components in the sample. Point Counting is recommended when the sample contains less than 10% asbestos by CVE. Friable materials found to be less than 1% by CVE are automatically point counted (400 points) at no additional charge. ProScience recommends further analysis by a gravimetric method for non-friable materials that are less than 1% by CVE.

The Quality Control data related to the samples analyzed is available upon client's written request. ProScience Analytical Services Inc., assumes no responsibility for potential sample contamination that may have occurred during the sample collection process or erroneous data provided by the client. As such, these results apply to the sample(s) as received. Unless otherwise indicated, all samples were received in acceptable condition.

The enclosed results may not be used under any circumstances as product endorsement by any US government agency including NIST/NVLAP.

All Laboratory records are retained for at least three years unless otherwise directed in writing by the client. The actual samples are retained for a period of two months and written request is necessary in order to be retained for a longer period of time. All analytical results and records are considered strictly confidential and will not be released under any circumstances to anyone except the actual client. The analytical results included in this report apply only to the items tested. This report may not be reproduced except in its entirety, without the permission of ProScience Analytical Services, Inc., Laboratory Director.

If you have any questions please contact the Optical Manager or the Laboratory Director.
Sincerely,

Sophetra Ken, Optical Asbestos Manager

Aimee Cormier, Laboratory Director

Enclosure: Version 2
LAB BATCH ID: B 120024 CLIENT PROJECT ID: 57464
Client Ref: Rhode Island College - Fogerty Life Science Building
CT ID# PH-0209; MA ID# AA000156; ME ID# LB-055; NVLAP Lab Code 200090-0; RI ID # AAL-093; VT ID# AL016876

22 Cummings Park • Woburn, Massachusetts • 01801 • Phone (781)935-3212 • Fax (781)932-4857

ProScience Analytical Services, Inc.

Client Name:	Silva Environmental & Associates, Inc.	**Batch:**	**B120024**
PO #:	N/A	Date Sampled:	1/23/2020
Client Project #:	57464	Date Received:	1/27/2020
Client Reference:	Rhode Island College - Fogerty Life Science Building	Date Analyzed:	1/28/2020
Method:	EPA/600/R-93/116	Date of Report:	1/28/2020

		Asbestos %						Non-Asbestos %						
Sample ID	Color	CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
FL-006	Beige	2	0	0	0	0	0	0	0	0	0	0	0	98

Description: Wall Joint Compound
Location: N/A
Comments:

Is asbestos present? Yes. Analyzed: Yes

Asbestos Codes: CHR = Chrysotile AMO = Amosite CRO = Crocidolite ACT = Actinolite TRE = Tremolite ANT = Anthophyllite
Non-Asbestos Codes: FBG = Fiberglass MNW = Mineral Wool CEL = Cellulose HAR = Hair SYN = Synthetic OTH = Other NON = Non-Fibrous Minerals

Note: To create a unique lab sample ID, use the Batch # and the Sample ID (example: [Batch #] - [Sample ID]).

* All results are in percentage.

Analyst: Sophetra Ken Aimee L Comer for

ProScience Analytical Services, Inc

M. Frank Silva
Silva Environmental & Associates, Inc.
45 Transit St.
Warwick, RI 02889

January 08, 2020

Dear M. Frank Silva,

The enclosed analytical results have been obtained by using EPA 600/R-93/116 or EPA 600/M4-82-020. Calibrated Visual Estimate (CVE) is used by ProScience for the determination of the percentage of asbestos and other components in the sample. Point Counting is recommended when the sample contains less than 10% asbestos by CVE. Friable materials found to be less than 1% by CVE are automatically point counted (400 points) at no additional charge. ProScience recommends further analysis by a gravimetric method for non-friable materials that are less than 1% by CVE.

The Quality Control data related to the samples analyzed is available upon client's written request. ProScience Analytical Services Inc., assumes no responsibility for potential sample contamination that may have occurred during the sample collection process or erroneous data provided by the client. As such, these results apply to the sample(s) as received. Unless otherwise indicated, all samples were received in acceptable condition.

The enclosed results may not be used under any circumstances as product endorsement by any US government agency including NIST/NVLAP.

All Laboratory records are retained for at least three years unless otherwise directed in writing by the client. The actual samples are retained for a period of two months and written request is necessary in order to be retained for a longer period of time. All analytical results and records are considered strictly confidential and will not be released under any circumstances to anyone except the actual client. The analytical results included in this report apply only to the items tested. This report may not be reproduced except in its entirety, without the permission of ProScience Analytical Services, Inc., Laboratory Director.

If you have any questions please contact the Optical Manager or the Laboratory Director.
Sincerely,

Sophetra Ken, Optical Asbestos Manager

Aimee Cormier, Laboratory Director

Enclosure: Version 2
LAB BATCH ID: B 119750 CLIENT PROJECT ID: 57464
Client Ref: Rhode Island College, Fogarty Life Science Bldg.
CT ID# PH-0209; MA ID# AA000156; ME ID# LB-055; NVLAP Lab Code 200090-0; RI ID # AAL-093; VT ID# AL016876

22 Cummings Park • Woburn, Massachusetts • 01801 • Phone (781)935-3212 • Fax (781)932-4857

ProScience Analytical Services, Inc.

Client Name: Silva Environmental & Associates, Inc.
PO #: N/A
Client Project #: 57464
Client Reference: Rhode Island College, Fogarty Life Science Bldg.
Method: EPA/600/R-93/116

Batch: B119750
Date Sampled: 1/3/2020
Date Received: 1/7/2020
Date Analyzed: 1/8/2020
Date of Report: 1/8/2020

		Asbestos %						Non-Asbestos %						
Sample ID	Color	CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
FL-001	Gray	0	0	0	0	0	0	5	0	0	0	0	0	95

Description: Textured Wall
Location: Room 125
Comments:
Is asbestos present? No. Analyzed: Yes

		Asbestos %						Non-Asbestos %						
Sample ID	Color	CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
FL-002		0	0	0	0	0	0	0	0	0	0	0	0	0

Description: Joint Compound
Location: N/A
Comments: No Joint Compound Present.
Analyzed: No

		Asbestos %						Non-Asbestos %						
Sample ID	Color	CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
FL-003	Multi	0	0	0	0	0	0	0	40	40	0	0	0	20

Description: Ceiling Tiles
Location: Room 125
Comments:
Is asbestos present? No. Analyzed: Yes

		Asbestos %						Non-Asbestos %						
Sample ID	Color	CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
FL-004	White	0	0	0	0	0	0	0	0	25	0	0	0	75

Description: Wallpaper
Location: Hallway
Comments:
Is asbestos present? No. Analyzed: Yes

		Asbestos %						Non-Asbestos %						
Sample ID	Color	CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
FL-005	Multi	0	0	0	0	0	0	<1	0	5	0	0	0	95

Description: Sheetrock
Location: Wall between Rooms 125-126
Comments:
Is asbestos present? No. Analyzed: Yes

Asbestos Codes: CHR = Chrysotile AMO = Amosite CRO = Crocidolite ACT = Actinolite TRE = Tremolite ANT = Anthophyllite
Non-Asbestos Codes: FBG = Fiberglass MNW = Mineral Wool CEL = Cellulose HAR = Hair SYN = Synthetic OTH = Other NON = Non-Fibrous Minerals

Note: To create a unique lab sample ID, use the Batch # and the Sample ID (example: [Batch #] - [Sample ID]).

* All results are in percentage.

Analyst: Dan Pine

EXHIBIT III

PRE-ABATEMENT AIR SAMPLES

CERTIFICATE OF ANALYSIS

Silva Environmental & Associates, Inc.
45 Transit Street
Warwick, Rhode Island 02889
(401) 732 - 3976

Lab No. Below

Date Rec'd. 01-22-2020

CERTIFICATE OF ANALYSIS

Client: Rhode Island College.
600 Mt. Pleasant Ave
Providence, RI 02908

Report Date: January 22, 2020

Project: Fogarty Life Science,Rms; 122,125-12

Project No.: 57464

PCM AIR SAMPLE ANALYSIS SUMMARY

Sample Identification	Decription / Location	Sample Volume	Density Fibers/mm2	Concentration Fibers/cc
01-20-100467 FL-001	Field Blank		<12.7	
01-20-100468 FL-002	Field Blank		<12.7	
01-20-100469 FL-003	Pre-Abatement air sample, Room 126	1050	2.55	<0.004
	The Field Blanks Falls Within Acceptable Limits.			

LAB NO. ALL - 084A1

NIOSH-PAT NO. 1022

Analysis Mthod: Phase Contrast icroscopy - NIOSH 7400 Method Revision #3 May 15, 1989

Comments: A VOID concentration means that the sample has been overloaded with particulate matter and could not be reliably analyzed

Analysis Performed By _____

Approved By _____
Laboratory Director

Date 1-22-20

00 31 32 – GEOTECHNICAL DATA

PART 1 - GENERAL

1.1 GEOTECHNICAL INFORMATION

A. No Geotechnical Data is available.

B. The Contractor is responsible for obtaining all geotechnical data required for the completion of this work as part of the base bid.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

00 40 00 – STATE PROCURMENT DOCUMENTS

Procurement documents are provided under separate cover.

END OF SECTION

00 43 00 – BID BOND

See AIA Document A310-2010, attached as the following page.

END OF SECTION

AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)
The State of Rhode Island, acting by and through the Department of Administration
Division of Purchases, on behalf of the User Agency
One Capitol Hill, Second Floor
Providence, Rhode Island 02908-5855
(401) 574-8100 (telephone)
(401) 574-8387 (facsimile)
www.purchasing.ri.gov

BOND AMOUNT: $

PROJECT:
(Name, location or address, and Project number, if any)

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

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User Notes:

(1718963276)

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this day of ,

	(Contractor as Principal)	*(Seal)*
(Witness)	*(Title)*	
	(Surety)	*(Seal)*
(Witness)	*(Title)*	

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User Notes: (1718963276)

00 50 00 – CONTRACTING FORMS

PART 1 - GENERAL

1.1 COPYRIGHT

A. Contractor is responsible for obtaining a valid license to use all copyrighted documents specified or included in the Project Manual.

1.2 AGREEMENT AND CONDITIONS OF THE CONTRACT

A. See Section 00 5200 for the Agreement form to be executed.

B. See Section 00 7200 for the General Conditions.

1.3 FORMS

A. Use the following forms for the specified purposes unless otherwise indicated elsewhere in the Contract Documents.

B. Bond Forms:

1. Performance Bond and Payment Bond Forms: AIA A312

C. Release of Lien:

1. Release of Liens Form: AIA G706A
2. RIC Waiver of Liens Form 01 20 00

D. Insurance certificate, supplementary attachment:

1. ACORD Certificate of Insurance Form: AIA G715

1.4 REFERENCE STANDARDS

A. AIA G706A – Release of Liens: 1994.

B. AIA A312 - Performance Bond: 2010 and Payment Bond: 2010.

C. AIA G715 – ACORD Certificate of Insurance: 1991.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

00 51 00 – NOTICE OF AWARD

RI State Purchasing shall issue the Notice of Tentative Award.

END OF SECTION

00 52 00 – AGREEMENT FORM

PART 1 - GENERAL

1.1 AGREEMENT FORM

A. The Agreement Form to be utilized on this project is AIA Document A101-2017 as amended, a copy of which follows this page.

B. Agreement made as of the date of issue of the Purchase Order for this Work.

C. This Agreement is entered into as of the date of the applicable Purchase Order and is assumed as executed once the Purchase Order is issued.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EXECUTION OF THE AGREEMENT

A. Following the issuance of the Notice of Tentative Award, the user Agency, Design Team and Contractor shall convene a Pre-Award Conference. Meeting minutes from the Pre-Award Conference and acceptance of the minutes by the Contractor shall be incorporated into the Contract.

B. The User Agency will transmit the A101-2017 to the Contractor for signature. The Contractor will sign and return the contract to the User Agency, who then transmits it to the RI State Purchasing Office for final signatures.

END OF SECTION

AIA® Document A101™ – 2017

Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

AGREEMENT made as of the day of in the year
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address, telephone and facsimile numbers, and website)

State of Rhode Island, acting by and through the Department of Administration, Division of Purchases, on behalf of the User AgencyOne Capitol Hill, Second Floor Providence, Rhode Island 02908-5855
401.578.8100 (telephone); 401.574.8387 (facsimile)
www.puchasing.ri.gov

on behalf of the User Agency:
(Name, legal status, address, telephone and facsimile numbers, and website)

Rhode Island College
600 Mt Pleasant Ave
Providence, RI 02908
Tel: (401) 456-9885
www.ric.edu

and the Contractor:
(Name, legal status, address, telephone and facsimile numbers, and website)

for the following Project:
(Name, location and detailed description)

600 Mt Pleasant Ave
Providence, RI 02908

The Design Agent:
(Name, legal status, address, telephone and facsimile numbers, and website)

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

The parties should complete A101™–2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201™–2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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(Paragraph Deleted)

The Owner and Contractor agree as follows.
TABLE OF ARTICLES

1 THE CONTRACT DOCUMENTS

2 THE WORK OF THIS CONTRACT

3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

4 CONTRACT SUM

5 PAYMENTS

6 DISPUTE RESOLUTION

7 TERMINATION OR SUSPENSION

8 MISCELLANEOUS PROVISIONS

9 ENUMERATION OF CONTRACT DOCUMENTS

EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS
The Contract Documents consist of this Agreement, Conditions of the Contract (General Conditions, Supplementary Conditions (if any), and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT
The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others. No part of the Work shall be performed by Subcontractors without the Owner's prior written consent.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
§ 3.1 The date of commencement of the Work shall
be the later of: (i) the issuance of the Purchase Order by the Owner; and (ii) the
(Paragraph Deleted)

date set forth in a notice to proceed issued by the User Agency.

(Paragraphs Deleted)

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion
§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:
(Check one of the following boxes and complete the necessary information.)

[ ] Not later than ( ) calendar days from the date of commencement of the Work.

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[ ] By the following date:

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. Subject to additions and deductions as provided in the Contract Documents, the Contract Sum shall be: $_____.

§ 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item	Price

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance

§ 4.3 Allowances, if any, are specified in the Bid Proposal Form and are included in the Contract Sum.

(Paragraph Deleted)

(Table Deleted)

§ 4.4 Unit prices, if
any, are specified in the Bid Proposal Form and include all costs, including without limitation, labor, materials, services, regulatory compliance, overhead, and profit necessary for the completion of the Work. Unit prices shall be used for both additions to, and deletions from the Work.

(Table Deleted)

§ 4.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any.)

.1 In the event that there is one date for Substantial Completion of the Work, the Contractor shall pay the Owner the sum stipulated in this Section 4.5.1 as liquidated damages, and not as a penalty, for each calendar day of delay until the Work is substantially complete: $_____.

.2 In the event that the Project is scheduled to be completed in phases, and there is more than one date for Substantial Completion of the Work, the Contractor shall pay the Owner an aggregate amount equal to the sums stipulated in this Section 4.5.2 as liquidated damages, and not as a penalty, for each calendar day of delay until the Work for each phase is substantially complete:

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Phase	Liquidated Damages Sum

.3 The Owner and the Contractor have reasonably determined the sums set forth in this Section 4.5 to be a fair estimate of the Owner' actual damages which are difficult to ascertain in the event of delay.

§ 4.6 Other:
(Paragraph Deleted)

The Owner shall not be liable to the Contractor or any Subcontractor for claims or damages of any nature caused by or arising out of any delays. The sole remedy against the Owner for delays shall be the allowance of additional time for completion of the Work.

ARTICLE 5 PAYMENTS
§ 5.1 Progress Payments
§ 5.1.1 Based upon Applications for Payment submitted to the Design Agent by the Contractor and Certificates for Payment issued by the Design Agent and approved by the Owner in writing, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the
month.

§ 5.1.3 The Owner shall make payment of the certified amount, less retainage, to the Contractor not later than the 30 th working day following written approval by the Owner.

(Paragraph Deleted)

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor and approved by the Design Agent and the Owner in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Design Agent and the Owner may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 In accordance with AIA Document A201™–2007, General Conditions of the Contract for Construction as modified by the Owner, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

.1 That portion of the Contract Sum properly allocable to completed Work;
.2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
.3 That portion of Construction Change Directives that the Design Agent determines, in the Design Agent's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

.1 The aggregate of any amounts previously paid by the Owner;
.2 The amount, if any, for Work that remains uncorrected and for which the Design Agent has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document

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A201–2007 as modified by the Owner;

.3 For Work performed or defects discovered since the last payment application, any amount for which the Design Agent may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2007 as modified by the Owner; and

.4 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due: five (5%) percent.

(Paragraph Deleted)

§ 5.1.7.1.1 Deleted.

(Paragraph Deleted)

§ 5.1.7.2 Deleted.

(Paragraph Deleted)

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:
(Paragraph Deleted)

The amount of five (5%) percent shall be retained by the Owner through the date of Substantial Completion of the Work and then after the date of Substantial Completion of the Work in accordance with R.I. Gen. Laws § 37-12-10.1.

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2007 as modified by the Owner.

§ 5.1.9 Except with the Owner's prior written approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.1.10 Within 10 working days of receipt of any progress payment from the Owner, the Contractor must pay its Subcontractors the full amount included for each such Subcontractor within the Contractor's Application for Payment in accordance with the provisions of AIA A201 – 2007, General Conditions of the Contract for Construction as modified by the
Owner.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, less the amount withheld pursuant to § 5.1.7.3, shall be made by the Owner to the Contractor when:

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A201–2007 as modified by the Owner, and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for Payment has been issued by the Design Agent and approved in writing by the Owner;

.3 the Contractor has submitted its final release and final releases from all of its Subcontractors and suppliers in a form acceptable to the Owner; and

.4 the Contractor has submitted to the Owner all close-out documents, including without limitation, all as-built plans, warranties, manuals, and other materials set forth in the Contract Documents.

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§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 working days after the issuance of the Design Agent's final Certificate for Payment and written approval by the Owner.

§ 5.3 Interest
Payments due and unpaid under the Contract shall bear interest from the date payment is due in accordance with the provisions of "Prompt Payment by Department of Administration," R.I. Gen. Laws §§ 42-11.1-1 **et seq.**

§ 5.4 Owner's Rights
§ 5.4.1 The Owner shall have the right to deduct from any payments due to the Contractor the amount of any unpaid obligations owed to the State of Rhode Island by the Contractor, including without limitation, any and all unpaid taxes, the amount of any claim against the Contractor arising out of this Agreement, or any amount on account of any other reason permitted by applicable law.

§ 5.5 Pursuant to R.I. Gen. Laws § 44-1-6, the Owner shall withhold payment from the Contractor if the Contractor does not maintain a regular place of business in Rhode Island in the amount of three (3%) percent of the Contract Sum until 30 calendar days after Final Completion and compliance by the Contractor with the requirements of such section. The three (3%) percent withheld pursuant to R.I. Gen. Laws § 44-1-6 is not considered retainage which is held pursuant to § 5.1.7.

(Paragraph Deleted)

ARTICLE 6 DISPUTE RESOLUTION
§ 6.1 Initial Decision Maker
Claims shall be referred to the Initial Decision Maker for initial decision. The Purchasing Agent appointed pursuant to the provisions of the "State Purchases Act," R.I. Gen. Laws § 37-2-1 et seq., will serve as the Initial Decision *Maker in accordance with the provisions of the State Purchases Act, State of Rhode Island Procurement Regulations, and this Section 6.1. An initial decision shall be required as a condition precedent to binding dispute resolution pursuant to Section 6.3 of any Claim arising prior to the date final payment is due.*

§ 6.2 Mediation
For any Claim not resolved by the Initial Decision Maker procedures set forth in Section 6.1, and prior to the implementation of the binding dispute resolution procedures set forth in Section 6.3, the Contractor shall *have the*
option to pursue mediation, exercisable by written notice to the Owner within 30 calendar days of an Initial Decision. In the event of the exercise of
such option by the Contractor, the Owner and the Contractor shall attempt to select a mediator, and in the event that the Owner and the Contractor cannot agree on a mediator, either party may apply in writing to the Presiding Justice of the Providence County Superior Court, with a copy to the other, with a request for the court to appoint a mediator, and the costs of the mediator shall be borne equally by both parties.

(Paragraph Deleted)

§ 6.3 Binding Dispute Resolution
For any Claim not resolved by the Initial Decision Maker procedures set forth in Section 6.1, or mediation at the option of the Contractor pursuant to Section 6.2, the method of binding dispute resolution shall be determined in accordance with the provisions of the "Public Works Arbitration Act," R.I. Gen. Laws §§ 37-16-1 **et seq.**

ARTICLE 7 TERMINATION OR SUSPENSION
§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2007, as modified by the Owner. The Contract may also be terminated by the Owner: (i) in the event of the unavailability of appropriated funds; (ii) in the absence of a determination of continued need; or (iii) as *otherwise provided in the State of Rhode Island Procurement Regulations General Conditions of Purchase or other applicable law.*

§ 7.1.1 Deleted.

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User Notes:

§ 7.2 The Work may be suspended by the Owner as provided in: (i) the State of Rhode Island General Conditions of Purchase Regulation or other applicable law; or (ii) Article 14 of AIA Document A201–2007 as modified by the Owner.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2007 or another Contract Document, the reference refers to: (i) the AIA Document A201 – 2007 or other Contract Document as modified by the Owner; and (ii) that provision in the AIA Document A201 – 2007 as modified by the Owner or other Contract Document as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 Representatives for the Owner

§ 8.2.1 The Owner's representative:
(Name, title, address, email address, and other information for the preferred methods of contact)

§ 8.2.2 The User Agency's representative:
(Name, title, address, email address, and other information for the preferred methods of contact)

Kevin Fitta, P.E., Director Capital Projects
Rhode Island College
600 Mt Pleasant Ave
Providence, RI 02908
Tel: (401) 456-9885
Email: kfitta@ric.edu

§ 8.2.3 The Design Agent's representative:
(Name, title, address, email address, and other information for the preferred methods of contact)

§ 8.3 The Contractor's representative:
(Name, title, address, email address, and other information for the preferred methods of contact)

§ 8.4 Neither the Owner's nor the Contractor's representative nor the Design Agent's representative shall be changed without 10 working days' prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in the Solicitation and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in the Solicitation and elsewhere in the Contract Documents.

§ 8.6 Deleted.

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§ 8.7 Other provisions:
§ 8.7.1 The Contractor represents and warrants to the Owner, in addition to any other representations and warranties of the Contractor elsewhere in the Contract Documents:

.1 The Contractor and its Subcontractors are each financially solvent, able to pay their debts as they mature, and possess sufficient working capital to perform their obligations under the Contract Documents.
.2 The Contractor and its Subcontractors are each able to furnish the tools, materials, equipment, and labor required to complete the Project as required under the Contract Documents.
.3 The Contractor and each Subcontractor are authorized to do business in the State of Rhode Island and are properly licensed by all necessary governmental authorities having jurisdiction over them and over the Work and the Project.
.4 The execution of this Agreement and its performance is within its duly authorized powers.
.5 The Contractor has visited the site of the Project, familiarized itself with the local and special conditions under which the Work is to be performed, and correlated its observations with the requirements of the Contract Documents.
.6 The Contractor possesses the requisite level of experience and expertise in the business administration, construction, and superintendence of projects of the size, complexity, and nature of the Project, and it will perform the Work with the care, skill, and diligence of a contractor possessing such experience and expertise.

§ 8.7.2 The representations and warranties of the Contractor in this Section 8.7 and elsewhere in the Contract Documents will survive the execution and delivery of this Agreement, any termination of this Agreement, and the final completion of the Work.

§ 8.7.3 Any Change Orders or other Modifications must be approved in writing by the Owner.

§ 8.7.4 The Owner is the State of Rhode Island, acting by and through its Department of Administration, Division of Purchases, and therefore, pursuant to the provisions of R.I. Gen. Laws § 34-28-31, mechanics liens may not be placed against the Project.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS
§ 9.1 This Agreement is comprised of the following documents:

.1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor, as modified by the Owner
.2 Deleted.
.3 AIA Document A201™–2007, General Conditions of the Contract for Construction, as *modified by the* Owner.
.4 Deleted.
.5 Drawings

(Table Deleted)

The Drawings are included in the Solicitation and are available on the Division of Purchases website at www.purchasing.ri.gov.

.6 Specifications

(Table Deleted)

The Specifications are included in the Solicitation and are available on the Division of Purchases website at www.purchasing.ri.gov.

.7 Addenda, if

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(Table Deleted)

any, issued pursuant to the Solicitation form a part of the Solicitation and are available on the Division of Purchases website at www.purchasing.ri.gov.

.8 *Supplementary and other Conditions of the Contract, including without limitation, the State of Rhode Island General Conditions of Purchase Regulation.*

.9 Other documents listed below:

(Paragraph Deleted)

.1 The Solicitation, issued by the Owner, including without limitation, the Invitation to Bid, the Instructions to Bidders, the Specifications and Drawings, any Addenda, and the Bid Checklist.

(Paragraph Deleted)

.2 The Bid Proposal, including without limitation, the Bid Form and the Bidder Certification Cover Form.

(Table Deleted)

.3 The Purchase Order issued by the Owner.

§ 9.2 This Agreement and the Contract Documents are subject to, and governed by, the laws of the State of Rhode Island, including all procurement statutes and regulations (available at www.purchasing.ri.gov), and applicable federal and local law, all of which are fully incorporated into this Agreement by this reference.

(Table Deleted)

(Paragraph Deleted)

§ 9.3 *In the event of any conflict between or among the Contract Documents, or any Contract Documents and any provision of the State of Rhode Island Procurement Regulations and/or any other provision of the Rhode Island General Laws, the State of Rhode Island Procurement Regulations and the Rhode Island General Laws shall control.*

ARTICLE 10 BENEFITS OF AGREEMENT

§ 10.1 The User Agency is a disclosed third-party beneficiary of this Agreement and shall have all of the rights and benefits hereunder to which such a party is entitled. Nothing contained in this Agreement shall create a contractual relationship with, or a cause of action in favor of, any other third party against the Owner or the User Agency.

§ 10.2 This Agreement shall be binding on the Contractor and its successors and assigns; provided, however, that the Contractor may not assign its rights nor delegate its responsibilities under this Agreement without the Owner's prior written consent.

This Agreement is entered into as of the day and year first written above; provided, however, that this Agreement shall not become a valid, binding, and enforceable contract unless and until the Owner shall have issued a Purchase Order.

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THE STATE OF RHODE ISLAND, acting by and through its Department of Administration, Division of Purchases

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
(Printed name and title)	*(Printed name and title)*

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00 55 00 – NOTICE TO PROCEED

RI State Purchasing shall issue the Purchase Order. The User Agency shall issue the Notice to Proceed, per AIA A101-2017 §3.1.

END OF SECTION

00 61 00 – BOND FORMS

The RI State Purchasing Notice of Tentative Award indicates the required bonding forms for this project.

END OF SECTION

00 62 00 – CERTIFICATES AND OTHER FORMS

PART 1 - GENERAL

1.1 ARCHITECT PROVIDED CERTIFICATES AND PROJECT FORMS

A. None.

1.2 USER AGENCY PROVIDED FORMS

A. None.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

00 65 00 – CLOSEOUT FORMS

PART 1 - GENERAL

1.1 CLOSEOUT FORMS

A. The following forms are required as part of the closeout documentation:
   1. Transmittal on Contractor's letter head for each package of documents transmitted.
   2. Upon Substantial Completion, the User Agency shall provide copies of the AIA Documents indicated in Section 01 7800.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

00 72 00 – GENERAL CONDITIONS

PART 1 - GENERAL

3.1 GENERAL CONDITIONS

A. The General Conditions to be utilized on this project are AIA Document A201-2007 as amended, a copy of which follows this page.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.2 EXECUTION OF THE GENERAL CONDITIONS

A. The User Agency will transmit the A201-2007 to the Contractor. The contractor shall initial and return to the User Agency, who then transmits it to the RI State Purchasing Office.

END OF SECTION

AIA® Document A201™ – 2007

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

THE OWNER:
(Name, legal status and address)

(Paragraphs deleted) The State of Rhode Island, acting by and through the Department of Administration Division of Purchases, on behalf of the User Agency
One Capitol Hill, Second Floor
Providence, Rhode Island 02908-5855
(401) 574-8100 (telephone)
(401) 574-8387 (facsimile)
(Paragraph deleted)
www.purchasing.ri.gov

THE USER AGENCY

(Paragraphs deleted)
(Name, address, telephone and facsimile numbers, and web address)

Rhode Island College
600 Mt Pleasant Ave
Providence, RI 02908
Tel. (401) 456-9885
(Paragraph deleted)
www.ric.edu
(Paragraphs deleted)

(Paragraphs deleted)
THE Design Agent:
(Name, legal status, address, telephone and facsimile numbers, and web address)

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (the Agreement) and consist of the Agreement (and the documents enumerated therein), Conditions of the Contract (General Conditions, Supplementary Conditions, if any, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Design Agent.

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Design Agent or the Design Agent's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Design Agent or the Design Agent's consultants or (4) between any persons or entities other than the Owner and the Contractor. The Design Agent shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Design Agent's duties.

§ 1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location, and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 INSTRUMENTS OF SERVICE

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Design Agent and the Design Agent's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 INITIAL DECISION MAKER

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items and services necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; the Contractor shall perform all work reasonably inferable from the Contract Documents as being necessary to produce the indicated results.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

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§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.2.4 In the event of any conflicts or discrepancies among the Contract Documents, the provisions of the Contract Documents will be interpreted in the following order of priority:

.1 Modifications (if any).
.2 The Purchase Order.
.3 The Agreement.
.4 The Solicitation, including any Addenda, and the Specifications and Drawings
.5 The Supplementary Conditions (if any).
.6 The General Conditions.
.7 The Bid Proposal.

§ 1.2.5 In the event of any conflicts or discrepancies between the Contract Documents and the State of Rhode Island Procurement Regulations or any provision of the Rhode Island General Laws, the State of Rhode Island Procurement Regulations and the Rhode Island General Laws will control.

§ 1.2.6 In the event of any inconsistency between the Drawings and Specifications, the better quality or greater quantity of Work shall be provided.

§ 1.2.7 The Owner will be the final decision maker for any and all interpretations.

§ 1.3 CAPITALIZATION

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.5.1 The Owner and the User Agency shall have a perpetual license to utilize the Drawings, Specifications, and other documents, including electronic or digital documents, prepared by the Design Agent and the Design Agent's consultants, for the execution of the Project and shall have and retain all rights to use them and reproduce them for the production and maintenance of the Work described therein. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Design Agent's or Design Agent's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Design Agent and the Design Agent's consultants.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express

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authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Design Agent does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 Deleted.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER
§ 2.2.1 Deleted.

§ 2.2.2 The Contractor shall secure and pay for permits and fees, necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.3 If required for the Work in the discretion of the Owner, the Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of any information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.5 Deleted.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK
If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK
If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a 10 working-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Design Agent's additional services made necessary by such default, neglect, or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Design Agent. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR
§ 3.1 GENERAL
§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Design Agent, or by tests, inspections, or approvals required or performed by persons or entities other than the Contractor.

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§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Owner and the Design Agent any errors, inconsistencies, or omissions discovered by or made known to the Contractor or additional Drawings, Specifications, or instructions required to define the Work in greater detail to permit the proper progress of the Work as a request for information in such form as the Design Agent may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Design Agent and the Owner any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Design Agent or Owner may require.

§ 3.2.3.1 Omissions from the Drawings and Specifications of items obviously needed to perform the Work properly, such as attachments, bolts, hangers, and other fastening devices, shall not relieve the Contractor from the obligation to furnish and install such items.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Design Agent issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2, 3.2.3, or 3.2.3.1, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Design Agent for damages resulting from errors, inconsistencies, or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.2.4.1 The Contractor shall not make any changes without prior written authorization from the Design Agent and the Owner.

§ 3.2.5 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Design Agent for evaluating and responding to the Contractor's requests for information that are not prepared in accordance with the Contract Documents or where the requested information is available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner-provided information, Contractor-prepared coordination drawings, or prior Project correspondence or documentation.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Design Agent and shall not proceed with that portion of the Work without further written instructions from the Design Agent. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without

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acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. Whenever the Contractor has an obligation to provide labor and materials under the Agreement, the Contractor, at a minimum, shall provide the labor for, and furnish and install and place in operation all items, including without limitation, all proper connections.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Design Agent in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Design Agent and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 WARRANTY

The Contractor warrants to the Owner and the Design Agent that materials and equipment furnished under the Contract will be of first quality, prime manufacture, and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements, including substitutions not properly authorized, may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Design Agent, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 TAXES

§ 3.6.1 The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.6.2 The State of Rhode Island is exempt from payment of any federal or state excise, transportation, or sales tax. The Rhode Island Department of Administration Division of Purchases will furnish Exemption Certificates upon request.

§ 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections required by the Rhode Island State Building Code necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded. The Contractor shall be responsible for obtaining the Certificate of Occupancy from the appropriate governmental authorities.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

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§ 3.7.3 The Contractor shall promptly notify the Design Agent and the Owner if the Contractor becomes aware that the Contract Documents are not in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities. If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Design Agent before conditions are disturbed and in no event later than 21 working days after first observance of the conditions. The Design Agent will promptly investigate such conditions and, if the Design Agent determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Design Agent determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Design Agent shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Design Agent's determination or recommendation, that party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Design Agent. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- **.1** Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- **.2** Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- **.3** Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Design Agent the name and qualifications of a proposed superintendent. The Design Agent may reply within 14 working days to the Contractor in writing stating (1) whether the Owner or the Design Agent has reasonable objection to the proposed superintendent or (2) that the Design Agent requires additional time to review. Failure of the Design Agent to reply within the 14 working-day period shall constitute notice of no reasonable objection.

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§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Design Agent has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, within 20 working days after the issuance of the Purchase Order, shall prepare and submit for the Owner's and Design Agent's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals, not less frequently than monthly, as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work. The Contractor shall certify on the initial schedule and all revised schedules that they comply with the Contract Documents.

§ 3.10.2 The Contractor shall prepare a submittal schedule, within 20 working days after the issuance of the Purchase Order, and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Owner's and the Design Agent's approval. The Owner's and the Design Agent's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Owner and the Design Agent reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Design Agent.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Design Agent and shall be delivered to the Design Agent for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Design Agent is subject to the limitations of Section 4.2.7. Informational submittals upon which the Design Agent is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Design Agent without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Design Agent Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Owner and the Design Agent or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Design Agent that the Contractor has (1) reviewed and approved them, (2) determined and verified

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materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Design Agent.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Design Agent's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Design Agent in writing of such deviation at the time of submittal and (1) the Design Agent has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Design Agent's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Design Agent on previous submittals. In the absence of such written notice, the Design Agent's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Design Agent will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Design Agent. The Owner and the Design Agent shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Design Agent have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Design Agent will review, approve, or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.12.11 The Owner shall be entitled to reimbursement from the Contractor for amounts paid to the Design Agent for evaluation of resubmittals.

§ 3.13 USE OF SITE

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, and any restrictions imposed by the User Agency or the Owner, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 CUTTING AND PATCHING

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably

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withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 ACCESS TO WORK

The Contractor shall provide the Owner and Design Agent access to the Work in preparation and progress wherever located.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Design Agent harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Design Agent. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Design Agent and the Owner.

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, the State of Rhode Island, and each executive, legislative, judicial, regulatory, and administrative body of the state, and any political subdivision thereof, including without limitation, any department, division, agency, commission, board, office, bureau, committee, authority, educational institution, school, water, and fire district, and other agency of Rhode Island state, municipal, and local government that exercises governmental functions, any other governmental authority, and any quasi-public corporation and/or body corporate and politic, including without limitation, the User Agency, their elected and appointed officials, members, employees, and agents, the Design Agent, the Design Agent's Consultants, Subconsultants, and Subcontractors, and agents and employees and any of them from and against any and all claims, demands, damages, liabilities, judgments, losses and expenses, including but not limited to attorneys' fees and costs of mediation, arbitration, and/or litigation, arising out of or resulting from performance of the Work, and/or the obligations of the under the Contract Documents, but only to the extent caused by the acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not any such claim, demand, damage, liability, judgment, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

§ 3.18.3 Without limiting the generality of the foregoing, the defense and indemnity set forth in this Section 3.18 includes, without limitation, all liabilities, damages, losses, claims, demands, and actions on account of bodily injury, death, or property loss to a person or entity indemnified hereunder or any other persons or entities, whether based upon statutory (including, without limitation, workers compensation), contractual, tort, or other liability of any person or entity so indemnified.

§ 3.18.4 The remedies set forth herein shall not deprive any person indemnified hereunder of any other indemnity action, right, or remedy otherwise available to any such person or entity at common law or otherwise.

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§ 3.18.5 The Contractor will include the indemnity set forth in this Section 3.18, without modification, in each Subcontract with any Subcontractor.

§ 3.18.6 Notwithstanding any other language in the Contract Documents to the contrary, the indemnity hereunder shall survive Final Completion of the Work and final payment under the Agreement and shall survive any termination of the Agreement.

ARTICLE 4 DESIGN AGENT

§ 4.1 GENERAL

§ 4.1.1 The Design Agent is the person lawfully licensed to practice his or her profession in the State of Rhode Island or an entity lawfully practicing its profession in the State of Rhode Island and identified in the Contract Documents as the Design Agent. The term "Design Agent" means the Design Agent or the Design Agent's authorized representative.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Design Agent as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Design Agent. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Design Agent is terminated, the Owner shall employ a successor Design Agent as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Design Agent.

§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Owner with assistance from the Design Agent will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction through the date the Design Agent issues the final Certificate for Payment and continuing until the expiration of the one-year period following Final Completion. The Design Agent will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Design Agent will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Design Agent will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Design Agent will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.2.1 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Design Agent for site visits made necessary by the fault of the Contractor or by defects and deficiencies in the Work.

§ 4.2.3 On the basis of the site visits, the Design Agent will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. The Design Agent will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Design Agent will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Design Agent about matters arising out of or relating to the Contract. Communications by and with the Design Agent's consultants shall be through the Design Agent. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Design Agent's evaluations of the Contractor's Applications for Payment, the Design Agent will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

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§ 4.2.6 The Design Agent has authority to reject Work that does not conform to the Contract Documents. Whenever the Design Agent considers it necessary or advisable, the Design Agent will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Design Agent nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Design Agent to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Design Agent will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Design Agent's action will be taken in accordance with the submittal schedule approved by the Design Agent or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Design Agent's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Design Agent's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Design Agent's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Design Agent, of any construction means, methods, techniques, sequences or procedures. The Design Agent's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Design Agent will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4. The Design Agent will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Design Agent will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Design Agent agree, the Design Agent will provide one or more project representatives to assist in carrying out the Design Agent's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.11 The Design Agent will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Design Agent's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Design Agent will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Design Agent will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Design Agent's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents and approved by the Owner.

§ 4.2.14 The Design Agent will review and respond to requests for information about the Contract Documents. The Design Agent's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Design Agent will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

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ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner and the Design Agent the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each portion of the Work. The Owner may reply within 14 working days to the Contractor in writing stating (1) whether the Owner or the Design Agent has reasonable objection to any such proposed person or entity or (2) that the Owner or Design Agent requires additional time for review.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Design Agent has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Design Agent has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Design Agent has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner or Design Agent makes reasonable objection to such substitution.

§ 5.2.5 MANUFACTURERS AND FABRICATORS

§ 5.2.5.1 Not later than 10 working days after the date of commencement of the Work, the Contractor shall furnish in writing to the Owner and the Design Agent the names of the manufacturers or fabricators for certain products, equipment, and systems identified in the Specifications and, where applicable, the name of the installing Subcontractor. The Owner may reply within 14 working days to the Contractor in writing, stating: (i) whether the Owner or the Design Agent has reasonable objection to any such proposed person manufacturer or fabricator; or (ii) whether the Owner or Design Agent requires additional time to review.

§ 5.2.5.2 The Contractor shall not contract with a proposed manufacturer, fabricator, or Subcontractor to whom the Owner or Design Agent has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.5.3 If the Owner or Design Agent has an objection to a manufacturer, fabricator, or Subcontractor proposed by the Contractor, the Contractor shall propose another to whom the Owner or Design Agent has no objection.

§ 5.2.5.4 The Contractor shall not substitute a manufacturer, fabricator, or Subcontractor previously selected if the Owner or Design Agent makes reasonable objection to such substitution.

§ 5.3 SUBCONTRACTUAL RELATIONS

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the

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Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Design Agent. Upon the request of the User Agency and/or the Owner, the Contractor shall provide the User Agency and/or the Owner with copies of each subcontract agreement. Each subcontract agreement shall preserve and protect the rights of the Owner and Design Agent under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

(Paragraph deleted)

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 working days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

§ 6.2 MUTUAL RESPONSIBILITY

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

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§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Design Agent apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement between the Owner and the Contractor; a Construction Change Directive requires agreement by the Owner and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Design Agent alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 CHANGE ORDERS

§ 7.2.1 A Change Order is a written instrument prepared by the Contractor and signed by the Owner, Contractor and Design Agent stating their agreement upon all of the following:

.1 The change in the Work;
.2 The amount of the adjustment, if any, in the Contract Sum; and
.3 The extent of the adjustment, if any, in the Contract Time.

§ 7.2.2 Subsequent to the approval of a Change Order as provided in § 7.1.2, whether such Change Order changes the Contract Sum or Contract Time or both, no additional claim related to such Change Order will be considered by the Owner. Any change, once incorporated into a Change Order, is all inclusive, and includes all factors that could have been considered at the time of the Change Order such as Project impact or schedule "ripple" effect.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order prepared by the Design Agent and signed by the Owner, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

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§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
.2 Unit prices stated in the Contract Documents or subsequently agreed upon;
.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
.4 As provided in Section 7.3.7.

§ 7.3.4 Deleted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Design Agent of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Design Agent shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in Section 7.3.1. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Design Agent may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

.1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
.2 Costs of materials, supplies and equipment, including cost of delivery;
.3 Rental costs of machinery and equipment, exclusive of hand tools; or
.4 Costs of premiums for all bonds and insurance and permit fees related to the Work..

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Design Agent. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Design Agent will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Design Agent determines, in the Design Agent's professional judgment, to be reasonably justified. The Design Agent's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Design Agent concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Contractor will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.3.11 The combined overhead and profit included in the total cost to the Owner for a change in the Work shall be based on the following schedule:

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.1 For the Contractor, for work performed by the Contractor's own forces, an amount not to exceed ten (10%) percent of the cost.
.2 For the Contractor, for work performed by the Contractor's Subcontractors, an amount not to exceed five (5%) of the amount due to the Subcontractors.
.3 For each Subcontractor, for work performed by the Subcontractor's own forces, an amount not to exceed ten (10%) percent of the cost.
.4 Where the Work represents both additions and deletions and results in a net increase, the allowable overhead and profit shall be in accordance with this Section 7.3.11, but in no event shall the amount exceed fifteen (15%) percent of the net increase in the cost of the Work.
.5 Overhead and profit is to include the Contractor's project management and supervisory costs, all administrative expenses and personnel, change estimate preparation, mobilization, setup & breakdown, meetings, all safety related costs, cleanup costs and storage costs pertaining to the changes in the work.
.6 The fee increase to any permit required by the additional work is allowed to be added to the Change Order costs. However, the Contractor is required to submit proof that the additional fee was paid to the presiding authority.
.7 In order to facilitate checking of quotations for extras or credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials and Subcontracts. Labor and materials shall be itemized in the manner prescribed above. Where major cost items are Subcontracts, they shall be itemized also.

§ 7.3.12 All proposals with an aggregate cost equal to or in excess of $500.00 shall be accompanied by a detailed itemization of costs, including labor, materials (quantities and prices), and Subcontracts, in a form acceptable to the Owner. In no event will a change order request reflecting an aggregate cost equal to or in excess of $500.00 be approved without such itemization. All suppliers, vendor and subcontractor goods shall also have the detailed itemization as indicated above.

§ 7.4 MINOR CHANGES IN THE WORK
The Design Agent with the prior written approval of the Owner has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be affected by written order signed by the Design Agent and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME
§ 8.1 DEFINITIONS
§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

The date of commencement of the Work is the date established in Section 3.1 of the Agreement..

(Paragraph deleted)
§ 8.1.3 The date of Substantial Completion is the date certified by the Design Agent in accordance with Section 9.8.

§ 8.1.4 Deleted.

§ 8.2 PROGRESS AND COMPLETION
§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

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§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Design Agent, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control, then the Contract Time shall be extended by Change Order for such reasonable time as the Owner may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 SCHEDULE OF VALUES

Within 20 working days of the issuance of the Purchase Order, and promptly if revision is necessary from time to time as a result of a Change Order, the Contractor shall submit to the Owner, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Design Agent and the Owner may require. This schedule, if and when approved by the Design Agent and the Owner in writing, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 At least 10 working days before the date established for each progress payment, the Contractor shall submit to the Design Agent and the Owner for approval an itemized Application for Payment prepared in accordance with the schedule of values for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or the Design Agent may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 All Applications for Payment for Change Orders must be accompanied by a Notice of Change in Purchase Order issued by the Owner, and if directed by the Owner, by the User Agency.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.1.3 The form of Application for Payment shall be AIA Document G702, Application and Certification for Payment, supported by AIA Document G702A, Continuation Sheet.

§ 9.3.1.4 Until Substantial Completion, the Owner shall pay ninety-five (95%) percent of the amount due the Contract on account of progress payments.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall be

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free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work. The Contractor shall immediately satisfy any lien, claim, or encumbrance against the site where the Project is located and indemnify the Owner from and against all resulting costs and expenses, including without limitation, attorneys' fees.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Design Agent will, within 7 working days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Design Agent determines is properly due, or notify the Contractor and Owner in writing of the Design Agent's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Design Agent to the Owner, based on the Design Agent's evaluation of the Work and the data comprising the Application for Payment, that, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Design Agent. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Design Agent has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.4.3 The Contractor must submit all product literature, material and color samples with each Application for Payment, or as otherwise required by the Owner.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Design Agent will withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Design Agent's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Design Agent is unable to certify payment in the amount of the Application, the Design Agent will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Design Agent cannot agree on a revised amount, the Design Agent will promptly issue a Certificate for Payment for the amount for which the Design Agent is able to make such representations to the Owner. The Design Agent may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Design Agent's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of:

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a separate contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;
- .7 failure to carry out the Work in accordance with the Contract Documents; or
- .8 any other failure to comply with the obligations of the Contractor under the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 The Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or

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equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Design Agent and the Design Agent will reflect such payment on the next Certificate for Payment.

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 After the Design Agent has issued a Certificate for Payment and the Owner has approved the Certificate for Payment in writing, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Design Agent.

§ 9.6.2 The Contractor shall pay each Subcontractor no later than 10 working days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Design Agent will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Design Agent and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within 7 working days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. The Owner shall have the right to withhold payment(s) to the Contractor in the event that any Subcontractors or material and equipment suppliers have not been properly paid. Neither the Owner nor Design Agent shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 FAILURE OF PAYMENT

If the Design Agent does not issue a Certificate for Payment, through no fault of the Contractor, within 7 working days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within 7 working days after the date established in the Contract Documents the amount certified by the Design Agent or awarded by binding dispute resolution, then the Contractor may, upon 7 additional working days' written notice to the Owner and Design Agent, make a claim for payment as provided under the provisions of applicable law.

§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Design Agent a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

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§ 9.8.3 Upon receipt of the Contractor's list, the Design Agent will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Design Agent's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Design Agent. In such case, the Contractor shall then submit a request for another inspection by the Design Agent to determine Substantial Completion. The Design Agent will perform no more than 2 inspections to determine whether the Work or a designated portion thereof has attained Substantial Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Design Agent for any additional inspections.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Design Agent will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment less the amount of five (5%) percent to be retained by the Owner in accordance with R.I. Gen. Laws § 37-12-10.1. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Design Agent as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Design Agent.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Design Agent shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Design Agent will promptly make such inspection and, when the Design Agent finds the Work acceptable under the Contract Documents and the Contract fully performed, the Design Agent will promptly issue a final Certificate for Payment stating that to the best of the Design Agent's knowledge, information and belief, and on the basis of the Design Agent's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Design Agent's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled. The Design Agent will perform no more than 2 inspections to determine whether the Work or a designated portion thereof has attained Final Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Design Agent for any additional inspections.

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§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Design Agent (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 working days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner, and (6) all other close-out documents required by the Owner, including without limitation, all as-built plans, warranties, manuals, and other materials set forth in the Contract Documents. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Design Agent so confirms, the Owner shall, upon application by the Contractor and certification by the Design Agent, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Design Agent prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from:

- **.1** liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- **.2** failure of the Work to comply with the requirements of the Contract Documents;
- **.3** terms of special warranties required by the Contract Documents; or
- **.4** claims permitted under the State of Rhode Island General Conditions of Purchase Regulation.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

§ 9.11 The Contractor and the Contractor's surety shall be liable for and shall pay the Owner as liquidated damages the sums specified in the Solicitation and Bid Form, or if completed, the amount set forth in Section 3.4 of the Agreement.

§ 9.12 Warranties required by the Contract Documents shall commence on the date of Final Completion of the Work.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to:

- **.1** employees on the Work and other persons who may be affected thereby;
- **.2** the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- **.3** other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

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§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel and in consultation with the appropriate governmental authorities.

§ 10.2.4.1 When use or storage of explosives, or other hazardous materials, substances or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall give the User Agency and the Owner reasonable advance notice.

§ 10.2.4.2 If the Contract Documents require the Contractor to handle materials or substances that under certain circumstances may be designated as hazardous, the Contractor shall handle such materials in an appropriate manner.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Design Agent or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Design Agent.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 HAZARDOUS MATERIALS

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Design Agent in writing.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Design Agent the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Design Agent will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons

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or entities proposed by the Owner. If either the Contractor or Design Agent has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Design Agent have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the extent permitted by the provisions of R.I. Gen. Laws §§ 9-31-1 et seq., the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Design Agent, Design Agent's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

§ 10.4 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as is specified in the Solicitation and as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 Claims for damages insured by usual personal injury liability coverage;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

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§ 11.1.1.2 The Contractor's liability insurance shall include all major coverages and be on a comprehensive general liability basis.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance as specified in the Solicitation and as otherwise acceptable to the Owner shall be filed with the Owner and the User Agency prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 working days' prior written notice has been given to the Owner and the User Agency. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the User Agency, and their elected and appointed officials, members, employees, and agents, the Design Agent and the Design Agent's consultants as additional insureds for claims caused in whole or in part by the Contractor's acts or omissions during the Contractor's operations; and (2) the Owner, the User Agency, and their elected and appointed officials, members, employees, and agents, as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.1.5 The Contractor shall be responsible for the prompt payment to the Owner of any deductible amounts under any insurance policies required under the Contract Documents for claims made pursuant to such policies.

§ 11.2 OWNER'S LIABILITY INSURANCE.

§ 11.2.1 The Contractor shall furnish the Owner and the User Agency, through the Design Agent, an insurance certificate providing Owner's Protective Liability extended to include the interests of the Design Agent, and to protect the Owner, User Agency, and Design Agent from any liability which might be incurred against any of them as a result of any operation of the Contractor or Subcontractors or their employees or anyone for whom either the Contractor or Subcontractors are responsible. Such insurance shall be written for the same limits as the Contractor's commercial general liability insurance and shall include the same coverage.

§ 11.2.2 If the Owner engages separate contractors to perform work for, or in or around, the Project, it shall require in its contracts with each separate contractor that Contractor and its officers, directors, partners, members, employees, and agents shall be: (i) named as additional insureds on a primary, noncontributory basis to any commercial general liability, pollution liability, and excess liability insurance policies; and (ii) provided a waiver of subrogation on all workers compensation and professional liability insurance policies.

§ 11.3 PROPERTY INSURANCE

§ 11.3.1 The Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the state of Rhode Island, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the User Agency, the Contractor, Subcontractors and Sub-subcontractors in the Project. If the Owner and/or

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the User Agency incur any damages by failure of the Contractor to maintain such insurance, then the Contractor shall bear all reasonable cost resulting from such failure.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Design Agent's and Contractor's services and expenses required as a result of such insured loss.

§ 11.3.1.2 Deleted.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 Deleted.

§ 11.3.3 Deleted.

§ 11.3.4 Deleted.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Contractor shall file with the Owner a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 working days' prior written notice has been given to the Owner and the User Agency.

§ 11.3.7 WAIVERS OF SUBROGATION

The Contractor waives all rights against the Owner and the User Agency and any of their subcontractors, sub-subcontractors, agents and employees, and (2) the Design Agent, Design Agent's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Design Agent, Design Agent's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

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§ 11.3.8 A loss insured under this property insurance shall be adjusted by the Contractor as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Contractor's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Contractor shall deposit in a separate account proceeds so received, which the Contractor shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Contractor as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within 5 working days after occurrence of loss to the Contractor's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Contractor shall furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in the Solicitation.

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the Design Agent's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Design Agent, be uncovered for the Design Agent's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Design Agent has not specifically requested to examine prior to its being covered, the Design Agent may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Design Agent or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Design Agent's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Final Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. If

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the Contractor fails to correct nonconforming Work within a reasonable time after receipt of notice from the Owner or Design Agent, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.2.4 Upon request by the Owner and prior to the expiration of one year from the date of Final Completion, the Design Agent will conduct and the Contractor shall attend 2 meetings with the Owner to review the facility operations and performance.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract shall be governed by the law of the State of Rhode Island.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to any executive, legislative, judicial, regulatory, or administrative body of the state, or any political subdivision thereof, including without limitation, any department, division, agency, commission, board, office, bureau, authority, school, water, or fire district, or other agency of Rhode Island state or local government that exercises governmental functions, any other governmental authority, and any quasi-public corporation and/or body corporate and politic. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 WRITTEN NOTICE

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice, or when received, if manually delivered or transmitted by electronic mail or facsimile to the last such address known to the party giving notice.

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§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Design Agent or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Design Agent timely notice of when and where tests and inspections are to be made so that the Design Agent may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Design Agent, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Design Agent will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Design Agent of when and where tests and inspections are to be made so that the Design Agent may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Design Agent's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Design Agent.

§ 13.5.5 If the Design Agent is to observe tests, inspections or approvals required by the Contract Documents, the Design Agent will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 INTEREST

No interest shall be due or payable on account of any payment due or unpaid under the Contract Documents except in accordance with the provisions of "Prompt Payment by Department of Administration," R.I. Gen. Laws §§ 42-11.1-1 et seq.

§ 13.7 TIME LIMITS ON CLAIMS

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 calendar days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons

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or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;

.2 An act of government, such as a declaration of national emergency that requires all Work to be stopped; or

.3 Because the Design Agent has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1

§ 14.1.2 Deleted.

§ 14.1.3 If one of the reasons described in Section 14.1.1 exists, the Contractor may, upon 7 working days' written notice to the Owner and Design Agent, terminate the Contract and recover from the Owner payment for Work executed.

§ 14.1.4 If the Work is stopped for a period of 60 calendar days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon 7 additional days' written notice to the Owner and the Design Agent, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor:

.1 refuses or fails to supply enough properly skilled workers or proper materials;

.2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;

.3 disregards or fails to comply with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority;

.4 otherwise is guilty of breach of a provision of the Contract Documents; or

.5 cancels or the Contractor or the Owner receives notice of cancellation or nonrenewal of any insurance required under the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner, upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, 7 working days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 Accept assignment of subcontracts pursuant to Section 5.4; and

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Design Agent's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

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§ 14.3.2 The
(Paragraphs deleted)
Owner shall not be liable to the Contractor or any Subcontractor for claims or damages of any nature caused by or arising out of any delays. The sole remedy against the Owner for delays shall be the allowance of additional time for completion of the Work in accordance with the provisions of Section 8.3.1.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE
§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall:

.1 cease operations as directed by the Owner in the notice;
.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination.

ARTICLE 15 CLAIMS AND DISPUTES
§ 15.1 CLAIMS
§ 15.1.1 DEFINITION
A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 NOTICE OF CLAIMS
Claims by either the Owner or Contractor must be initiated by written notice to the other party. Such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly serviced if delivered in person, by mail, by courier, or by electronic transmission. Claims by either party must be initiated within 21 working days after occurrence of the event giving rise to such Claim or within 21 working days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE
Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Design Agent will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST
If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME
§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

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§ 15.1.5.3 Claims for increase in the Contract Time shall set forth in detail the circumstances that form the basis for the Claim, the date upon which each cause of delay began to affect the progress of the Work, the date upon which each cause of delay ceased to affect the progress of the Work and the number of days' increase in the Contract Time claimed as a consequence of each such cause of delay. The Contractor shall provide such supporting documentation as the Owner may require including, where appropriate, a revised construction schedule indicating all the activities affected by the circumstances forming the basis of the Claim.

§ 15.1.5.4 The Contractor shall not be entitled to a separate increase in the Contract Time for each one of the number of causes of delay which may have concurrent or interrelated effects on the progress of the Work, or for concurrent delays due to the fault of the Contractor.

§ 15.1.6
(Paragraphs deleted)
Deleted.

§ 15.2 INITIAL DECISION
§ 15.2.1 Claims shall be referred to the Initial Decision Maker for initial decision. The Purchasing Agent appointed pursuant to the provisions of the "State Purchases Act," R.I. Gen. Laws § 37-2-1 et seq., will serve as the Initial Decision Maker in accordance with the provisions of the State Purchases Act, State of Rhode Island Procurement Regulations, and this Section 15.2.1. An initial decision shall be required as a condition precedent to binding dispute resolution pursuant to Section 15.3.1 of any Claim arising prior to the date final payment is due.

§ 15.2.2 Deleted.

§ 15.2.3 Deleted.

§ 15.2.4 Deleted.

§ 15.2.5 Deleted.

§ 15.2.6 Deleted.

§ 15.2.6.1 Deleted.

§ 15.2.7 Deleted.

§ 15.2.8 Deleted.

§ 15.3 MEDIATION
§ 15.3.1 For any Claim not resolved by the Initial Decision Maker procedures set forth in Section 15.2.1, and prior to the implementation of the binding dispute resolution procedures set forth in Section 15.4.1, the Contractor or the Design Agent shall have the option to pursue mediation, exercisable by written notice to the Owner within 30 calendar days of an Initial Decision. In the event of the exercise of such option by the Contractor or the Design Agent, the Owner and the Contractor or the Design Agent shall attempt to select a mediator, and in the event that the Owner and the Contractor or the Design Agent cannot agree on a mediator, either party may apply in writing to the Presiding Justice of the Providence County Superior Court, with a copy to the other, with a request for the court to appoint a mediator, and the costs of the mediator shall be borne equally by both parties.

§ 15.3.2 Deleted.

§ 15.3.3 Deleted.

§ 15.4 BINDING DISPUTE RESOLUTION
§ 15.4.1 For any Claim not resolved by the Initial Decision Maker procedures set forth in Section 15.2.1, or mediation at the option of the Contractor pursuant to Section 15.3.1, the method of binding dispute resolution shall be determined in accordance with the provisions of the "Public Works Arbitration Act," R.I. Gen. Laws §§ 37-16-1 et seq.

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(Paragraphs deleted)
§ 15.4.4 Deleted.

§ 15.4.4.1 Deleted.

§ 15.4.4.2 Deleted.

§ 15.4.4.3 Deleted.

§ 16 COMPLIANCE WITH APPLICABLE LAW

The Contractor and its Subcontractors shall comply with all applicable federal, state, and local laws.

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00 73 43 – PREVAILING WAGE RATES

The State of Rhode Island Department of Labor, Division of Professional Regulation General Decision Modification document is an integral part of the Bid Documents for use in fulfilling prevailing wage rate requirements. A copy is available linked to the web site of the State of Rhode Island Department of Administration, Division of Purchases. Contractors working on RI Prevailing Wage projects must adjust employee hourly rates every July 1 in accordance with updated Davis Bacon rates. These rates may be obtained at the following website:

www.wdol.gov/dba.aspx

The Division of Purchases Web Site Address is: http://www.purchasing.ri.gov/RIVIP/Info.asp

The link for the US Government prevailing wage tables is:
http://www.purchasing.ri.gov/bidinfo/geninfo/geninfo.aspx

Applicable Rhode Island labor laws may be found at: http://www.dlt.ri.gov/pw/

END OF SECTION

00 91 13 – ADDENDA AND MODIFICATIONS

PART 1 - GENERAL

A. As of the time of publication of this Project Manual, no Addenda had been issued.

B. Should Addenda be issued during the Bid Period, they will augment this Document and become a part of the Project Manual.

C. Such Addenda and Modifications when issued, with reference to the Project Manual, the General Conditions, Supplemental General Conditions, Drawings or Specifications, shall be inserted following this page and become integral parts of the Contract Documents.

END OF SECTION

01 10 00 – SUMMARY

PART 1 - GENERAL

1.1 PROJECT

A. The Project consists of the construction of the following types of work:
   1. Demolition of existing offices.
   2. Acoustic ceiling tile and frame installation.
   3. Laboratory casework and equipment.
   4. Installation of flooring and interior finishes.
   5. Interior door installation.
   6. Window shade installation.
   7. Mechanical, electrical, fire protection, and plumbing upgrades.

1.2 CONTRACT DESCRIPTION

A. Contract Type: A single prime contract based on a Stipulated Price as described in Document 00 50 00 – Contracting Forms.

1.3 DESCRIPTION OF WORK

A. Scope of demolition and removal work is shown on drawings plus as specified in Section 02 4100.

B. Scope of alterations work is shown on drawings and/or as specified herein.

1.4 SCHEDULE

A. The date of commencement of the Work shall be the later of: (i) the issuance of the Purchase Order by the Owner; and (ii) the date set forth in a notice to proceed issued by the User Agency.

B. Ordering of products, coordination and preparatory work shall commence within 7 days of receipt of Purchase Order.

C. Construction at the site can commence May 18th, 2020.

D. Substantial completion date is August 7th, 2020. This is the date to which liquidated damages may apply and may only be adjusted as provided for in the Contract Documents. Contractor shall be responsible for completing the submittals required for issue of a Purchase Order in a timely manner. No extension will be granted for purchasing delays.

E. Final Completion August 14th, 2020. This date represents the completion of all outstanding punchlist items and complete demobilization of the site.

F. Cooperate with User Agency to minimize conflict and to facilitate the facility's operations.

1.5 ITEMS TO BE SALVAGED

A. HVAC VAV Boxes and Network Tele-Data drops.

1.6 SUBCONTRACTOR CERTIFICATION REQUIREMENTS

A. See individual Specification sections.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 14 00 – COORDINATION OF WORK WITH USER AGENCY

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Contractor Use of Site and Premises.

B. Utility and Building Services Outages and Shutdowns.

C. Construction Requirements in Occupied Buildings.

D. Construction Activities in Occupied Spaces.

E. Time Restrictions and Working Hours.

F. Schedule Coordination.

1.2 CONTRACTOR USE OF SITE AND PREMISES

A. User Agency intends to continuously occupy the facility. Work areas will be made available as mutually agreed to during project scheduling.

B. Construction Operations: Limited to areas noted on Drawings. Coordinate with Site Utilization Requirements. Include in the Base Bid all costs of this coordination, including all premium time wages that may be required to meet these requirements and project schedule. Cost of all work done during second or third shifts or on weekends and holidays shall be included in the bid price. Contractor is responsible for protection and restoration of existing conditions including, but not limited to hardscape, landscape and lawns.

C. Arrange use of site and premises to allow:
   1. Adjacent projects to progress as planned for the User Agency.
   2. Use of street and adjacent properties by the Public.
   3. Continued operation of the facility.

D. For activities requiring closure of parking lots, roadways and/or walkways, seven (7) days' notice is required. Refer to Section 01 50 00 Temporary Facilities and Controls for further information.

E. Provide access to and from site as required by law and by User Agency:
   1. Maintain appropriate egress for workforce and users of the facility.
   2. Do not obstruct roadways, sidewalks, or other public ways without permit. Provide necessary signage and barriers to direct pedestrians around work areas.
   3. Barriers and signage must be provided by the contractor to the satisfaction of the User Agency to separate the work area from occupied areas. Efforts must be taken to limit dust, noise and odors from escaping the work area. Proper separation and protection of interior spaces shall be established and maintained during the project, to the satisfaction of the User Agency.
   4. Contractor is responsible for cleaning construction dust and/or debris from public areas and daily or at the request of the User Agency. Work areas within the building shall be kept tidy at all times.
   5. Contractor shall provide and maintain walk-off mats at all entrances to the work site from occupies areas.

1.3 UTILITY AND BUILDING SERVICES OUTAGES AND SHUTDOWN:

A. Prevent accidental disruption of utility services to other facilities. Contractor is responsible for restoration and damages resulting from unplanned disruptions to utilities.

B. For life safety systems interruptions or shutdowns, including but not limited to fire sprinklers and fire alarm system, seven (7) days' written notice to User Agency and authorities having jurisdiction shall be provided. Contractor to utilize Fire Sprinkler and Alarm System Impairment Notification Forms found in Section 00 73 02. Contractor is responsible for providing Fire Alarm Technician or support personal to provide the necessary bypassing or fire watch as required for fire sprinkler or other life safety shutdowns.

C. Electrical, plumbing, network and other utility shutdowns shall be scheduled off hours. Contractor shall provide written request for utility shutdown at least 72 hours in advance.

D. When construction activities impact ventilation, heating or air conditioning to occupied building spaces, the contractor shall provide the necessary equipment to maintain proper ventilation rates and a temperature of 68° heating and 72° cooling. Prior to the decommissioning of equipment, the contractor shall submit a plan for temporary HVAC services, including unit location, utility connection, ductwork tie in and other logistical considerations.

1.4 CONSTRUCTION REQUIREMENTS FOR OCCUPIED BUILDINGS:

A. User Agency intends to continuously occupy the facility. Work areas will be made available as mutually agreed to during project scheduling.

B. The Building and surrounding areas will be occupied during construction. The Contractor shall be solely responsible for initiating, maintaining and supervising safety, security and protection programs and shall comply with all applicable laws, ordinances, rules and regulations concerning safety of people and the protection of property.

C. Barriers and signage must be provided by the contractor to the satisfaction of the User Agency to separate the work area from occupied areas. Appropriate signage, approved by the User Agency, shall be placed at all potential entrances to the Project Site and maintained throughout the project.

D. Efforts must be taken to limit dust, noise and odors from escaping the work area. Proper separation and protection of interior spaces shall be established and maintained during the project, to the satisfaction of the User Agency. Contractor shall provide and maintain walk-off mats and plastic barriers at work site entries.

E. Contractor shall provide appropriate masking of building supply air intakes to protect indoor air quality and limit transfer of odors. Contractor to coordinate with User Agency regarding shut down of appropriate units as work continues.

F. Contractor to provide air scrubbing and/or negative air machines to prevent odors from escaping the Project Site.

G. During the progress of the Work, the Contractor shall so conduct his work that as little inconvenience as possible is caused to the occupants. At the close of the work each day, the Contractor shall pick up and stow all equipment and miscellaneous material leaving the site in a neat and safe condition.

H. The Contractor shall repair or replace, at his own expense, with new any item, surface, or object that is damaged by the Contractor or damaged because of the Contractor's actions during the course of the Work and during any guarantee period.

I. Site and building conditions shall be restored to their condition as they were at the start of the Work. Before commencing work, the Contractor shall report any existing damage to the Architect in writing to assure that the Contractor will not be liable for preexisting damage.

J. Contractor is responsible for cleaning construction dust and/or debris from public areas and daily or at the request of the User Agency. Work areas within the building shall be kept tidy at all times.

K. Refer to Section 01 50 00 – TEMPORARY FACILITIES AND CONTROLS for more information.

1.5 CONSTRUCTION ACTIVITIES IN OCCUPIED SPACES

A. The Project Site is defined as the immediate rooms under construction at a given time. Any work in vertically or horizontally adjacent classrooms, hallways, MEP/IT/FP spaces and grounds outside the footprint indicated on the Site Utilization Plan shall be considered as being outside the Project Site. Areas outside the project site are identified as Occupied Spaces.

B. The safety of building occupants and construction workers is paramount. All construction activities within Occupied Spaces shall be marked with cones and caution tape. Computer generated signage shall be provided indicating the path of travel around construction zones and shall also be posted at stairwell doors indicating where internal construction activities may take place.

C. Activities which require work in Occupied Spaces shall be specifically and clearly indicated on the Two-Week Look-Ahead and confirmed with the User Agency at least two (2) business days in advance.

D. Sufficient time to clean up work zones shall be allocated at the end of the shift. All construction activities within the building shall be thoroughly vacuumed, wet mopped and cleaned to the satisfaction of the User Agency at the end of each shift.

E. All construction materials, tools and debris must be removed from occupied building spaces once construction activities have ended for the day.

1.6 TIME RESTRICTIONS AND WORKING HOURS

A. Include in the Base Bid all costs of this coordination, including all premium time wages that may be required to meet these requirements and project schedule. Cost of all work done during second or third shifts or on weekends and holidays shall be included in the bid price.

B. Disruptive Activities & Work Restrictions: The College uses the following categories to indicate work activities allowable during certain time periods:

1. No Work: on site work is prohibited to take place during this time. Workers are prohibited from the site without prior notification to the User Agency. In order to ensure the safety of occupants and preserve the educational experience, work **MAY NOT** take place during the time periods specified in Paragraph C, below.
2. Quiet Work: vibration producing work may not occur. Work that generates noise or odors that would escape the project site and cause disruption to occupant in adjacent Occupied Spaces is prohibited. Disallowed activities include but are not limited to: demolition of block and concrete, use of jackhammers, saw cutting, hammer drilling, connecting to building structure, mechanical fastening and other work activities which provides loud noises or vibrations that are constant in

nature. Use of heavy solvents, odious paints and other irritants which cannot be contained through mechanical or physical barriers prohibited. Work in Occupied Spaces prohibited unless specific, written authorization is requested and granted.

a. It is the sole discretion of the User Agency to determine if activities are considered disallowed during quiet work periods. The designation of disallowed activities is contingent on location within the job site and the activities of the occupants.

3. No Restrictions: Normal construction activities may take place. Coordinate with RIC all noisy work and utility shut downs prior to commencement of specific work. Summer classes are scheduled for surrounding spaces.

C. Working Hours

1. Contractor is expected to plan and execute the work on schedule within the parameters indicated above. Regular working hours for contractors are between 7:00 a.m. and 4:00 p.m., Monday through Friday. Work that is to take place outside of these timeframes are to be reflected on the Two Week Look-Ahead and require approval by RIC.
2. Contractor is permitted to work holidays, nights, and weekends if it is communicated two (2) business days in advance.
3. In the event of adverse weather, the College is open unless a State of Emergency is called by the Governor. The College is not responsible for lost time due to weather. Contractor to communicate with Project Manager regarding the college's status.
4. Special Work Hours are called for the following activities:
   a. No Work Hours: None.
   b. Material deliveries: No restrictions.

1.7 SCHEDULE COORDINATION

A. The contractor shall provide, in writing, via email, by noon on Thursdays the two week project look ahead which lists in detail the planned activities, locations of disturbance, scheduled subcontractors and working hours for the forthcoming Sunday-Saturday. The same shall be provided for the second week, but as a working draft. The document shall list out any utility shutdowns or other activities which require review and approval of the User Agency. Failure to provide the Look Ahead may result in a reduction of payment of general requirements line item in the following pay requisition.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 20 00 – PRICE AND PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Sales tax exemption.

B. Allowances.

C. Testing and inspection allowance.

D. Unit prices.

E. Alternates.

F. Schedule of values.

G. Applications for payment.

H. Change procedures.

I. Defect assessment.

J. Warranty inspection retainage.

K. Waiver of Lien Form

L. MBE Compliance Form

1.2 TAX EXEMPTION

A. The State of Rhode Island is exempt from payment of any federal or state excise, transportation, or sales tax. Refer to A201-2007 General Conditions §3.6.2.

1. Place exemption certificate number on invoice for materials incorporated in the Work of the Project.
2. Furnish copies of invoices to Owner.
3. Upon completion of Work, file a notarized statement with Owner that all purchases made under exemption certificate were entitled to be exempt.
4. Pay legally assessed penalties for improper use of exemption certificate number.

1.3 ALLOWANCES

A. Refer to A201-2007 §3.8 for Allowance provisions. General Contractor overhead and profit, bonding and other fees should be calculated into the Contract Sum and may not be assessed on Allowance Usage.

B. Design Agent Responsibility:

1. Consult with Contractor for consideration and selection of products, suppliers, and Installers.
2. Select products in consultation with User Agency and transmit decision to Contractor.
3. Prepare Change Order to account for the use of allowance.

C. Contractor Responsibility:

1. Assist Design Agent or its Consultants in selection of products, suppliers and installers.

2. Obtain proposals from suppliers and installers and offer recommendations.
3. On notification on selection by Design Agent, execute purchase agreement with designated supplier and installer.
4. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
5. Modify the Schedule of Values to provide line items for each approved use of an allowance.
6. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.

D. Schedule of Allowances: Allowances
   1. Please refer to the Bid Form for the list of Allowances.

1.4 TESTING AND INSPECTION ALLOWANCE

A. All costs of regularly scheduled testing are included in the Base Bid. See Bid Form for allowance to cover costs of additional testing to be provided when directed by the User Agency.

B. See Section 01 40 00 and its attachment for testing requirements.

1.5 UNIT PRICES

A. See Section 01 22 00.

1.6 ALTERNATES

A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at the User Agency's option. Accepted Alternates will be identified in the Purchase Order.

B. Coordinate related work and modify surrounding work as required.

C. Schedule of Alternates: See Section 01 23 00.

1.7 SCHEDULE OF VALUES

A. Refer to A201-2007 General Conditions §9.2 for Schedule of Values provisions. Contractors are encouraged to submit the Schedule of Values as soon as practical after contract commencement, but within the duration indicated in the General Conditions.

B. Schedule of Values (SOV) shall only be accepted on an original AIA Form G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheet.

C. Format:
   1. Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the major specification Section.
   2. At a minimum, provide line items under the heading General Conditions for: Site Mobilization, Bonds, Insurance, Permits, Construction Schedules, Temporary Facilities, Project Management & Supervision, General Cleaning, and Dumpsters & Trash Removal. The Design Agent and User Agency reserves the right to request further breakout beyond those requested here.
   3. At a minimum, provide line items under the heading Closeout for: Final Cleaning, Monetized Punchlist (zero value at start of contract), Administrative Closeout, Owner's Manual, Project

Record Documents and Warranty Retainage (.5%). The Design Agent and User Agency reserves the right to request further breakout beyond those requested here.

4. Per A101-2017 §5.5, out of state firms shall also include a "Foreign Company" line item valued at 3% of the Contract Sum.
5. Provide separate line items for Labor and Materials where the value is greater than $10,000.
6. Provide separate line items where multiple vendors or subcontractors are providing services.
7. No single line item shall exceed twenty percent (20%) of the total contract.
8. Identify each Allowance as a line item.
9. Identify each Alternate as a line item.

D. Submit for review and approval to the Design Agent and User Agency the Schedule of Values prior to the first Application for Payment. Indicate in the email the intended date for each progress payment, typically the last day of the month. The first Application for Payment will not be accepted until the SOV is approved.

E. Revisions:

1. Once approved, the SOV shall only be revised to accommodate changes to the Contract Value.
2. Revise SOV to list changes to the contract value for which a revised Purchase Order has been issued. Provide a heading for the Change Order Number and list Change Order Proposals comprising said Change Order as individual lines on the SOV.
3. As Allowances are used, under the heading for the appropriate allowance, list Change Order Proposals charged to the Allowance as individual lines on the SOV. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.

1.8 APPLICATIONS FOR PAYMENT

A. See General Conditions §9.3 for Applications for Payment provisions. Contractors shall submit for payment on a monthly basis.

B. Prepare a draft version "pencil copy" of each application.

1. The Pencil Copy shall be distributed via email ten (10) calendar days prior to the established date for progress payment for review by Design Agent and User Agency's representative.
2. Accompanying the Pencil Copy, Contractor shall provide a summary list of all sub-contractors who performed work on the site for the month.
3. Design Agent and User Agency's representative shall review the Pencil Copy and request adjustments as appropriate.
4. Contractor shall make agreed revisions and prepare final for payment

C. Submitting for Payment

1. Prepare one (1) original of the approved AIA Form G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheet, accompanied by three (3) copies.
2. Individually sign and notarize and emboss with notary's official seal, the original and each of the three (3) copies. Deliver to Design Agent for further processing and distribution.

3. Applications not including original copyrighted AIA G702, and G703 Forms, will be rejected, and returned for re-submittal.
4. Applications not properly signed and notarized will be rejected, and returned for re-submittal.

D. An Application for Payment is not considered acceptable per the Prompt Payment Policy until the signed, notarized and certified AIA G702 and G703 Forms with ALL required enclosures are received. Applications submitted without the following items described in this section and its attachments will be returned for resubmittal. These items shall be sent via email to the User Agency's Representative. Failure to provide items listed below with the Application for Payment submission will result in a delay in processing and may result in a reduction in the amount of said Application for Payment.

1. Transmittal letter as specified for Submittals in Section 01 33 00.
2. Updated construction schedule, prepared per Section 01 33 00.
3. Statement signed by the Contractor's firm principal certifying that there are no unidentified outstanding claims for delay.
4. Beginning with the second Application for Payment, Certified Monthly Payroll Records for all workers on site for the previous month.
    a. Forms for the submission of Certified Payroll Records may be found from the Rhode Island Prevailing Wage Website in either PDF or Excel formats. These forms must be used on monthly submittals.
5. Beginning with the second Application for Payment, Contractor's right to payment must be substantiated by documenting, on a copy of the RIC Waiver of Lien Form included in this Project Manual, that payment monies due, less retainage not exceeding five (5) percent, have been paid in full to subcontractor and suppliers for work, materials, or rental of equipment billed for under specific line item numbers in the immediately preceding application.
6. Affidavits attesting to off-site stored products with insurance certificates as requested.
7. Digital Photographs as specified in Section 01 33 00. Provide as a link.
8. Updated Submittal Log.
9. Identify Apprenticeship hours required under RIGL 37-13-3.1 for all contracts over $1million in value.
10. A Minority Utilization Report for minority subcontractors must be included. Use the form provided.
11. Additional Substantiating Data: When the User Agency or Design Agent requires additional substantiating information from the review of the "pencil copy," submit data justifying dollar amounts in question.

1.9 CHANGE PROCEDURES

A. Refer to AIA A201-2007 General Conditions §7.

B. Submittals: Submit name of the individual authorized to receive change documents and be responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.

C. Types of Change Proposals

1. Stipulated Sum Change Order: Based on Proposal Request and Contractor's Change Proposal as approved by Design Agent. All quotations shall include detailed material costs and labor hour and rate breakouts.
2. Unit Price Change Order: For contract unit prices and quantities, the Change Order will be executed on a fixed unit price basis. For unit costs or quantities of units of work which are not pre-determined, execute the Work under a Construction Change Directive. Changes in the Contract Sum or Contract Time will be computed as specified for a Time and Material Change Order.
3. Time and Material Change Order: Submit an itemized account and supporting data after completion of the change, including timeslips signed by User Agency's representative, within the time limits indicated in the Conditions of the Contract. The Design Agent will determine the change allowable in the Contract Sum and Contract Time as provided in the Contract Documents. Only User Agency-representative-signed timeslips will be considered.

D. The Design Agent may issue a Proposal Request which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required, and the period of time during which the requested price will be considered valid. Contractor will prepare and submit the Change Proposal within fifteen (15) calendar days.

E. The Contractor may propose changes by submitting a Change Proposal request to the Design Agent and User Agency, describing the proposed change and its full effect on the Work. Include a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation, and a statement describing the effect on Work by separate or other Contractors. Document any requested substitutions in accordance with Section 01 60 00.

F. For all Change Proposals, maintain detailed records of work done on a Time and Material basis. Submit timeslips daily for verification and sign-off by User Agency's representative on-site. Provide full information required for an evaluation of the proposed changes, and to substantiate costs for the changes in the Work.

G. Document each quotation for a change in cost or time with sufficient data to allow an evaluation of the quotation. Provide detailed breakdown of costs and estimates for labor and materials including a detailed breakdown for subcontractor's or vendor's Work. Include copies of written quotations from subcontractors or vendors.

H. Construction Change Directive: refer to General Conditions §7.3. Design Agent may issue a directive, on AIA Form G713.

I. For Minor Changes, §7.4: The Design Agent will advise of minor changes in the Work not involving an adjustment to Contract Sum or Contract Time by issuing supplemental instructions on AIA Form G710.

J. Change Order Forms: AIA G701 Change Order.

K. Execution of Change Orders: The Design Agent will issue Change Orders for signatures of the parties as provided in the Conditions of the Contract. Electronic signatures are acceptable. Design Agent shall also issue a Letter of Justification to accompany the Change Order.

1. The approved Change Order amount shall include all compensation to the Contractor, including but not limited to Overhead and Profit, General Conditions, Material, Labor,

Equipment and other costs. Following the execution of the Change Order, no additional compensation for the work covered in the Change Order shall be considered.

L. Correlation Of Contractor Submittals:
   1. Promptly revise the Schedule of Values and the Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum. Promptly revise progress schedules to reflect any change in the Contract Time, revise sub-schedules to adjust times for any other items of work affected by the change, and resubmit.
   2. Promptly enter changes in the Project Record Documents.
   3. Update Schedule of Values and Subcontractor List as required.

1.10 DEFECT ASSESSMENT

A. Refer to General Conditions §12.2. Replace the Work, or portions of the Work, not conforming to specified requirements.

B. If, in the opinion of the Design Agent, it is not practical to remove and replace the Work, the Design Agent will direct an appropriate remedy or adjust payment.

C. The defective Work may remain, but the unit sum will be adjusted to a new sum at the discretion of the Design Agent.

D. The defective Work will be partially repaired to the instructions of the Design Agent, and the unit sum will be adjusted to a new sum at the discretion of the Design Agent.

1.11 WARRANTY INSPECTION RETAINAGE

A. One-half of one percent of the cost of the Work will be retained from Final Payment for duration of twelve (12) months from date of Substantial Completion. This shall be included in the Schedule of Values. If, after ten months, all systems including mechanical and electrical, are determined by the User Agency to be properly functioning, the Warranty Inspection Retainage will be released.

B. If, after twelve (12) months, there are found to be modifications, adjustments, or corrections necessary to be made to address any system or product malfunction, in order to fulfill specified performance or requirements of such systems or products, release of the warranty inspection retainage will be delayed until such malfunctions are rectified.

C. If, after twelve (12) months from the date of Substantial Completion, all systems have not been fully addressed, the User Agency may utilize the Warranty Inspection Retainage to hire others to execute necessary modifications, adjustments, or corrections.

1.12 WAIVER OF LIEN FORM

A. RIC Document Waiver of Lien Form is included, following this page, as an integral part of the Contract documents. A copy with completed information must be submitted with the second and each succeeding Application for Payment.

1.13 MBE COMPLIANCE

A. The MBE Compliance Form is included after this section. Contractors shall work with the RI Office of Diversity, Equity & Opportunity to ensure that all participation and reporting requirements are met.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

RHODE ISLAND COLLEGE

Capital Projects Administration
600 Mount Pleasant Ave, Welcome Center Suite 300, Providence, RI 02908

WAIVER OF LIEN FORM MATERIAL OR LABOR

Construction Project Title: _____

General Contractor: _____

Subcontractor/Supplier: _____

DUNS No.: _____

Application / Certificate for Payment No.: _____

Paid Through Date: _____

Schedule of Values Line Item No.: _____

Description of Work Heading: _____

Total Payments Received, Including Current Payment: _____

The undersigned Representative of the above Subcontractor/Supplier has been contracted by the above General Contractor to furnish materials, or labor, or both, as included in the approved Schedule of Values under the Line Item No. and Description of Work Heading indicated above, for the Construction Project listed above.

The undersigned acknowledges receipt of payment, under this Line Item No. and Description of Work Heading, and hereby waives and releases any and all lien, or claim or right to lien, on the Construction Project listed above, and premises, under the statutes of the State of Rhode Island, relating to Mechanics Liens, on account of materials, or labor, or both, furnished, or which may be furnished, by the undersigned to, or on account of, the above numbered Application and Certificate for Payment.

Dated at this _____day of_____, 20____

Company: _____

Signature: _____

Printed Name: _____

Title: _____

END OF ATTACHMENT

Office of Diversity, Equity and Opportunity (ODEO)
MBE Compliance Office
1 Capitol Hill, 3rd Floor
Providence, RI 02908

(401) 574-8670
http://odeo.ri.gov/

Pursuant to RIGL 37-14.1 as well as the regulations promulgated thereto, the MBE Compliance Office requires that you complete the following table. Please note that these figures will be verified with the MBEs identified. If there are outstanding issues, such as retainage or a dispute, please indicate and attach supporting documentation for same. Also note that copies of invoice and cancelled checks for payment to all MBE subcontractors and suppliers are required.

Contractor/Vendor Name:
Project Name & Location:
Original Prime Contract Amount: $_____ **Current Prime Contract Amount: $_____** **% Complete: _____**

MBE/WBE Subcontractor	Original Contract Amount	Change Orders	Revised Contract Value	% Completed To Date	Amount Paid To Date	Amount Due	Retainage %	Retainage Amount	Explanation

I declare, under penalty of perjury, that the information provided in this verification form and supporting documents is true and correct.

_____ Signature

_____ Date

_____ Printed Name

Notary Certificate:

Sworn before me this _____ day of _____ , 20___.

_____ Notary Signature

_____ Commission Expires

END OF ATTACHMENT

01 22 00 – UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

B. Related Requirements:

1. Section 01 20 00 "Price & Payment Procedures" for procedures for submitting and handling Change Orders.

1.3 DEFINITIONS

A. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

B. Excavation quantities shall be measured on a volume basis as computed from original in-place position. Fill quantities shall be measured on a volume basis as computed from in-place position.

C. No removed material shall be calculated against more than one category of allowance.

1.4 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead, and profit.

B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. User Agency reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at User Agency's expense, by an independent surveyor acceptable to Contractor.

1.5 SCHEDULE OF UNIT PRICES

A. Please refer to the Bid Form for the list of Unit Costs. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

1. See attached Bid Form.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 23 00 – ALTERNATES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Description of alternates.

1.2 ACCEPTANCE OF ALTERNATES

A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at User Agency's option. Accepted alternates will be identified in the Contract Documents.

B. Coordinate related work and modify surrounding work to integrate the Work of each alternate.

1.3 SCHEDULE OF ALTERNATES

A. See attached Bid Form.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 30 00 – ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Pre-Award Meeting.

B. Site Administration.

C. Coordination and Project Conditions.

D. Preconstruction Meeting.

E. Site Utilization Plan.

F. Preconstruction Video.

G. Site Mobilization Meeting.

H. Progress Meetings.

I. Digital Photographs of Progress.

J. Pre-installation Meetings.

1.2 PRE-AWARD MEETING

A. Following the issuance of the Notice of Tentative Award from the RI State Purchasing Office, the Design Team, User Agency and Contractor shall convene as soon as possible for a Pre-Award Meeting.

B. The Architect shall prepare meeting minutes and provide to the User Agency in Microsoft Word format within two (2) business days of the meeting. The User Agency shall review and make edits as required and transmit to the Contractor for review and acceptance. Upon the receipt of an email indicating the Contractor's acceptance of the minutes, the User Agency shall prepare the AIA Contract and General Conditions.

C. Agenda

1. Introductions.
2. Roles, responsibilities and lines of communications.
3. Site utilization expectations.
4. Anticipated schedule.
5. Thorough Scope Review, using form generated by the User Agency and Design Agent. Form shall become part of the Contract Documents.
6. Discussion of inspections, testing, verification and commissioning.
7. Review of pre-award and post-contract documents, deliverables and requirements.

1.3 SITE ADMINISTRATION

A. Maintain a daily attendance log to include the names of all project employees and guests to the site. Each guest signing the log should indicate a brief description of the reason for the visit, the guest's employer or organization. The log sheet, or sheets, must clearly indicate the Project Name, and the name of the general Contractor. Each line in the log should allow for the name of

that employee, the employee's job title (use terminology used by prevailing wage job title), and the name of that employee's employer. This log shall be kept on a uniform form prescribed by the Director of Labor and Training. Such log shall be available for inspection on the site at all times by the Purchaser, Owner, User Agency, and/or the Director of the Department of Labor and Training and his or her designee. Provide copies when requested.

B. Daily Attendance Form
   1. Maintain Daily Attendance Form acceptable to the Department of Labor and Training for all projects with a contract value over $1 Million. Submit as requested.

1.4 COORDINATION AND PROJECT CONDITIONS

A. Coordinate the scheduling, submittals, and the Work of the various Sections of the Project Manual to ensure an efficient and orderly sequence of the installation of interdependent construction elements.

B. Verify that the utility requirements and characteristics of the operating equipment are compatible with the building utilities. Coordinate the Work of the various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

C. Coordinate the space requirements, supports and installation of the mechanical and electrical Work, which are indicated diagrammatically on the Drawings. Follow the routing shown for the pipes, ducts, and conduit, as closely as practicable; place runs parallel with the lines of the building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

D. Coordinate the completion and cleanup of the Work of the separate Sections in preparation for Substantial Completion and for portions of the Work designated for the User Agency's partial occupancy.

E. After the User Agency's occupancy of the premises, coordinate access to the site for correction of defective Work and the Work not in accordance with the Contract Documents to minimize disruption of the User Agency's activities.

1.5 PRECONSTRUCTION MEETING

A. The Design Agent will schedule a meeting after a Purchase Order is issued to the Contractor.

B. Attendance Required: User Agency's Representative, Design Agent, and Contractor.

C. Agenda:
   1. Distribution of the Contract Documents.
   2. Review of submission of contractually required deliverables: Superintendent Qualifications, procurement timeline and list of Subcontractors, list of products, submittal log with timelines, schedule of values, project schedule, site safety procedures and mobilization schedule.
   3. Designation of the personnel representing the parties in the Contract and the Design Agent.
   4. The procedures and processing of requests for information, site access, field decisions, submittals, substitutions, applications for payments, proposal requests, Change Orders, and Contract closeout procedures.
   5. Scheduling.

D. The Design Agent shall record the minutes and distribute copies within two (2) days of the meeting to the participants, with copies to the Contractor, User Agency, other participants, and those consultants affected by the decisions made.

1.6 SITE UTILIZATION PLAN

A. A preliminary site utilization information will be provided by the User Agency to the awarded contractor for use in developing their Site Utilization Plan.
   1. Contractor is responsible for protection and restoration of existing conditions including, but not limited to hardscape, landscape and lawns.
   2. Contractor shall provide restrictive devices to construction areas that are clearly separating work from non-work areas. These devices shall be maintained around building while allowing access to all egress doors and full use by the Owner.
   3. Contractor to provide overhead cover protection at all entrances and egresses from the building. Entrances and paths of egress must be clearly marked with signage with placement and language approved in advance by the Owner.
   4. Staging of equipment, dumpsters and materials must be situated within the project areas.

B. Large deliveries of materials or equipment that may block parking or access to the parking lot area shall occur prior to 7:30am. Use of areas outside of the project area will be permitted during off-hours is permissible provided such use is coordinated with the Owner at least 72 hours in advance.

C. For activities requiring closure of the parking lot, roadways and/or walkways, the Contractor is responsible for all temporary barriers and acquiring RIC Campus Police details to route pedestrians and vehicular traffic.

D. A Site Utilization Plan shall be submitted by the Contractor within ten (10) business days of issuance of the Purchase Order for approval by the Owner.

1.7 PRECONSTRUCTION VIDEO

A. Conduct a pre-construction survey of the project side and areas immediately adjacent to the site. Submit two (2) copies of the video on DVD to the User Agency.

1.8 SITE MOBILIZATION MEETING

A. The Design Agent will schedule a meeting at the Project site prior to the Contractor's occupancy and may occur at the same time as the Preconstruction meeting noted above.

B. Attendance Required: The User Agency, Design Agent, Contractor, the Contractor's Superintendent, and major Subcontractors.

C. Agenda:
   1. Use of the premises by the User Agency and the Contractor.
   2. The User Agency’s requirements and partial occupancy.
   3. Construction facilities and controls provided by the User Agency.
   4. Temporary utilities provided by the User Agency.
   5. Security and housekeeping procedures.
   6. Schedules.

7. Application for payment procedures.
8. Requirements for the start-up of equipment.
9. Inspection and acceptance of the equipment put into service during the construction period.

D. Contractor shall record the minutes and distribute the copies within two days after the meeting to the participants, with copies to the Design Agent, User Agency, other participants, and those consultants affected by the decisions made.

1.9 PROGRESS MEETINGS

A. Schedule and administer the meetings throughout the progress of the Work at weekly intervals while work is in process.

B. Make arrangements for the meetings, prepare the agenda with copies for the participants, and preside at the meetings.

C. Attendance Required: The job superintendent, major subcontractors and suppliers, the User Agency, Design Agent, and Consultants as appropriate to agenda topics for each meeting.

D. Agenda:

1. Review the minutes of previous meetings.
2. Review of the Work progress.
3. Field observations, problems, and decisions.
4. Identification of the problems which impede the planned progress.
5. Review of the submittals schedule and status of the submittals.
6. Review of delivery schedules.
7. Maintenance of the progress schedule.
8. Corrective measures to regain the projected schedules.
9. Planned progress during the succeeding work period.
10. Coordination of the projected progress.
11. Maintenance of the quality and work standards.
12. Effect of the proposed changes on the progress schedule and coordination.
13. Other business relating to the Work.

E. Contractor shall record the minutes and distribute the copies within two days after the meeting to the participants, with copies to the Design Agent, Consultants, User Agency, participants, and others affected by the decisions made.

1.10 DIGITAL PHOTOGRAPHS OF WORK PROGRESS

A. Submit minimum 12 digital photographs of construction progress each month. Include both jpg. and reduced-size pdf versions for email use. Refer to Price and Payment Procedures 01 20 00

B. Include an additional minimum of 12 photographs documenting underground utilities when installed in relationship to visible site features.

C. Include photographs of important in-wall or ceiling utilities before close-in at appropriate stages of construction.

D. See Section 01 78 00 for close-out copy requirements of these files.

1.11 PREINSTALLATION MEETINGS

A. When required in the individual specification Sections or listed below, convene a pre-installation meeting at the site prior to commencing the Work of the Section. Pre-installation Meetings:
   1. The following items of work will require pre-installation meetings:
      a. Temporary HVAC systems
      b. Door Access and Security Systems

B. Require attendance of the parties directly affecting, or affected by, the Work of the specific Section.

C. Notify the Design Agent four days in advance of the meeting date.

D. Prepare an agenda and preside at the meeting:
   1. Review the conditions of installation, preparation and installation procedures.
   2. Review coordination with the related work.

E. Record the minutes and distribute the copies within two days after the meeting to the participants, with copies to the Design Agent, User Agency, participants, and those Consultants affected by the decisions made.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 33 00 – SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Submittal procedures.

B. Site superintendent.

C. Construction progress schedules.

D. Subcontractor list.

E. Proposed products list.

F. Product data.

G. Shop drawings.

H. Samples.

I. Test reports.

J. Design Data.

K. Certificates.

L. Manufacturer's instructions.

M. Manufacturer's field reports.

N. Erection drawings.

1.2 SUBMITTAL PROCEDURES

A. Per General Conditions §3.10.2, a Submittal Schedule (Log) shall be submitted. To ensure timely execution of the work, Contractor is encouraged to submit the Submittal Schedule for review within seven (7) calendar days of issuance of the Purchase Order. The Submittal Log shall list all required submittals, organized by division and section, with a proposed date for each item to be submitted. This shall coordinate with the construction schedule.

1. As the project progresses, update the Submittal Log with the date submittal was sent, days since submittal was sent, status of submittal, date submittal was received in return, and any date associated with resubmittals.
2. Update the Submittal Log with each submission and response.
3. Issue copy of the updated Submittal Log electronically with each Application for Payment or upon request by the User Agency.

B. Preparation and transmission of submittals:

1. Identify all variations from the Contract Documents and any Product or system limitations which may be detrimental to a successful performance of the completed Work.
2. Allow space on the submittals for the Contractor's, Design Agent’s, and Consultant's electronic review stamps.
3. Transmit each submittal with a dated Design Agent-accepted transmittal form.

4. Sequentially number the transmittal form. Mark revised submittals with an original number and a sequential alphabetic suffix.
5. Identify the Project, Contractor, subcontractor and supplier; the pertinent drawing and detail number, and the specification Section number, appropriate to the submittal.
6. Apply a Contractor's electronic stamp certifying that the review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of the information is in accordance with the requirements of the Work and the Contract Documents.
7. Transmit printed copies and electronic PDF copy of each submittal to the Design Agent for review and comment as outlined in Section.

C. Submittal Review & Resubmission
1. For each submittal, allow fifteen (15) calendar days for review.
2. When revised for resubmission, identify the changes made since the previous submission.
3. Distribute copies of the reviewed submittals as appropriate. Reproduce as necessary to inform subcontractors without internet download capabilities. Instruct the parties to promptly report any inability to comply with the Contract requirements.
4. Produce additional copies as required for the Record Document purposes as described in Section 01 78 00.

1.3 SITE SUPERINTENDENT

A. Immediately after the issuance of the Purchase Order, Contractor shall submit the name, email, cell phone, resume of the proposed site superintendent for review and approval by the Design Agent and User Agency.

B. The site superintendent shall be familiar with the drawings and specifications.

C. No substitution or replacement of the site superintendent shall be made without notifying the Design Agent and User Agency.

1.4 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial progress schedule in duplicate within ten (10) days of issuance of Purchase Order for Design Agent and User Agency. Upon receipt of reviewed comments, Contractor to submit detailed schedules within five (5) days.

B. Distribute copies of the reviewed schedules to the Project site file, subcontractors, suppliers, and other concerned parties. Instruct the recipients to promptly report, in writing, the problems anticipated by the projections indicated in the schedules

C. Submit updated schedules with each Application for Payment, identifying changes since previous version as follows:
1. Indicate the progress of each activity to the date of submittal, and the projected completion date of each activity.
2. Identify the activities modified since the previous submittal, major changes in the scope, and other identifiable changes.
3. Provide a narrative report to define the problem areas, the anticipated delays, and impact on the Schedule. Report the corrective action taken, or proposed, and its effect including the effect of changes on the schedules of separate contractors.

D. Submit a computer-generated horizontal bar chart with separate line for each major portion of the Work or operation, identifying the first work day of each week.

E. Show a complete sequence of construction by activity, identifying the Work of separate stages and other logically grouped activities. Indicate the early and late start, the early and late finish, float dates, and duration. Critical path items shall be clearly identified.

F. Indicate an estimated percentage of completion for each item of the Work at each submission.

G. Provide a separate schedule of submittal dates for shop drawings, product data, and samples, including User Agency-furnished Products and Products identified under Allowances, if any, and the dates reviewed submittals will be required from the Design Agent. Indicate the decision dates for selection of the finishes.

H. Indicate the delivery dates for User Agency furnished Products, and for Products identified under Allowances.

1.5 SUBCONTRACTOR LIST

A. Provide subcontractor list per General Conditions §5.2.1. For each subcontractor, provide contact name, phone number, trade and email. Indicate the SOV line item(s) for which the subcontractor will be providing and if labor will be provided.

1.6 PROPOSED PRODUCTS LIST

A. Within ten (10) days of issuance of Purchase Order, submit a list of major products proposed for use, with the name of the manufacturer, the trade name, and the model number of each product.

B. For the products specified only by reference standards, give the manufacturer, trade name, model or catalog designation, and reference standards.

C. With each product listed, indicate the submittal requirements specified to be adhered to, and an indication of relevant "long-lead-time" information, when appropriate.

1.7 PRODUCT DATA

A. Product Data: Submit to the Design Agent for review for the limited purpose of checking for conformance with the information given and the design concept expressed in the Contract Documents. Provide copies and distribute in accordance with the SUBMITTAL PROCEDURES article and for the record documents purposes described in Section 01 78 00.

B. Submit one (1) printed copy and one (1) electronic PDF copy for review. The Design Agent will retain the reviewed printed copy for record and return the reviewed electronic PDF copy to the Contractor for distribution.

C. Mark each copy to identify the applicable products, models, options, and other data. Supplement the manufacturers' standard data to provide the information specific to this Project.

D. Indicate the product utility and electrical characteristics, the utility connection requirements, and the location of utility outlets for service for functional equipment and appliances.

E. After a review distribute in accordance with the Submittal Procedures article above and provide copies for record documents described in Section 01 78 00.

1.8 SHOP DRAWINGS

A. Shop Drawings: Submit to the Design Agent for review for the limited purpose of checking for conformance with the information given and the design concept expressed in the Contract Documents. Produce copies and distribute in accordance with the SUBMITTAL PROCEDURES article and for the record documents purposes described in Section 01 78 00.

B. Submit two (2) printed copies and one (1) electronic PDF copy for review. The Design Agent and /or Consultants will retain the reviewed printed copies for record and return the reviewed electronic PDF copy to the Contractor for distribution.

C. Indicate the special utility and electrical characteristics, the utility connection requirements, and the location of utility outlets for service for functional equipment and appliances.

1.9 SAMPLES

A. Samples: Submit to the Design Agent for review for the limited purpose of checking for conformance with the information given and the design concept expressed in the Contract Documents. Produce duplicates and distribute in accordance with the SUBMITTAL PROCEDURES article and for the record documents purposes described in Section 01 78 00.

B. Samples for Selection as Specified in Product Sections:

1. Submit to the Design Agent for aesthetic, color, or finish selection.
2. Submit samples of the finishes in the colors selected for the Design Agent's records.
3. After review, produce duplicates and distribute in accordance with the SUBMITTAL PROCEDURES article and for the record documents purposes described in Section 01 78 00.

C. Submit samples to illustrate the functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate the sample submittals for interfacing Work.

D. Include identification on each sample, with the full Project information.

E. Submit at least the number of samples specified in the individual specification Sections; the Design Agent will retain two samples.

F. Reviewed samples, which may be used in the Work, are indicated in the individual specification Sections.

G. Samples will not be used for testing purposes unless they are specifically stated to be in the specification Section.

1.10 TEST REPORTS

A. Submit (1) printed and (1) electronic PDF lab reports in accordance with Section 01 40 00.

B. Submit test reports for information for the limited purpose of assessing conformance with the information given and the design concept expressed in the Contract Documents.

1.11 DESIGN DATA

A. Submit (1) printed and (1) electronic PDF data for the Design Agent’s knowledge as contract administrator for the User Agency.

B. Submit information for the limited purpose of assessing conformance with the information given and the design concept expressed in the Contract Documents.

1.12 CERTIFICATES

A. When specified in the individual specification Sections, submit (1) printed and (1) electronic PDF certification by the manufacturer, installation/application subcontractor, or the Contractor to the Design Agent in the quantities specified for the Product Data.

B. Indicate that the material or product conforms to or exceeds the specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on the material or product, but must be acceptable to the Design Agent and its Consultants.

1.13 MANUFACTURER'S INSTRUCTIONS

A. When specified in the individual specification Sections, submit (1) printed and (1) electronic PDF copy of instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to the Design Agent for delivery to the User Agency in the quantities specified for Product Data.

B. Indicate the special procedures, and the perimeter conditions requiring special attention, and the special environmental criteria required for application or installation.

1.14 MANUFACTURER'S FIELD REPORTS

A. Submit (1) printed and (1) electronic PDF of reports for the Design Agent's benefit as contract administrator for the User Agency.

B. Submit the report within 30 days of observation to the Design Agent for the limited purpose of assessing conformance with the information given and the design concept expressed in the Contract Documents.

1.15 ERECTION DRAWINGS

A. When specified in the individual Specification sections, the trade contractors shall submit (1) printed and (1) electronic PDF copy of erection drawings for review prior to proceeding with fabrication and/or construction.

B. Erection drawings shall be prepared in accordance with the latest edition of the respective trades' codes of standard practice.

C. All erection drawings shall be fully developed by the trade contractors or by agents of the contractors. CAD files, photocopies, or other reproductions of the contract drawings in whole or in part shall not be used by the trade contractors or their agents for the preparation and development of erections drawings without the expressed written consent of the Design Agent.

1.16 SUBMITTAL LIST

A. See individual specification sections for requirements.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 35 23 – HOT WORK PROCEDURE

PART 1 - GENERAL

1.1 PURPOSE

A. To establish regulations and rules for the safe uses of open flames and spark producing equipment in state owned or leased facilities. Applicable regulations pertinent to this guide include OSHA 29 CFR 1910.252-.255 and NFPA 51B, and the insurers Hot Work Requirements.

1.2 POLICY

A. Fire Protection

1. Contractors and employees shall comply with the regulations set forth in this policy to ensure the safe use of open flames and spark producing equipment.
2. When performing work within a state facility with a cutting torch or when using welding, brazing or soldering equipment a hot work permit is required to be filled out and precautions followed. The Hot Work Permits are available (free of charge) directly from the state's property insurer.
3. Prior to the start of the hot work operation, the contractor is to coordinate deactivation of related of the alarm system necessary to prevent false alarms prior to the start of the hot work operation with the User Agency.
4. Upon completion of the project the fire alarm system will be restored to operational status.
5. During the hot work operation the following precautions will be followed:

    c. A fire watch will be required by the individual responsible for authorizing the hot work operation.

    d. Welding leads and burning hoses are to be kept out of walkways as much as possible

    e. Inspect all leads, grounds, clamps, torches and cylinders before use. Be sure all fittings, couplings and connections are tight.

    f. In gas welding and cutting, mixtures of fuel gas and air or oxygen must not be permitted except prior to consumption.

    g. Only approved apparatus must be used, and portable cylinders of compressed gas must be properly secured to prevent upset.

    h. Use proper ventilation in the work area.

    i. All exposed combustible and flammable material within 35 feet of the point of operation should be removed where possible. Otherwise, protect with Approved welding pads, blankets and curtains, fire resistive tarpaulins or metal shields.

    j. Cutting or welding on pipes or other metal in contact with combustible walls, partitions, ceilings or roofs shall not be undertaken if the work is close enough to cause ignition by conduction.

    k. All hoses and leads will be inspected frequently and will be replaced as necessary.

    l. A cutting or welding prohibition will be required whenever an area contains or may contain flammable/explosive vapors. The prohibition can only be lifted

when the area has been purged and cleaned and the area has been tested and shown to be free of a flammable/explosive mix.

1.3 RESPONSIBILITY

A. Supervisor

1. Supervisor will train their employees in the potential fire hazards associated with hot work.
2. Supervisor will initiate a hot work permit prior to assigning work.
3. The supervisor will obtain confirmation that:
    a. Available sprinklers, hose streams and extinguishers are in service and operable.
    b. Hot work equipment is in good working condition.
    c. The following requirements within 35 feet of hot work shall be adhered to: a.) Flammable liquid, dust, lint and oily deposits have been removed. b.) Explosive atmosphere has been eliminated.
    d. The floors have been swept clean.
    e. Combustible floors have been wet down, covered with damp sand or fire resistive sheets are in place.
    f. All exposed combustible and flammable material within 35 feet of the point of operation should be removed where possible. Otherwise, protect with FM Approved welding pads, blankets and curtains, fire resistive tarpaulins or metal shields.
    g. All wall and floor openings are covered.
    h. FM approved welding pads, blankets and curtains installed under and around work.
    i. Protect or shut down ducts and conveyors that might carry sparks to distant combustible material.
4. The supervisor is responsible for assuring that a 60 minute fire watch is maintained at the completion of all hot work assignments, that a hot work permit has been acquired for work involving open flames or spark producing tools and for assuring all fire prevention procedures and precautions are followed for protection of people and property including a fire watch, deactivation of the fire alarm.
5. The supervisor will require that the area be monitored periodically for three hours after the fire watch is completed.
6. The supervisor will confirm that employees are trained in use of fire extinguishers and hoses, and that the employees are familiar with emergency procedures in the event of a fire.
7. At least once while the permit is in effect, the area should be inspected by the individual responsible for authorizing, cutting or welding operations to ensure that it is a fire safe area. (See article 3 above for fire safe conditions.)
8. Proper personnel protective equipment including helmets, eye wear, face and hand shields applicable to the equipment used will be provided by the supervisor.
    a. The equipment will be maintained and fit tested by management.
9. Personal protective clothing consistent with OSHA standards will be worn.
10. Tarps or fire resistant coverings sufficient to cover combustible materials within 35 feet of the operation will be provided.

B. Employees
   1. The employee shall be responsible to work in a safe manner and follow all safety precautions as trained by the supervisor.
   2. The employee charged with performing the hot work will initiate part 2 of the hot work permit and verify that a 60 minute fire watch has been maintained.
   3. Employees performing hot work will be required to either properly remove or cover combustible materials in the 35 foot area surrounding the hot work operation.

C. Fire Safety Officer
   1. The state employee charged with maintaining or inspecting the fire alarm system will deactivate the system.
   2. The area will be evaluated by this individual to identify fire hazards and provide required suppression equipment.
   3. The fire safety officer will ensure that combustible materials within 35 feet of the hot work operation are properly tarped or moved a safe distance.
   4. In addition, this officer will ensure that personnel in close proximity to this work area are properly protected against heat, sparks and slug.

D. Management
   1. Maintain a log of hot work permits.
   2. Provide safety training for supervisors.
   3. Confirm that all contractors follow all requirements of this protocol.

HOT WORK PERMIT

STOP!
Avoid hot work or seek an alternative/safer method, if possible.

This *Hot Work Permit* is required for any temporary operation involving open flames or producing heat and/or sp
This includes, but is not limited to: brazing, cutting, grinding, soldering, torch-applied roofing and welding.

Part 1

Instructions

1. **Firesafety supervisor:**
   - **A.** Verify precautions listed at right (or do not proceed with the work).
   - **B.** Complete and retain Part 1. (**Part 1A** is for quality assurance documentation, if necessary.)
   - **C.** Issue **Part 2** to person performing hot work.

HOT WORK BY
☐ Employee
☐ Contractor _____

DATE	JOB NUMBER

LOCATION/BUILDING AND FLOOR

NATURE OF JOB

NAME (PRINT) AND SIGNATURE OF PERSON PERFORMING HOT WORK

I verify the above location has been examined, the precautions checked on the Required Precautions Checklist have been taken to prevent fire, and permission is authorized for this work.

NAME (PRINT) AND SIGNATURE OF FIRESAFETY SUPERVISOR/OPERATIONS SUPERVISOR

TIME STARTED: a.m. p.m. TIME FINISHED: a.m. p.m.

Permit Expires	DATE	TIME	a.m. p.m.

Note: Emergency notification on back of form.
Use as appropriate for your facility.

To order additional hot work permits or other FM Global resources, order online 24 hours a day, seven days a week, at www.fmglobalcatalog.com.

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Required Precautions Checklist

- ☐ Control valves to water supply for sprinkler system are open.
- ☐ Hose streams and extinguishers are in service/operable.
- ☐ Hot work equipment in good working condition.

Requirements within 35 ft. (11 m) of hot work

- ☐ Flammable liquid, dust, lint and oily deposits removed.
- ☐ Explosive atmosphere in area eliminated.
- ☐ Floors swept clean.
- ☐ Combustible floors wet down, covered with damp sand or fire-resistive sheets.
- ☐ Remove other combustible material where possible. Otherwise, protect with FM Approved welding pads, blanket and curtains, fire-resistive tarpaulins or metal shields.
- ☐ All wall and floor openings covered.
- ☐ FM Approved welding pads, blankets and curtains installed and around work.
- ☐ Protect or shut down ducts and conveyors that might carry to distant combustible material.

Hot work on walls, ceilings or roofs

- ☐ Construction is noncombustible and without combustible co or insulation.
- ☐ Combustible material on other side of walls, ceilings or roofs i

Hot work on enclosed equipment

- ☐ Enclosed equipment cleaned of all combustible material.
- ☐ Containers purged of flammable liquid/vapor.
- ☐ Pressurized vessels, piping and equipment removed from ser isolated and vented.

Fire watch/hot work area monitoring

- ☐ Fire watch will be provided during and for one (1) hour after including any break activity.
- ☐ Fire watch is supplied with suitable extinguishers, and where a charged small hose.
- ☐ Fire watch is trained in use of equipment and in sounding ala
- ☐ Fire watch may be required in adjoining areas, above and bel
- ☐ Monitor hot work area for up to an additional three (3) hours one (1) hour fire watch.

☐ **Other precautions taken:**

_____
_____
_____
_____

END OF SECTION

01 35 24 – MANAGING FIRE PROTECTION SYSTEM IMPAIRMENT

PART 1 - GENERAL

1.1 IMPLEMENTATION

A. The following management procedure applies to the Contract for Construction and is a part of the Contract Documents.

1.2 MANAGING FIRE PROTECTION SYSTEM IMPAIRMENT

A. Impairment to fire protection equipment is a situation in which the system is shut off, either in whole or in part. The impairment may be necessary to conduct scheduled maintenance of equipment or to make emergency repairs. Impairment may also be due to new construction. Normal system tests and inspections are not considered impairment.

B. Regardless of the reason, impairment results in the sprinkler system and/or fire alarm system being temporarily out of service, such a condition may result in severe property loss in the event of a fire. Locations protected by automatic sprinkler systems must have an impairment handling program to control situations when sprinkler systems must be shut down.

C. Whenever a sprinkler system has been impaired all hot work in the area of the impaired system should be prohibited.

D. A periodic fire watch should be established when either the sprinkler system or the fire alarm system is out of service.

E. The State's property insurance carrier recommends an impairment handling kit. The Red Tag Permit System consists of four key elements:

1. A Red Tag Permit
2. Fire Protection Equipment Decals: are to be affixed to fire protection equipment as a reminder that authorization is needed before any shut down can occur.
3. Reusable Impairment Tag for Fire Service Connections: There is space on the notification tag for the phone numbers of the Fire department, Alarm Company, and the local Water Department as well.
4. Red Tag Permit System Wall Hanger: contains pockets to keep other elements of the system organized and within reach; also, the Hanger lists steps to be taken before, during and after impairment. The Wall Hanger also lists the contact to be notified of the impairment.

F. An engineer and/or client service representative can advise you on how to proceed and follow up until protection has been restored. In addition, this representative may be able to help minimize downtime, if possible, reduce fire exposure to the area, arrange for temporary protection and determine how to restore protection as quickly as possible.

G. For scheduled maintenance of fire alarm systems, vendors must, as prescribed in Rhode Island Fire Codes, notify the User Agency 48 hours in advance of pending maintenance.

H. As part of base contract, the Contractor is required to provide a licensed electrician to oversee and perform the required temporary modifications to the fire alarm system during the impairment, including bypass control during fire sprinkler work. The College will not provide personnel for this purpose.

END OF SECTION

RHODE ISLAND COLLEGE

OFFICE OF CAPITAL PROJECTS | 600 MOUNT PLEASANT AVE, PHYSICAL PLANT, PROVIDENCE, RI 02908

FIRE SPRINKLER AND ALARM SYSTEM IMPAIRMENT NOTIFICATION FORM

To: RIC Office of Capital Projects

Date: _____

Start of Planned Impairment: _____

End of Planned Impairment: _____

Building occupied during impairment: Yes:___ No:____

Any hot work to be performed: Yes:___ No:____

Description of Work to be performed:

_____

_____

_____

_____

_____

_____

_____

_____

RIC Trade & Fire Alarm Safety Manager, David Benevides, can also be directly contacted at 401-456-4747.

Contractor supervisory personnel shall remain in the building for the entire duration of the impairment.

Name: _____

Company: _____

Phone: _____

RED TAG PERMIT

CONTROL NUMBER	INDEX NUMBER
2151373	

PRECAUTIONS TAKEN (CHECK AS APPROPRIATE)

- ☐ Emergency Organization Notified
- ☐ Public Fire Department Notified
- ☐ Hazardous Operations Stopped
- ☐ Hot Work Prohibited
- ☐ Smoking Restricted
- ☐ Other _____
- ☐ Continuous Work Authorized
- ☐ Ongoing Patrol of Area
- ☐ Hydrant Connected to Sprinkler Riser
- ☐ Pipe Plugs on Hand
- ☐ Fire Hose Laid Out

CONTACT NAME

LOCATION (City, State/Province)

CONTACT PHONE NO.	CONTACT FAX NO.

CHECK IF	SPRINKLER VALVE LOCATION/NUMBER
☐ SPRINKLER ☐ FIRE PUMP ☐ CO_2 ☐ HALON ☐ OTHER	AREA PROTECTED

REASON FOR IMPAIRMENT

PLANNED DATE/TIME TO BE CLOSED

PLANNED DATE/TIME TO BE OPEN

NAME/TITLE OF RESPONSIBLE PERSON

AUTHORIZED BY (NAME)	FIRE PROTECTION EQUIPMENT OPERATOR (NAME)

PART 1 INSTRUCTIONS

Permit Authorizer: Fill out using ballpoint pen, sign and issue permit as follows:

Phone Part 1 information, or fax this part, to the FM Global number listed on the Red Tag Permit Wall Kit.

Place Part 2 in center pocket of Wall Kit as visual reminder of impairment.

Issue Part 3 (Red Tag) to Fire Protection Equipment Operator to attach to impaired equipment.

FM Global

RED TAG PERMIT

Part 1 of 3

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END OF ATTACHMENT

01 40 00 – QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Quality control and control of installation.

B. Contractor Qualifications

C. Verification of Credentials and Licenses.

D. Tolerances

E. References.

F. Testing and inspection services.

G. Manufacturers' field services.

H. Mock-up Requirements.

I. Testing and Balancing.

J. Repair of Defective Construction

1.2 QUALITY CONTROL AND CONTROL OF INSTALLATION

A. Monitor a quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of the specified quality.

B. Comply with all manufacturers' instructions and recommendations, including each step in sequence.

C. When the manufacturers' instructions conflict with the Contract Documents, request a clarification from the Design Agent before proceeding.

D. Comply with the specified standards as a minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform the Work by persons qualified to produce the required and specified quality.

F. Verify that field measurements are as indicated on the Shop Drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.3 CONTRACTOR QUALIFICATIONS

A. To demonstrate qualification for performing the Work of this Contract, bidders may be requested to submit written evidence of financial position and license to perform work in the State.

B. The owner reserves the right and sole discretion to determine equivalent or prior experience and the right to reject any or all bids which fail to demonstrate equivalent prior experience.

The owner will contact project references and reserves the right to reject bids based on poor performance with similar projects.

C. Qualifications will be evaluated based on similar project experience for:
   1. Completion of at least 3 similar historically significant projects within the past five for both the general contractor and subcontractors.
   2. Size and dollar value of similar completed projects.
   3. Contractor's performance with similar projects. (references will be checked)
   4. Contractor's ability to subcontract with qualified firms.
   5. Relevant experience of individuals assigned to the project.

1.4 VERIFICATION OF CREDENTIALS AND LICENSES

A. The User Agency has implemented a project management oversight process and is applying it to current construction projects at RIC.

B. An element of this oversight process is the verification that persons employed on the project site have appropriate and current credentials and licenses in their possession, at the project site, for the work they are performing.

C. Be forewarned that state resident inspectors will be checking for verification of credentials and licenses of both union and non-union persons, in their onsite inspections.

D. State resident inspectors will also be reviewing Contractor's Certified Monthly Payroll Records for conformance with RI State Prevailing Wage Rate requirements.

E. Those persons without the appropriate credentials and licenses will be subject to dismissal from the project site.

1.5 TOLERANCES

A. Monitor the fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with the manufacturers' tolerances. When the manufacturers' tolerances conflict with the Contract Documents, request a clarification from the Design Agent before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.6 REFERENCES

A. For products or workmanship specified by association, trade, or other consensus standard, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by the date of issue current on the date of the Contract Documents, except where a specific date is established by code.

C. Obtain copies of the standards where required by the product specification Sections.

D. When the specified reference standards conflict with the Contract Documents, request a clarification from the Design Agent before proceeding.

E. Neither the contractual relationships, duties, nor responsibilities of the parties in the Contract, nor those of the Design Agent, shall be altered from the Contract Documents by mention or inference otherwise in reference documents.

1.7 TESTING AND INSPECTION SERVICES

A. The Contractor will submit the name of an independent firm to the Design Agent for approval by the User Agency, to perform the testing and inspection services.
   1. Base Bid Testing Requirements List. The Contractor shall pay for all the services required in the Base Bid as described:
      a. Section 03 3001 – Cast-in-Place Concrete
      b. Section 04 0511 – Mortar and Masonry Grout
   2. Additional User Agency-Authorized Testing Requirements List Contractor shall coordinate any User Agency-authorized additional testing also described to be paid for from Testing Allowance:
      a. None

B. The independent firm will perform the tests, inspections and other services specified in the individual specification Sections and as required by the Design Agent or its Consultants.
   1. Laboratory: Authorized to operate in the location in which the Project is located.
   2. Laboratory Staff: Maintain a full-time registered Engineer on staff to review the services.
   3. Testing Equipment: Calibrated at reasonable intervals with devices of accuracy traceable to either the National Bureau of Standards or to the accepted values of natural physical constants.

C. Testing, inspections and source quality control may occur on or off the project site. Perform off-site testing as required by the Design Agent or the User Agency.

D. Reports will be submitted by the independent firm to the Design Agent, the Consultant for that trade, and the Contractor, in duplicate, indicating the observations and results of tests and indicating the compliance or non-compliance with Contract Documents.

E. Cooperate with the independent firm; furnish samples of the materials, design mix, equipment, tools, storage, safe access, and the assistance by incidental labor as requested.
   1. Notify the Design Agent and Engineer and the independent firm 24 hours prior to the expected time for operations requiring services.
   2. Make arrangements with the independent firm and pay for additional samples and tests required for the Contractor's use.

F. Testing and employment of the testing agency or laboratory shall not relieve the Contractor of an obligation to perform the Work in accordance with the requirements of the Contract Documents.

G. Re-testing or re-inspection required because of a non-conformance to the specified requirements shall be performed by the same independent firm on instructions by the Design Agent or its Consultant. Payment for the re-testing or re-inspection will be charged to the Contractor by deducting the testing charges from the Contract Sum.

H. Agency Responsibilities:
   1. Test samples of mixes submitted by the Contractor.

2. Provide qualified personnel at the site. Cooperate with the Design Agent or its Consultant and the Contractor in performance of services.
3. Perform specified sampling and testing of the products in accordance with the specified standards.
4. Ascertain compliance of the materials and mixes with the requirements of the Contract Documents.
5. Promptly notify the Design Agent, Consultant and the Contractor of observed irregularities or non-conformance of the Work or products.
6. Perform additional tests required by the Design Agent or its Consultants.
7. Attend the preconstruction meetings and the progress meetings.

I. Agency Reports: After each test, promptly submit two copies of the report to the Design Agent, appropriate Consultant, and to the Contractor. When requested by the Design Agent, provide an interpretation of the test results. Include the following:
   1. Date issued.
   2. Project title and number.
   3. Name of inspector.
   4. Date and time of sampling or inspection.
   5. Identification of product and specifications section.
   6. Location in the Project.
   7. Type of inspection or test.
   8. Date of test.
   9. Results of tests.
   10. Conformance with Contract Documents.

J. Limits On Testing Authority:
   1. Agency or laboratory may not release, revoke, alter, or enlarge on the requirements of the Contract Documents.
   2. Agency or laboratory may not approve or accept any portion of the Work.

K. Agency or laboratory may not assume any duties of the Contractor.

L. Agency or laboratory has no authority to stop the Work.

1.8 MANUFACTURERS' FIELD SERVICES

A. When specified in the individual specification Sections, require the material or Product suppliers, or manufacturers, to provide qualified staff personnel to observe the site conditions, the conditions of the surfaces and installation, the quality of workmanship, the start-up of equipment, or test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.

B. Submit the qualifications of the observer to the Design Agent 30 days in advance of the required observations. Observer is subject to approval of the Design Agent.

C. Report the observations and the site decisions or instructions given to the applicators or installers that are supplemental or contrary to the manufacturers' written instructions.

D. Refer to Section 01 33 00 - SUBMITTAL PROCEDURES, MANUFACTURERS' FIELD REPORTS article.

1.9 MOCK-UP REQUIREMENTS

A. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

B. Accepted mock-ups shall be a comparison standard for the remaining Work.

C. Where mock-up has been accepted by Architect and is no longer needed, remove mock-up and clear area when directed to do so.

1.10 TESTING, ADJUSTING, AND BALANCING

A. Submit, for the User Agency's approval, the name of an independent firm to perform testing, adjusting and balancing of systems. The independent firm's services will be paid for by the Contractor.

B. The independent firm will perform services specified in individual specifications Sections.

C. Reports will be submitted by the independent firm to the Design Agent and the User Agency indicating observations and test results, indicating compliance or non-compliance with specified requirements and with the requirements of the Contract Documents.

1.11 REPAIR OF DEFECTIVE CONSTRUCTION

A. Refer to General Conditions §12. Repair, or remove and replace, defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
    a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 50 00 – TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Temporary Utilities:
   1. Temporary electricity.
   2. Temporary lighting for construction purposes.
   3. Temporary heating.
   4. Temporary cooling.
   5. Temporary ventilation.
   6. Telephone service.
   7. Temporary water service.
   8. Temporary sanitary facilities.

B. Construction Facilities:
   1. Field offices and sheds.
   2. Hoisting.
   3. Parking/Traffic.
   4. Project identification.
   5. Traffic regulation.
   6. Independent Food Vendors

C. Temporary Controls:
   1. Barriers.
   2. Enclosures and fencing.
   3. Security.
   4. Fire detection.
   5. Water control.
   6. Dust control.
   7. Erosion and sediment control.
   8. Noise control.
   9. Pest and rodent control.
   10. Pollution control.

D. Removal of utilities, facilities, and controls with reseeding and repair of grounds.

1.2 TEMPORARY ELECTRICITY

A. The User Agency will pay the cost of energy used. Exercise measures to conserve energy. Utilize the User Agency's existing power service.

B. Complement the existing power service capacity and characteristics as required for construction operations.

C. Provide power outlets, with branch wiring and distribution boxes located at each floor or as required for construction operations. Provide flexible power cords as required for portable construction tools and equipment. All flexible power cords shall be suspended with hangers to eliminate trip hazards.

D. Provide main service disconnect and over-current protection at a convenient location or a feeder switch at the source distribution equipment or meter.

E. Permanent convenience receptacles may not be utilized during construction.

F. Provide distribution equipment, wiring, and outlets to provide single-phase branch circuits for power. Provide 20-ampere duplex outlets, single-phase circuits for power tools.

1.3 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. Provide and maintain incandescent lighting for construction (interior & exterior) operations to achieve a minimum lighting level of 2 watt/sq. ft. (21 watt/sq m).

B. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.

C. Maintain lighting and provide routine repairs.

D. Permanent building lighting may be utilized during construction where not removed.

1.4 TEMPORARY HEATING

A. Existing facilities will be occupied and heated by the College when temperatures require. Take care to avoid leaving doors open in exterior walls that could compromise heating operations. For new construction, the cost of energy will be borne by the Contractor. Provide temporary heating as necessary for construction operations.

B. Supplement with temporary heat devices if needed to maintain the specified conditions for construction operations even in existing buildings.

C. Maintain a minimum ambient temperature of 50 degrees F in the areas where construction is in progress, unless indicated otherwise in the product Sections.

D. In areas of work with mechanical hot-air heating, clean units and replace filters after Substantial Completion.

E. Do not use new equipment for heating after replacement during construction.

F. Provide temporary heating to occupied spaces if construction activities impact normal function of existing systems to occupied spaces. Submit an implementation plan for review and approval by RIC.

1.5 TEMPORARY COOLING

A. Existing facilities are not available.

B. Provide and pay for cooling devices and cooling as needed to maintain the specified conditions for construction operations.

C. Maintain a maximum ambient temperature of 80 degrees F in the areas where construction is in progress, unless indicated otherwise in the specifications.

D. Provide temporary cooling to occupied spaces if construction activities impact normal function of existing systems to occupied spaces. Submit an implementation plan for review and approval by RIC.

1.6 TEMPORARY VENTILATION

A. Ventilate the enclosed areas to achieve a curing of materials, to dissipate humidity, and to prevent the accumulation of dust, fumes, vapors, or gases.

B. If existing ventilation fans are used during construction, clean fans in areas of work after Substantial Completion.

C. Provide temporary ventilation to occupied spaces if construction activities impact normal function of existing systems to occupied spaces. Submit an implementation plan for review and approval by RIC.

1.7 TELEPHONE SERVICE

A. Provide, maintain, and pay for cell phone service to the field supervisor at the time of project mobilization.

1.8 TEMPORARY WATER SERVICE

A. The User Agency will pay the cost of temporary water. Exercise measures to conserve energy. Utilize the User Agency's existing water system, extend and supplement with temporary devices as needed to maintain the specified conditions for construction operations.

B. Extend branch piping with outlets located so that water is available by hoses with threaded connections. Provide temporary pipe insulation if needed to prevent freezing.

1.9 TEMPORARY SANITARY FACILITIES

A. Contractor needs to provide and maintain temporary toilet facilities for use by all construction personnel. Trades people will not be permitted to use existing facilities within the building.

1.10 FIELD OFFICES AND SHEDS

A. Do not use existing facilities for storage. Job meetings will be held on campus at a location to be chosen by the College.

B. Storage Areas and Sheds: Size to the storage requirements for the products of the individual Sections, allowing for access and orderly provision for the maintenance and for the inspection of Products to the requirements of Section 01 60 00. Containers will be permitted within the project limit line.

C. Preparation: Fill and grade the sites for the temporary structures to provide drainage away from the buildings.

D. Removal: At the completion of the Work remove the buildings, foundations, utility services, and debris. Restore the areas.

1.11 HOISTING

A. Contractor is responsible for all hoisting required to facilitate, serve, stock, clean, and complete the Work. Include all costs for Operating Engineers, fuel, delivery and removal, mobilization, staging, protection of grades and surfaces, and equipment.

1.12 PARKING/TRAFFIC

A. Workers must park in lots assigned by the College with daily permits. See Site Utilization Plan.

B. Use of designated existing on-site streets and driveways for construction traffic is permitted. Tracked vehicles are not allowed on paved areas.

C. Do not allow heavy vehicles or construction equipment in parking areas.

D. Do not allow vehicle parking on existing sidewalks.

E. Provide and maintain access to fire hydrants and control valves free of obstructions.

F. Remove mud from construction vehicle wheels before entering streets. Cleanup dirt, rocks, and debris left on street from construction vehicles.

G. Use designated existing on-site roads for construction traffic.

H. Maintenance:

1. Maintain the traffic and parking areas in a sound condition free of excavated material, construction equipment, products, mud, snow, and ice.
2. Maintain existing and permanent paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain the paving and drainage in original, or specified, condition.
3. Plywood and other protections shall be provided when construction equipment is driven over concrete.

I. Removal, Repair:

1. Remove temporary materials and at Substantial Completion.
2. Remove underground work and compacted materials to a depth of 2 feet; fill and grade the site as specified.
3. Repair existing and permanent facilities damaged by use, to the original or specified condition.

1.13 INDEPENDENT FOOD VENDORS

A. Independent or contracted food vendor trucks are prohibited on Rhode Island College's campus. Contractors are permitted to use college dining facilities (Donovan Dining, Café in Student Union, and The Galley Cafe in Building 3).

1.14 PROJECT IDENTIFICATION (IF REQUIRED)

A. Project Identification Sign: One painted or printed sign, 32 sq ft area, bottom 6 feet above the ground.

1. Contents:
    a. Project title, and name of the User Agency as indicated on the Contract Documents.
    b. Names and titles of the authorities.
    c. Names and titles of the Design Agent and Consultants.
    d. Name of the Design Agent Contractor.
2. Graphic Design, Colors, and Style of Lettering: 3 colors, as designated by the Design Agent during construction.

B. Project Informational Signs:
   1. Painted or printed informational signs of same colors and lettering as the Project Identification sign, or standard products; size lettering to provide legibility at 100-foot distance.
   2. Provide sign at each field office, storage shed, and directional signs to direct traffic into and within site. Relocate as the Work progress requires.
   3. No other signs are allowed without the User Agency's permission except those required by law.

C. Design all signs and their structures to withstand a 60-miles/hr-wind velocity.

D. Sign Painter or Printer: Experienced as a professional sign painter for a minimum of three years.

E. Finishes, Painting or Printing: Adequate to withstand weathering, fading, and chipping for the duration of construction.

F. Show content, layout, lettering, color, foundation, structure, sizes, and grades of members.

G. Installation:
   1. Install the project identification sign within 15 days after the date of receipt of the Purchase Order from State of Rhode Island Department of Administration, Division of Purchases.
   2. Erect at the designated location.
   3. Erect the supports and framing on a secure foundation, rigidly braced and framed to resist wind loadings.
   4. Install the sign surface plumb and level, with butt joints. Anchor securely.
   5. Paint exposed surfaces of the sign, supports, and framing.

H. Maintenance: Maintain the signs and supports clean, repair deterioration and damage.

I. Removal: Remove the signs, framing, supports, and foundations at the completion of the Project and restore the area.

1.15 TRAFFIC REGULATION

A. Signs, Signals, And Devices:
   a. Post Mounted and Wall Mounted Traffic Control and Informational Signs: As approved by local jurisdictions.
   b. Traffic Cones and Drums, Flares and Lights: As approved by local jurisdictions.
   c. Flag person Equipment: As required by local jurisdictions.
   d. Police Details: Provide all police details as required by local jurisdictions, including payment directly to applicable jurisdiction.
   e. On Campus Police Details: The User Agency shall provide and cover costs for details provided by RIC Campus Police. If RIC is unable to provide, contractor shall provide flaggers and will be compensated for the flagger’s hours.

B. Flag Persons: Provide trained and equipped flag persons to regulate the traffic when construction operations or traffic encroach on the public traffic lanes.

C. Flares and Lights: Use flares and lights during the hours of low visibility to delineate the traffic lanes and to guide traffic.

D. Haul Routes:

1. Consult with the authority having jurisdiction, establish the public thoroughfares to be used for haul routes and site access.

E. Traffic Signs and Signals:
1. At approaches to the site and on site, install at crossroads, detours, parking areas, and elsewhere as needed to direct the construction and affected public traffic.
2. Install and operate automatic traffic control signals to direct and maintain the orderly flow of traffic in areas under the Contractor's control, and areas affected by the Contractor's operations.
3. Relocate as the Work progresses, to maintain effective traffic control.

F. Removal:
1. Remove equipment and devices when no longer required.
2. Repair damage caused by installation.
3. Remove post settings to a depth of 2 feet.

1.16 BARRIERS

A. Provide barriers to allow for the User Agency's use of the site and to protect existing facilities and adjacent properties from damage from the construction operations, or demolition.

B. Provide barricades and covered walkways required by RIC for public rights- of-way, or for public access to the building.

C. Provide protection for plants designated to remain. Replace damaged plants.

D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.17 ENCLOSURES AND FENCING

A. Exterior: Contractor shall provide 6-ft. high commercial grade chain link fence that is properly secured and maintained around the building and/or site in order to protect the public and the work. Include in the Site Plan the location of the fence and pedestrian and vehicular gates for User Agency review. Access shall be available to all egress doors as designated by the User Agency. Provide visual screening on fence using fabric approved by the User Agency. Equip with vehicular and pedestrian gates with locks. Provide one set of keys to all gates and door locks to the User Agency.

B. Perform adjustment to the proposed layout as may be directed by the User Agency.

C. Contractor to provide overhead cover protection at all entrances and egresses from the building. Entrances and paths of egress must be clearly marked with signage with placement and language approved in advance by the User Agency.

D. Staging of equipment, dumpsters and materials must be situated within the project fenced-in areas.

E. Interior Enclosures:
1. Provide temporary partitions and ceilings as indicated to separate the work areas from User Agency-occupied areas, to prevent penetration of dust and moisture into User Agency-occupied areas, and to prevent damage to the existing materials and equipment.
2. Construction: Framing and reinforced polyethylene, plywood, or gypsum board sheet materials with closed joints and sealed edges at intersections with existing surfaces, as agreed with the User Agency: Maximum flame spread rating of 75 in accordance with ASTM E84.

1.18 SECURITY

A. Security Program:

1. Protect the Work, the existing premises, or the User Agency's operations from theft, vandalism, and unauthorized entry.
2. Initiate the program in coordination with the User Agency's existing security system at mobilization.
3. Maintain the program throughout the construction period until User Agency occupancy of each designated area.

B. Entry Control: Coordinate the access of the User Agency's personnel to the site in coordination with the User Agency's security forces. The Contractor is responsible for providing adequate locks for the site and furnish the requested quantities of keys to the User Agency.

1.19 FIRE DETECTION

A. Before beginning any construction operation that can potentially trigger the existing fire alarm detection system, notify the User Agency through use of the form provided in Section 01 10 00.

B. Failure to so notify the User Agency will subject the Contractor to a monetary fine for each occurrence, should the fire detection system be activated inadvertently by a construction activity.

C. Comply with the User Agency’s insurance underwriting standards and insurer recommendations for Hot Work, sprinkler impairment, and site maintenance.

1.20 WATER CONTROL

A. Grade the site to drain. Maintain excavations free of water. Provide, operate, and maintain the pumping equipment.

B. Protect the site from puddling or running water. Provide water barriers as required to protect the site from soil erosion.

1.21 DUST CONTROL

A. Execute the Work by methods to minimize raising dust from construction operations.

B. Provide positive means to prevent air-borne dust from dispersing into the atmosphere.

1.22 EROSION AND SEDIMENT CONTROL

A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

B. Minimize the amount of bare soil exposed at one time.

C. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.

D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.

E. Periodically inspect the earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

F. Follow Rhode Island DEM Soil Stabilization Requirements, including, but not limited to:

1. Stabilizations of disturbed areas must, at a minimum, be initiated immediately whenever any clearing, grading, excavating or other earth disturbance activities have permanently ceased on any portion of the site, or temporarily ceased on any portion of the site and will not resume for a period exceeding fourteen (14) calendar days.
2. Stabilization must be completed using vegetative stabilization measures or using alternative measures whenever vegetative measures are deemed impracticable or during periods of drought.
3. All disturbed soils exposed prior to October 15th shall be seeded by that date.
4. Any such areas which do not have adequate vegetative stabilization by November 15th must be stabilized through the use of non-vegetative erosion control measures.
5. If work continues within any stabilized areas during the period from October 15th through April 15th, care must be taken to ensure that only the area required for that day's work is exposed, and all erodible soil must be stabilized within five (5) working days.

1.23 CLEANING

A. Refer to Section 01 74 13 – Cleaning. Contractor to maintain a neat and orderly work site. Trash shall be cleaned from site and surrounding area on a daily basis.

B. For projects within occupied buildings, contractor shall sweep and wet mop all floors on a daily basis for impacted spaces. Surfaces of desks, tables, etc. shall be covered during construction and cleaned of dust and debris.

1.24 NOISE CONTROL

A. Provide methods, means, and facilities to minimize noise produced by the construction operations.

1.25 PEST AND RODENT CONTROL

A. Provide methods, means, and facilities to prevent pests, insects and rodents from damaging the Work, or accessing or invading the facility.

1.26 POLLUTION CONTROL

A. Provide methods, means, and facilities to prevent the contamination of soil, water, and the atmosphere from discharge of noxious, toxic substances, and pollutants produced by the construction operations.

1.27 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, and materials, prior to Substantial Completion.

B. Remove the underground installations to a minimum depth of 2 feet. Grade the site as indicated.

C. Clean and repair the damage caused by installation or use of temporary work.

D. Restore the existing and new facilities used during construction to their original condition.

E. Restore any temporary exterior laydown or storage areas to the original condition. After each use, regrade and reseed as required to meet this requirement.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 60 00 – PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Products.

B. Product delivery requirements.

C. Product storage and handling requirements.

D. Product options.

E. Product substitution procedures.

1.2 PRODUCTS

A. Products: Means new material, machinery, components, fixtures, or systems forming the Work; but does not include the machinery or equipment used for the preparation, fabrication, conveying, or erection of the Work. Products may include the existing materials or components required or specified for reuse.

B. Furnish products of qualified manufacturers suitable for the intended use. Furnish products of each type by a single manufacturer unless specified otherwise.

C. Do not use materials and equipment removed from the existing premises, except as specifically permitted by the Contract Documents.

D. Furnish interchangeable components of the same manufacturer for the components being replaced.

1.3 PRODUCT DELIVERY REQUIREMENTS

A. Transport and handle products in accordance with the manufacturer's instructions.

B. Promptly inspect shipments to ensure that the products comply with the requirements, the quantities are correct, and the products are undamaged.

C. Provide equipment and personnel to handle the products by methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. Store and protect the products in accordance with the manufacturers' instructions.

B. Store with seals and labels intact and legible.

C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to the product.

D. For exterior storage of fabricated products, place on sloped supports above the ground.

E. Provide bonded off-site storage and protection when the site does not permit on-site storage or protection.

F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent the condensation and degradation of products.

G. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

H. Provide equipment and personnel to store the products by methods to prevent soiling, disfigurement, or damage.

I. Arrange storage of the products to permit access for inspection. Periodically inspect to verify that the products are undamaged and are maintained in acceptable condition.

1.5 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any Product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Products of one of the manufacturers named and meeting the specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named in accordance with the following article.

1.6 PRODUCT SUBSTITUTION PROCEDURES

A. Instructions to Bidders specify the time restrictions for submitting requests for Substitutions during the bidding period to requirements specified in this section.

B. Substitutions may be considered after the bid only in the following circumstances:

1. When a product becomes no longer in production following the date of receipt of the Purchase Order for this Contract. Submit certification both that specified product was carried in Bid, and is no longer obtainable. Provide cost change documentation.
2. There is a significant cost savings offered to the User Agency. Provide price comparison of both bid and offered substitution products as well as all collateral costs of the change.
3. Code changes or site conditions require a different item from that bid. Submit as for 2 above.

C. Document each request with complete data substantiating the compliance of a proposed Substitution with the Contract Documents.

D. A request constitutes a representation that the Bidder:

1. Has investigated the proposed Product and determined that it meets or exceeds the quality level of the specified product.
2. Will provide the same warranty for the Substitution as for the specified Product.
3. Will coordinate the installation and make changes to other Work which may be required for the Work to be complete with no additional cost to the User Agency, including redesign.
4. Waives claims for additional costs or time extension which may subsequently become apparent.
5. Will reimburse the User Agency and the Design Agent for review or redesign services, including those associated with re-approval by the authorities having jurisdiction.

E. Substitutions will not be considered when they are indicated or implied on the Shop Drawing or Product Data submittals, without a separate written request, or when acceptance will require revision to the Contract Documents.

F. Substitution Submittal Procedure, If Permitted Following Contract Award:

1. Submit three copies of a request for Substitution for consideration, no later than 20 working days following date of receipt of the Purchase Order for this Contract. Limit each request to one proposed Substitution. Identify product of fabrication or installation method to be replaced. Include Specification Section number and title and Drawing number and title.
2. Submit the Shop Drawings, Product Data, and the certified test results attesting to the proposed product equivalence. The burden of proof is on the proposer.
3. The Design Agent will notify the Contractor in writing of a decision to accept or reject the request. Costs for review time on unsuccessful requests will be included in the next change order.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 71 00 – EXAMINATION, PREPARATION AND EXECUTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Examination & preparation.

B. Field engineering.

C. Protection of adjacent construction.

D. Protecting installed construction.

E. Materials used in cutting and patching.

F. Preparation of cutting and patching.

G. Special procedures.

H. Selective demolition.

I. Cutting and patching.

1.2 EXAMINATION & PREPARATION

A. Acceptance of Conditions:

1. Verify that existing applicable site conditions, substrates, or substrate surfaces are acceptable or meet specific requirements of individual specifications Sections, for subsequent Work to proceed.
2. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.
3. Examine and verify specific conditions described in individual specifications Sections.
4. Verify that utility services are available, of correct characteristics, and in correct locations.
5. Beginning of new Work, which relies upon the quality and proper execution of Work of a preceding trade, means acceptance of that preceding Work as appropriate for the proper execution of subsequent Work.
6. Acceptance of preceding Work that can be shown later to have adversely affected proper performance of new Work may result in removal and repeat performance of all Work involved at no cost to the User Agency.

B. Clean substrate surfaces prior to applying next material or substance.

C. Seal cracks or openings of substrate prior to applying next material or substance.

D. Apply substrate primer, sealer, or conditioner, required or recommended by manufacturer, prior to applying any new material or substance in contact or bond.

E. Prior to the application, installation, or erection of any products and product components, perform any other preparatory operations, or surface or substrate modifications, as may be specified or directed by product manufacturers.

1.3 FIELD ENGINEERING

A. Employ a Land Surveyor registered in the State of Rhode Island and acceptable to Design Agent and the User Agency.

B. Locate and protect survey control and reference points. Promptly notify Design Agent of any discrepancies discovered.

C. Control Datum for survey is to be agreed to with the Design Agent.

D. Verify setbacks and easements, if any; confirm drawing dimensions and elevations.

E. Provide field-engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.

F. Submit a copy of site drawings and certificate signed by the Land Surveyor that the elevations and locations of the Work are in conformance with the Contract Documents.

G. Maintain a complete and accurate log of control and survey work as it progresses.

H. If required by the User Agency, on completion of foundation walls and major site improvements, prepare a certified survey illustrating dimensions, locations, angles, and elevations of construction and site work.

I. Protect survey control points prior to starting site work; preserve permanent reference point during construction.

J. Promptly report to Design Agent the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

K. Replace dislocated survey control point based on original survey control. Make no changes without prior written notice to Design Agent.

1.4 PROTECTION OF ADJACENT CONSTRUCTION

A. Protect existing adjacent properties and provide special protection where specified in individual Specification Sections.

B. Provide protective coverings at wall, projections, jambs, sills, and soffits of existing openings.

C. Protect existing finished floors, stairs, and other existing surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

D. Cover and protect furnishings, materials and equipment within the spaces receiving new work. Move items as necessary to install new work and return them to original locations at the close of construction in that area.

E. Repair adjacent properties damaged by construction operations to original condition to the satisfaction of the User Agency.

F. Prohibit unnecessary traffic from existing landscaped areas.

1.5 PROTECTING INSTALLED CONSTRUCTION

A. Protect installed Work and provide special protection where specified in individual specification sections.

   1. IT wires shall not be painted. IT wires, faceplates, racks and other components shall be fully protected during painting activities. IT wires which have been painted or exposed to paint splatter shall be replaced and terminated at no cost to the User Agency upon request.

B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

E. Repair or replace installed Work damaged by construction operations, as directed by the Design Agent.

PART 2 - PRODUCTS

2.1 MATERIALS USED IN CUTTING AND PATCHING

A. Unless otherwise indicated, the Contractor shall provide materials for cutting and patching which will result in an equal-or-better product than the material being cut and patched, in terms of performance characteristics and including visual effects where applicable. The Contractor shall use material identical with the original materials where feasible.

B. Match existing materials unless otherwise specified.

C. Restore Work with new Products in accordance with requirements of Contract Documents.

D. Materials shall comply with the requirements of the Technical Specifications found in individual Sections; match existing with new products, or salvaged products as appropriate, for patching and extending work.

E. Provide submittals for approval to the Design Agent and User Agency.

PART 3 - EXECUTION

3.1 PREPARATION

A. The Contractor shall provide adequate temporary support for Work to be cut to prevent failure

B. The Contractor shall provide adequate protection of other Work during cutting and patching.

C. Examine the areas and conditions under which work of this section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

D. Identify any hazardous substance or conditions exposed during the Work to the User Agency and Design Agent for decision or remedy.

E. By careful study of the Contract Documents, determine the location and extent of selective demolition and repairs to be performed.

3.2 SPECIAL PROCEDURES

A. The Contractor shall use methods least likely to damage Work to be retained and Work adjoining. Provide proper surfaces to receive patching and finishing.

B. Where physical cutting action is required, the Contractor shall cut Work with sawing and grinding tools, not with hammering and chopping tools. Openings through concrete Work shall be core-drilled or using a masonry saw.

C. Remove ceiling tiles as necessary to access areas of work. Store and replace carefully to avoid damage. Replace all ceiling tiles damaged during the work with new tiles to match. Repair ACT grid damaged during the work in accordance with this section.

D. Fit Work tight to pipes, sleeves, ducts, conduits, and other penetrations through surfaces.

E. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

F. At penetration of fire rated partitions, ceiling, or floor construction, completely seal voids with fire rated or fire resistant material in accordance with Specifications, to full thickness of the penetrated element.

G. All demolition work shall be carried on in such a manner that the existing building and site and their component parts will not be damaged. Any damage to the building shall be corrected by the Contractor, to the satisfaction of the User Agency and Architect, at no additional cost to the User Agency.

H. Close openings in exterior surfaces to protect existing Work from weather and extremes of temperature and humidity.

I. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.

3.3 SELECTIVE DEMOLITION

A. Carefully demolish and remove from the building and site those items specified to be demolished and removed.

B. Remove, cut, modify and patch as necessary to conduct Work in a manner to minimize damage and to provide means of restoring products and finishes to original or specified condition. Replace and restore at completion.

C. Prepare and follow an organized plan for demolition and removal of items:
   1. Shut off, cap, and otherwise protect existing utility lines.
   2. Completely remove items scheduled to be so demolished and removed, leaving surfaces clean, solid, and ready to receive new materials specified elsewhere.
   3. For projects involving excavation, remove rocks larger than 6” diameter, roots, and debris.

D. Remove unsuitable material not marked for salvage, such as rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.

E. Remove debris and abandoned items from area and from concealed spaces.

F. The Contractor shall be responsible for the removal and disposal of all materials and equipment from the site and building during the project. Unless directed otherwise by the User Agency, all demolition materials to be removed from the site shall be disposed of in accordance with applicable laws and regulations. **User Agency shall have first right of refusal of any and all materials and equipment scheduled for removal.**

G. In the event of demolition of items not so scheduled to be demolished, promptly replace such items to the approval of the Architect and at no additional cost to the User Agency.

3.4 CUTTING AND PATCHING

A. Provide patching and repairs to all surfaces as indicated and as required for a complete and proper job, including all surfaces damaged as a result of the work of this Contract. Patch or replace portions of existing surfaces which are damaged, or shows imperfections not acceptable to the Design Agent or User Agency.

B. Employ skilled and experienced installers to perform cutting and patching.

C. Submit written request in advance of cutting or altering elements which affect:
   1. Structural integrity of element.
   2. Integrity of weather-exposed or moisture-resistant elements.
   3. Efficiency, maintenance, or safety of element.
   4. Visual qualities of sight-exposed elements.
   5. Existing construction, or Work of separate contractor.

D. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:
   1. Fit the several parts together, to integrate with other Work.
   2. Uncover Work to install or correct ill-timed Work.
   3. Remove and replace defective and non-conforming Work.
   4. Remove samples of installed Work for testing.
   5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

E. Execute Work by methods that will avoid damage to other Work, and provide proper surfaces to receive patching and finishing.

F. Cut masonry, concrete, and other rigid materials using masonry saw or core drill.

G. Remove ceiling tiles as necessary to access areas of work. Store and replace carefully to avoid damage. Replace all ceiling tiles damaged during the work with new tiles to match. Repair ACT grid damaged during the work in accordance with this section.

H. Restore Work with new Products in accordance with requirements of Contract Documents.

I. Fit Work tight to pipes, sleeves, ducts, conduits, and other penetrations through surfaces.

J. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

K. At penetration of fire rated partitions, ceiling, or floor construction, completely seal voids with fire rated or fire resistant material in accordance with Specifications, to full thickness of the penetrated element.

L. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit. Ensure a neat transition to adjacent finishes

M. Identify any hazardous substance or conditions exposed during the Work to the Owner and Design Agent for decision or remedy.

N. Prepare surface and remove surface finishes to provide installation of new Work and finishes.

O. Trim doors as necessary to clear existing floor finish. Refinish door as required to seal the door completely.

P. When completed, patches or repairs shall not be visible to the naked eye from a distance of 6 feet.

Q. Exterior Patching

1. Any damage to buildings, roads, public roads, bituminous concrete areas, fences, lawn areas, trees, shrubbery, poles, underground utilities, etc. shall be made good by and at the Contractor's own expense, all to the satisfaction of the User Agency.
2. The Contractor shall patch, repair and/or replace all adjacent materials and surfaces damaged after the installation of new work at no expense to the User Agency. All repair and replacement work shall match the existing in kind and appearance.
3. Restore grassed landscaped areas damaged by construction operations to full healthy growth, by installing loam and sod to the requirements, and under the supervision of the user agency.

R. See General Conditions for additional requirements.

END OF SECTION

01 74 13 – CLEANING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Cleaning requirements during construction operations.

B. Final cleaning prior to turning the project over to the User Agency.

C. Scope

D. Related Documents

E. Quality

F. Contractor's Failure to Clean

G. Cleaning Materials

H. Construction in an Occupied Building

I. Process Cleaning During Cleaning

J. Final Cleaning

1.2 SCOPE

A. This section specifies the requirements for maintaining a clean and orderly work site during and at the completion of the Work.

B. Pay special attention to work areas that affect occupied spaces and public areas.

1.3 RELATED DOCUMENTS

A. This section supplements Article 4.17 of the General Conditions.

B. Consult the individual sections of the specifications for cleaning of Work installed under those sections**.**

C. Cutting and Patching: Section 01 73 29.

D. Pest Control: Comply with pest control requirements in Section 01 50 00.

E. Construction Waste Disposal: Comply with waste disposal requirements in Section 01 74 19.

1.4 QUALITY

A. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

B. Conduct all cleaning and disposal operations to comply with all federal, state, and local laws, regulations, codes, ordinances and by-laws.

1. Do not burn or bury rubbish and waste materials on the site.
2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains**.**
3. Do not dispose of wastes into streams or waterways.

C. In cleaning items with manufacturer's finish or items previously finished by a Subcontractor, care shall be taken not to damage such manufacturer's or Subcontractor's finish Any damage to finishes caused by cleaning operations shall be repaired at the Contractor's expense.

1.5 CONTRACTOR'S FAILURE TO CLEAN

A. If the Contractor fails to maintain levels of cleanliness in work areas, satisfactory to the User Agency, then the User Agency shall have the right to cause such areas to be cleaned by others. The costs to the User Agency for such cleaning, plus 25% for administration, shall be the obligation of the Contractor and shall be deducted from any money due the Contractor hereunder.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned.

B. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 CONSTRUCTION IN AN OCCUPIED BUILDING

A. Efforts must be taken to limit dust, noise and odors from escaping the work area. Proper separation and protection of interior spaces shall be established and maintained during the project, to the satisfaction of the User Agency. Contractor shall provide and maintain walk-off mats and plastic barriers at work site entries.

B. Contractor shall provide appropriate masking of building supply air intakes to protect indoor air quality and limit transfer of odors. Contractor to provide air scrubbing and/or negative air machines to prevent odors from escaping the Project Site.

C. Do not leave debris, tools or materials in occupied areas.

D. Immediately following the completion of Work in an occupied area, Contractor shall pick up and stow all equipment and miscellaneous material leaving the site in a neat and safe condition.

   1. Occupied spaces must be returned to original conditions to the greatest extent possible by 8am weekdays. If it is not feasible to do as such, notify the User Agency immediately. With approval, the area shall be cordoned off with cones and caution tape and computer generated signage shall be posted to the satisfaction of the User Agency.

E. Contractor shall ensure that horizontal and vertical surfaces in the occupied areas in the building impacted by construction activities are thoroughly vacuumed, wet mopped and cleaned to the satisfaction of the User Agency at the end of each shift, or upon request.

3.2 PROGRESS CLEANING DURING CONSTRUCTION

A. Maintain areas under Contractor's control (including employee parking and Contractor's staging areas) free of waste materials, scraps, surplus material, debris and rubbish. Maintain site in a clean and orderly condition.

B. Clean interior areas daily to provide suitable conditions for Work and to prevent fire or accidents. Sufficient time to clean up work zones shall be allocated at the end of the shift.

C. All combustible waste materials shall be removed from buildings at the end of each working day.

D. Wet down dry materials and rubbish to lay dust and prevent blowing dust.

E. Vacuum clean interior building areas when ready to receive finish painting, and continue vacuum cleaning on an as-needed basis until Substantial Completion.

F. Waste Management
   1. Collect and remove waste materials, debris, and rubbish from the site daily, as necessary to prevent an on-site accumulation of waste material, debris, and rubbish, and dispose off-site.
   2. Remove debris and rubbish from pipe chases, plenums attics, crawl spaces and other closed or remote spaces, prior to closing the space.
   3. Maintain the Site free from accumulations of waste, debris, and rubbish.
   4. Do not allow materials and rubbish to drop free or be thrown from upper floors, but remove by use of a material hoist or rubbish chutes.
   5. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.
   6. Provide on-site containers for collection of waste materials and rubbish.

G. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.

H. Broom clean interior areas prior to start of surface finishing and continue cleaning on a daily basis.

I. Control cleaning operations so that dust and other particulates will not adhere to wet or newly-coated surfaces. Responsibility for construction cleaning shall not be delegated to subcontractors performing construction work under this Contract.

J. Clean as required to ensure proper and lasting installation of equipment and finishes.

3.3 FINAL CLEANING

A. Unless otherwise specified under other sections of the Specifications, the Contractor shall perform final cleaning operations as herein specified prior to final inspection.

B. Cleaning shall include all surfaces, interior and exterior, which the Contractor has had access to, whether new or existing.

C. Remove grease, mastic, adhesive, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed interior and exterior surfaces. This includes cleaning of the Work of all finishing trades where needed, whether or not cleaning by such trades is included in their respective specifications. Remove labels that are not permanent.

D. Repair, patch, and touch up marred surfaces to the specified finish, to match adjacent surfaces.

E. Polish glossy surfaces to a clear shine.

F. Site & Exteriors
   1. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
   2. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.

3. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
4. Remove all cigarette buds and other litter.

G. Remove excess materials
1. Remove tools, construction equipment, machinery, and surplus material from Project site.
2. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
3. Remove all attic stock (extra materials) from the building and transmit per the User Agency's directive.

H. Interiors
1. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
2. Sweep concrete floors broom clean in unoccupied spaces.
3. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
4. Final Cleaning of resilient floors and wood floors shall be as specified under the respective sections of the Specifications.
5. Leave all architectural metals, hardware, and fixtures in undamaged, polished conditions.

I. Glass
1. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
2. Clean plastic glazing in accordance with the manufacturer's directions.
3. In cleaning glass and finish surfaces, care shall be taken not to use detergents or other cleaning agents which may stain adjoining finish surfaces.
4. All broken or defective glass caused by the Contractor's Work shall be replaced at the expense of the Contractor.

J. Cleaning of MEP Equipment
1. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
2. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
3. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
4. Clean ducts, blowers, and coils if units were operated during construction or that display contamination with particulate matter on inspection.
5. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
6. Leave pipe and duct spaces, plenums, furred spaces and the like clean of debris and decaying materials.

K. Prior to submitting a request to the Architect to certify Substantial Completion of the Work, the Contractor shall inspect all interior and exterior spaces and verify that all waste materials, rubbish,

tools, equipment, machinery, and surplus materials have been removed, and that all sight-exposed surfaces are clean. Leave the Project clean and ready for occupancy.

L. User Agency's responsibility for cleaning commences at occupancy, however Contractor shall provide satisfactory cleaning as requested or required as a result of Contractor activity in the project area or occupied spaces. .

END OF SECTION

01 74 19 – CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Waste Management Requirements

B. Related Requirements

C. Definitions

D. Waste Management Procedures

E. Waste Management Implementation

1.2 WASTE MANAGEMENT REQUIREMENTS

A. User Agency requires that this project generate the least amount of trash and waste possible.

B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.

C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.

D. Required Recycling, Salvage, and Reuse: The following may not be disposed of in landfills or by incineration:

1. Aluminum and plastic beverage containers.
2. Corrugated cardboard.
3. Wood pallets.
4. Clean dimensional wood: May be used as blocking or furring.
5. Land clearing debris, including brush, branches, logs, and stumps.
6. Metals, including packaging banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
7. Glass.
8. Gypsum drywall and plaster.
9. Plastic buckets.
10. Paper, including wrapping, newsprint, and office.

E. Methods of trash/waste disposal that are not acceptable are:

1. Burning on the project site.
2. Burying on the project site.
3. Dumping or burying on other property, public or private.
4. Other illegal dumping or burying.

F. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.3 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.

B. Section 01 50 00 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.

C. Section 01 60 00 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.

D. Section 01 70 00 - Execution Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

E. Section 01 74 13 – Cleaning

1.4 DEFINITIONS

A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.

B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.

C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.

D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.

E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.

F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.

G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.

H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

I. Return: To give back reusable items or unused products to vendors for credit.

J. Reuse: To reuse a construction waste material in some manner on the project site.

K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.

L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.

M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.

N. Toxic: Poisonous to humans either immediately or after a long period of exposure.

O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 WASTE MANAGEMENT PROCEDURES

A. See Section 01 10 00 for list of items to be salvaged from the existing building for relocation in project or for User Agency.

B. See Section 01 30 00 for additional requirements for project meetings, reports, submittal procedures, and project documentation.

C. See Section 01 50 00 for additional requirements related to trash/waste collection and removal facilities and services.

D. See Section 01 60 00 for waste prevention requirements related to delivery, storage, and handling.

E. See Section 01 70 00 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

3.2 WASTE MANAGEMENT IMPLEMENTATION

A. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.

B. Meetings: Discuss trash/waste management goals and issues at project meetings.
   1. Pre-bid meeting.
   2. Pre-construction meeting.
   3. Regular job-site meetings.

C. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
   1. Provide containers as required.
   2. Provide adequate space for pick-up and delivery and convenience to subcontractors.
   3. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.

D. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.

E. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.

F. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.

G. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

01 78 00 – CLOSEOUT PROCEDURES AND SUBMITTALS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Related Requirements

B. Definitions

C. Quality Assurance

D. Starting And Adjusting of Systems

E. Demonstration and Instructions

F. Substantial Completion

G. Spare Parts and Maintenance Products

H. Product Warranties and Product Bonds

I. Emergency Contacts List

J. Final Completion

K. Project Turnover

L. Mark-up Set of Construction Documents

M. Administrative Closeout

N. Owner's Manual

O. Project Record Documents

P. Final Application for Payment.

1.2 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

B. Individual Product Sections: Specific requirements for operation and maintenance data.

C. Individual Product Sections: Warranties required for specific products or Work.

1.3 DEFINITIONS

A. Substantial Completion: refer to General Conditions A201 §9.8.1.

B. Project Closeout is the period of time after the Substantial Completion date until the Contractor, Design Agent and User Agency have completed all contract items, closeout obligations, and processed final payment. This time period may overlap a portion of the warranty period.

C. Warranty period is one year from the Substantial Completion date, unless specified otherwise. Individual products and work performed may have longer specific warranty periods as outlined in the Certificate of Substantial Completion. The warranty period may also be referred to as "Post Construction Phase".

1.4 QUALITY ASSURANCE

A. Employ personnel assembling submittals experienced in the maintenance and the operation of the described products and systems.

1.5 STARTING AND ADJUSTING OF SYSTEMS

A. Coordinate schedule for starting and adjusting of various equipment and systems.

B. Notify Design Agent and User Agency seven days prior to starting and adjusting of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions which may cause damage.

D. Verify that tests, meter readings and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify wiring and support components for equipment are complete and tested.

F. Execute starting and adjusting under supervision of responsible Contractor's personnel or manufacturer's representative, in accordance with manufacturer's instructions.

G. Adjust operating Products and equipment to ensure smooth and unhindered operation.

H. When specified in individual specifications Section, require manufacturer to provide authorized representative to be present at the site to inspect, check, and approve equipment or system installation prior to starting, and to supervise placing of equipment or system in operation.

I. Submit a written report in accordance with Section 01 40 00 that equipment or system has been properly installed and is functioning correctly.

1.6 DEMONSTRATION AND INSTRUCTIONS

A. Provide training and demonstrations of the equipment and sequences of systems operation to User Agency's personnel two weeks prior to date of Substantial Completion.

B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

C. Training and demonstrations to include the following in conjunction with designated Operations personnel:

1. Operate the equipment and systems for a minimum of two hours or five repetitions, or as otherwise required. If problems occur, correct them and repeat the full demonstration.
2. Demonstrate proper equipment and systems operation, as well as procedures for cleaning, lubrication, maintenance, replacement of routine expendable parts and all other actions required for normal operations and maintenance.
3. Demonstrate and review both normal and failure modes of system controls operation where they are designed as such.
4. Review O&M manuals
5. Place systems into full operation

D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manuals with User Agency's personnel in detail to explain all aspects of operation and maintenance.

E. Demonstrate start-up, operation, control, adjustment, trouble shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled or agreed upon times, at equipment or system location.

F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

G. For each training session, Contractor shall provide written verification of training including, date, time, name of trainer, systems demonstrated, and agenda. Contractor shall prepare and submit a sign in sheet with name, email, title, phone number and signature of all attendees. This shall be turned over as part of the closeout package.

1.7 SUBSTANTIAL COMPLETION

A. Refer to General Conditions §9.8 Substantial Completion for more information.

B. The User Agency will occupy all portions of the building after Substantial Completion as specified in Section 01 10 00.

C. Per RI General Laws § 37-12-10.1, Contractor shall notify User Agency and Design Agent that work is considered substantially complete utilizing the format indicated in the statute. A walk-though inspection for determining the date of Substantial Completion will be scheduled. Prior to the request, the following items shall be competed:

1. All security, network and telecommunications and door access shall be complete.
2. Complete startup and testing of mechanical, electrical and plumbing systems.
3. Completion of Demonstration and Instructions
4. Contractor shall prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete. The Design Agent shall review and perform an inspection
5. Testing and balance reports are available.
6. Request and complete commissioning and inspection.
7. Deliver tools, spare parts, extra materials, and similar items to location designated by User Agency, per requirements, below.
8. Make final changeover of permanent locks and deliver keys and keying schedule to User Agency. Advise User Agency's personnel of changeover in security provisions.
9. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
10. Submit changeover information related to heat and other utilities, and User Agency's occupancy, use, operation, and maintenance.
11. Complete final cleaning requirements, including touchup painting.
12. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

13. Obtain and submit releases permitting User Agency unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

D. Following demonstration of compliance with the items above, and as stipulated in RI General Laws § 37-12-10.1, Design Agent shall prepare a Certificate of Substantial Completion. At such time, Contract may submit an Application for Payment releasing held retainage.

1.8 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Furnish spare parts, maintenance, and extra products (attic stock) in the quantities specified in the individual specification Sections.

B. Deliver to the Project site and place in a location as directed by the User Agency; obtain a receipt prior to final payment.

C. See Owner's Manual, below, on submission of documentation.

1.9 PRODUCT WARRANTIES AND PRODUCT BONDS

A. Warranty period shall commence at date of substantial completion.

B. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with User Agency's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.

C. Retain warranties and bonds until time specified for submittal.

D. Execute and assemble the transferable warranty documents and bonds from the subcontractors, suppliers, and manufacturers.

E. Verify that the documents are in the proper form, contain full information, and are notarized.

F. Include in the Operations and Maintenance Manuals within the appropriate material specification section, indexed separately on Table of Contents.

G. Closeout Submittals Warranties and Bonds:

1. For equipment or component parts of equipment put into service during construction with User Agency's permission, submit documents within 10 days after acceptance.
2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

H. See §3.3 Owner's Manual, below, on submission of documentation. At Final Completion of all work as certified by the College and Architect/Engineer, the Contractor shall deliver a <u>Letter of Warranty</u> to the College. This Warranty certifies that the Contractor shall promptly replace or repair any defects in equipment, materials or workmanship that becomes apparent within one (1) year from the date of Final Completion, or the College's acceptance of the Project, whichever is later.

I. The Warranty shall include repairs and corrections to pipe covering, paint, woodwork, or any other material and equipment caused to be imperfect due to defective workmanship or materials. All direct and consequential repairs shall be entirely at the expense of the Contractor.

J. Additional manufacturers' extended warranties for major equipment shall be supplementary to this guarantee.

1.10 EMERGENCY CONTACT LIST:

A. Construction Contacts:

1. During the course of construction, the Contractor shall supply a telephone number that the College may call on a twenty–four (24) hour/day basis for emergency repairs or service made necessary because of Contract work in progress.
2. Coordinate with the Project Manager to complete and file form with Facilities Service Response Center.

B. Warranty Period Contacts:

1. Provide a telephone number that the College may call on a twenty–four (24) hour/day basis to receive immediate repairs and service, during the Warranty period. If the College is unable to contact the Contractor to obtain service, the College shall arrange for service from another service provider or College employees and shall charge the expenses to the Contractor.

1.11 FINAL COMPLETION

A. Refer to General Conditions Article 9.10 Substantial Completion for more information.

B. In order for Final Payment to be accepted, the following must be complete:

1. Resolution of all outstanding punch list items
2. Final inspection of the project by the User Agency, Design Agent and Contractor
3. Final inspections and certifications from authorities having jurisdiction.
4. Acceptance of all Closeout Documentation (See Part 3 – Execution for Details).
    a. Administrative Closeout
    b. Owner’s Manual
    c. Project Record Documents
    d. Final Application for Payment

C. See Owner’s Manual, below, on submission of documentation.

1.12 PROJECT TURNOVER:

A. Sign off of the punch list is required for approval of the final Application for Payment.

B. At the time of Substantial Completion, the Contractor shall coordinate with the College’s Project Manager to schedule a project turnover meeting. This meeting shall include the College’s Project Manager, Contractor, Sub-Contractors, Architect/Engineers (if applicable) and the College’s Operations & Engineering representatives.

C. Commissioning Review: The project Commissioning Agent's final report detailing their findings, recommendations, and summary of any open issues shall be made available and reviewed in the course of the Project Turnover Meeting(s).

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 MARK-UP SET OF CONTRACT DOCUMENTS

A. During construction, Contractor shall maintain one set of contract documents at the site, dedicated for use as a Mark-Up Set of Contract Documents. The Mark-Up Set is separate from documents used for construction and shall include:
   1. Drawings and Specifications, including any bid addenda
   2. Specifications.
   3. RFIs, ASIs and Sketches
   4. Change Orders and other modifications to the Contract.
   5. Reviewed Shop Drawings, Product Data, and Samples.
   6. Manufacturer's instructions for assembly and installation.

B. Contractor shall record actual revisions of the Work for all trades, marking up plans and specifications as construction progresses and maintain continuously during the project.

C. The plans shall be marked to show deviations in actual construction from the contract drawings. Deviations shall be shown in the same general detail utilized in the contract drawings. The drawings shall show the following information, but not be limited to:
   1. Locations and descriptions of any utilities constructed or located within the construction limits. Provide survey point numbers on the plans for reference.
   2. Locations and dimensions of changes within the facility. Floor plan/layout changes should also include revised room numbers, as physically tagged in the field.
   3. Changes in grade, alignment, location, elevations, details, and dimensions of all work including facilities, structures, roads and utilities.
   4. Incorporate approved sketch (SK) drawings.
   5. Where the contract drawings show options, show only the option used in construction.

D. Record information concurrent with the construction progress, not less than weekly.

E. Failure to maintain accurate as-built mark-ups will constitute sufficient justification for withholding payments to the Contractor.

F. Maintain the Mark–Up Set (site "red–lines") so that it may be available for review by the Architect, College, and the College's representatives.

G. The corrections on the Mark–Up set shall be incorporated into original contract plan CAD files for final delivery to the College as part of Project Record Documents, below. All plans shall be included in the set.

3.2 ADMINISTRATIVE CLOSEOUT

A. Prepare and submit electronically and one (1) hard copy the following documentation to the User Agency. Each of the sections of Administrative Closeout shall be individual .pdf files emailed to the User Agency's Representative, copied to the Design Agent. All submissions shall be accompanied by a Transmittal Form indicating the date of the transmission and items included in the package.
   1. Certification of Work: Submit a written certification that the Contract Documents have been reviewed, the Work has been inspected, and that the Work is complete in accordance with the Contract Documents and is ready for the User Agency's review.
   2. Asbestos Abatement Compliance: Provide submittals to Design Agent that are required by governing or other authorities, including abatement documentation, including but not limited to waste manifests, air clearance testing reports and other documentation correctly prepared as proscribed in the abatement plan. Failure to include correctly prepared abatement documentation will delay issuing of final payment.
   3. AIA Document G706 - Contractor's Affidavit of Payment of Debts and Claims
   4. AIA Document G706A - Contractor's Affidavit of Release of Liens
   5. AIA Document G707 - Consent of Surety to Final payment

3.3 OWNER'S MANUAL

A. Content of Owner's Manual:
   1. Title Page
   2. Table of Contents
   3. Project Overview
   4. Project Team Contact List
   5. Summary Equipment List
   6. Operations and Maintenance Documentation, Organized by Specification Section
   7. Materials and Finishes Schedule
   8. Roofing and Building Envelope
   9. Spare Parts and Maintenance Products Turnover Documentation

B. Preparation of Owner's Manual: Project Overview.
   1. Provide Summary of the scope of work of the project.
   2. Schedule summary including start date, completion date, and start and end date of the project Guarantee.

C. Preparation of Owner's Manual: Project Team Contact List
   1. Directory, listing the names, addresses, and telephone numbers of the Design Agent, its Consultants, Contractor, Subcontractors, and major equipment suppliers.
   2. Specifically list out Emergency contact list with contact names and twenty-four (24) hours contact information for use during the guarantee/maintenance period.

D. Preparation of Owner's Manual: Summary Equipment List
   1. The Contractor shall compile a Summary Equipment List for all new equipment provided under the project. For renovation projects, include a separate spreadsheet for all equipment removed under the project

2. Contractor shall utilize the Owner's Standard Building Equipment Data Sheet template, providing information including but not limited to: make, model name, model number, serial number, location and area served. Include the name of subcontractors and suppliers, including local source of supplies and replacement parts. Ensure that all subcontractors, suppliers and replacement part providers are included in the Project Team Contact List.
3. Summary Equipment List shall be provided in both .pdf and editable Microsoft Excel.

E. Preparation of Owner's Manual: The Operations and Maintenance Documentation. Contractor shall assemble a complete set of Operations and Maintenance (O&M) manuals indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. The Operations and Maintenance Documentation shall be organized by specification section and divided by each product or system. Provide the following information as applicable, separated with subdivides within each :

1. Product cover page: System Name; Brand; Warranty Summary & Contact; Specification section; Description of purpose and area served; Names, addresses, and telephone numbers of the Subcontractors and suppliers.
2. Significant design criteria.
3. Each Item of Equipment and Each System: Include a description of the unit or system, size capacity, pressure drops, horsepower and the component parts. Identify the function, normal operating characteristics, and limiting conditions. As applicable, include performance curves, with priming data and tests, and complete nomenclature and model number of replaceable parts.
4. Final approved shop drawings, submittal and cut sheet data detailing equipment performance data and features. For shop drawings: Provide with reinforced punched binder tab. Bind in with the text; fold the larger drawings to the size of the text pages.
5. For each component, include the original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
6. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instructions. Include summer, winter, and special operating instructions.
7. Routine and Preventative Maintenance Requirements: Include the manufacturer's printed operation and maintenance instructions. Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions. Include a servicing and lubricating schedule, and a list of lubricants required. Include a list of the original manufacturer's spare parts, Predicted life of parts subject to wear current prices, and recommended quantities to be maintained in storage.
8. Maintenance instructions for [special] finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
9. Originals of product warranties and bonds.
10. Other information as specified in the individual product specification Sections.
11. Building Products, Applied Materials, and Finishes: Include product data, with the catalog number, size, composition, and the color and texture designations. Include information for re- ordering custom manufactured products.

12. Instruction for Care and Maintenance: include manufacturer's instructions for cleaning agents and methods, precautions against detrimental agents and methods, and a recommended schedule for cleaning and maintenance.
13. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.
14. Charts of valve tag numbers, with the location and function of each valve.
15. Equipment performance field test results, including HVAC system Test and Balancing (TAB) Report, motor alignment tests, etc.
16. Electrical short circuit studies, circuit protective device coordination studies and arc flash studies
17. Electrical panelboard and switchboard schedules
18. As installed schedules for lighting fixtures, lamps, and ballasts
19. Other data as required under pertinent sections of specifications
20. Provide and install framed charts in appropriate building MEP rooms for One Line diagrams, process flow diagrams and valve charts.
21. Software: Provide copies of system software and device configuration files for all electronic systems installed under the project. Files to be provided on formatted CD, mass storage device or other acceptable media. Include applicable software documentation and User Manuals. Systems requiring software backup include but are not limited to:
    a. Building Automation Systems (BAS)
    b. Fire Alarm Systems and Smoke Control Systems
    c. Elevator Controls
    d. Lighting Controls
22. Door Access Control Systems
23. Additional information required for Electrical, Controls and HVAC Sections:
    a. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
    b. Include sequence of operation by the controls manufacturer.
    c. Include color-coded wiring diagrams and process flow diagrams as installed for applicable systems: One Line and Process Flow diagrams (11x17) for applicable systems: Mechanical (heating, cooling, piping, process water and specialty systems), HVAC (Air handlers, ductwork, piping), Plumbing, Electrical (normal, standby power systems and specialty systems), Fire Alarm and Security and Telecom
    d. Include control diagrams by the controls manufacturer as installed.
    e. Include the Contractor's coordination drawings, with color-coded piping diagrams as installed.
    f. Include charts of valve tag numbers, with the location and function of each valve, keyed to the flow and control diagrams.
    g. Include test and balancing reports as specified in Section 01 40 00.

h. Boiler and elevator and other applicable certificates and operating permits/licenses, DEM permits including generator permits

i. Test and inspection documentation including fire pump test data, asbestos abatement plans and manifests.

F. Materials and Finishes Schedule shall be submitted in conjunction with O&M manual general requirements. Materials and Finishes manual is for architectural products, applied materials and finishes.

1. Final As–Built surfaces finish schedule, keyed to reduced size floor plans.
2. Additional Requirements: As specified in the individual product specification Sections.

G. Spare Parts and Maintenance Products Turnover Documentation: provide signed transmittals indicating materials delivered, date, location, name, title and signature of person who received the items.

H. Formatting

1. Submit the Owner's Manual bound in 8-1/2 x 11 inch text pages, in minimum 2 inch size three D side ring commercial quality binders with durable cleanable plastic covers. Pages shall be duplex printed.
2. Prepare binder covers with the typed title of the manual, title of the project, and the subject matter of binder. Label each spine with the following: Building, project or facility name, project number, submission date.
3. Internally subdivide the binder contents with typed permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs. Tabs shall match the headings provided in 3.3.A, Content of Owner's Manual, above.
4. The Electronic format shall be organized by Construction Specification Institute (CSI) divisions and include all materials/equipment/systems installed in the building. There shall be one pdf file created for each CSI division.
5. Electronic .pdf shall be "OCR" keyword searchable, bookmarked by section. File and folder names shall be as mutually agreed.

I. Draft Submission

1. Submit electronically a preliminary draft of the Owner's Manual thirty (30) calendar days prior to the contractual Substantial Completion date. The Design Agent and its consultants will review drafts and return electronically with comments. Contractor shall make revisions as noted.
2. A resubmitted draft shall be provided electronically and as one (1) hard copy at contractual Final Completion. This copy will be reviewed and returned after final inspection, with the Design Agent's comments. Revise the content of the document sets as required prior to final submission.

J. Final Submission: Submit three (3) sets of revised final volumes plus electronic copy in final format within ten (10) days after receipt of final comments.

3.4 PROJECT RECORD DOCUMENTS

A. Project Record Documents shall comprise of the following:

1. As-Built Drawings.

2. Record Specifications.
3. Record Contract.

B. Preparation of As-Built Drawings

1. At the end of construction, the Design Agent will provide to the Contractor a complete set of CAD file(s) with all the plan adjustments (bid addenda, bulletins and sketches produced by the Design Agent) fully incorporated into the base CAD file(s). This shall happen within 14 days of Substantial Completion.
2. The Contractor shall retain Competent Drafting Personnel and will coordinate the process to take all field changes/adjustments by all Subcontractors. The Competent Drafting Personnel shall transfer this information and the Mark-Up Set accurately to the CAD file(s). All hand–drawn SK's that are not included in the Design Team's electronic update must be added to the CAD file(s) by the Contractor.
3. The Contractor shall also include any electronic "MEP coordination drawings" produced by the construction team in the final electronic As–Builts. The coordination drawings shall not replace any of the original contract drawings, and they shall be fully labeled both to demonstrate the area of the building shown and to identify all elements shown on the plan. If abbreviations are used, a key must be included on these plans.
4. Include site surveys and As Built. Measured horizontal and vertical locations of the underground utilities and appurtenances, referenced to permanent surface improvements. Include the locations and description of any existing utility lines and other existing installations of any kind or description encountered during construction. Note all changes in size, material, location, and elevation of all new or abandoned underground utility lines and pertinent work, including site grading. Document topography and drainage changes. Show the location of all valves, manholes, etc. and include dimensions to permanent features such as building corners. Note direction of each new valve opening. Show clearances between new utilities and existing crossed lines. Locate all bends, thrust blocks, and other restraints.
5. The placement, size, and type of any fire extinguishers.
6. Measured locations of internal utilities and appurtenances concealed in the construction.
7. Details not on the original Contract drawings, including field changes of dimension and detail.
8. The Contractor will ensure that all notes and schedules included in the design drawings are updated to accurately reflect actual installed conditions.
9. The As-Built Drawings shall include a cover page and content index.
10. As-built Drawings shall be labeled so that the following information is legible when rolled as well as on a cover page: Building, project or facility name, Design Agent's project number, and submission date.

C. Preparation of <u>Record Specifications</u>: Include cover page, title page, table of contents and tabulated and divided by Specification Section. Prepare in binders and electronically as per 3.4.E, Format, below. For each Specification, prepare a summary and provide documentation as follows. Each page shall include the Specification Section Number and Title.

1. Part 1 – General: Statement of compliance with General subsection or description of any deviations

2. Part 2 – Products: For each installed item covered in the Specification Section, provide a copy of the Product Cover Page (from the Owner's Manual).
3. Part 3 – Execution: Statement of compliance with Execution subsection or description of any deviations. Include any ASI or RFI responses in support of actual installation.

D. Preparation of Record Contract: Include cover page, title page, table of contents and tabulated and divided. This list is not all inclusive; final list shall be agreed upon with Design Agent and User Agency, based on review of the draft.

1. State Purchase Order
2. Bid Form
3. Executed AIA A101 and A201
4. State Change Orders, including Purchase Order, AIA Cover Sheet and Backup. Provide a tab for each Change Order.
5. Correspondence and Project Meeting Minutes.
6. Copies of Contractor's project warranty letter, Subcontractor warranty letters and special guarantees and warranties such as roofing, waterproofing, windows and doors as applicable.
7. Project Documents and Certificates (trade permits and 128 Forms, Final Certificate of Occupancy, etc.).
8. Certificate of Substantial Completion
9. Original and Updated Project Schedules
10. Project Progress Photographs
11. Additional Associated Materials. Each shall be considered a separate section, identified in the table of contents and divided as such. Example items include but not limited to:
    a. National Grid Rebate Applications.
    b. LEED scorecards
    c. If the project required geotechnical, archeological, or other miscellaneous studies or other reports, these shall also be submitted as Record Documents.

E. Project Record Documents Format: Printed

1. As Built Drawings shall be organized into 3 sets, stapled with edge binding. The title block, visible when drawings are rolled, shall state the building name, title of the project, substantial completion date, Design Agent and Contractor.
2. Record Specifications and Record Contract Documents shall be printed duplex on 8-1/2 x 11 inch text pages, in minimum 2 inch size three D side ring commercial quality binders with durable cleanable plastic covers.
3. Prepare binder covers and spline labels with the printed title of "Project Record Documents", building name, title of the project, substantial completion date, Design Agent and Contractor, and the subject matter of binder.
4. Provide cover pages and internally subdivide the binder contents with permanent page dividers, based on the following sections, as applicable.

F. Project Record Documents Format: Electronic

1. All .pdf shall include bookmarks for Sections and be "OCR" keyword searchable.

2. Folder structures and file names shall be as agreed.

G. Project Record Document Draft

1. Contractor shall prepare an electronic draft of the project record documents for review by the Design Agent and the User Agency fifteen (15) days prior to final inspection, or within twenty-one (21) days of receipt of updated electronic files from the Design Team, whichever comes first.
2. Ensure the entries are complete and accurate, enabling future reference by the User Agency.
3. All Design Agent and User Agency comments/mark-ups on the draft package shall be returned to the Contractor within twenty-one (21) calendar days. The Contractor shall make corrections as noted and resubmit within twenty-one (21) calendar days.

H. Final Submission

1. Within fifteen (15) calendar days of receiving final approval of the corrected drafts, the Contractor shall submit three (3) printed, bound copies and one (1) electronic copy of all documents.

3.5 FINAL APPLICATION FOR PAYMENT

A. Refer to AIA A101-2017 §5.2. Following the requirements of Section 01 20 00, submit the final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due to the Design Agent.

B. Design Agent shall work with the User Agency to determine that all requirements have been fulfilled, and if so, issue a final Certificate for Payment.

END OF SECTION

02 4100 – SELECTIVE DEMOLITION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Selective demolition of building elements for alteration purposes.

B. Abandonment and removal of existing utilities.

1.2 RELATED REQUIREMENTS

A. Section 01 1000 - Summary: Limitations on Contractor's use of site and premises.

B. Section 01 1000 - Summary: Description of items to be salvaged or removed for re-use by Contractor.

C. Section 01 6000 - Product Requirements: Handling and storage of items removed for salvage and relocation.

1.3 REFERENCE STANDARDS

A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

1.4 SUBMITTALS

A. See Section 01 3300 - Submittal Procedures, for submittal procedures.

B. Utilization Plan Plan: Showing:
   1. Location of dust protection.
   2. Areas for temporary construction and field offices.
   3. Areas for temporary placement of removed materials.

C. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 SCOPE

A. Remove portions of existing building as required for installation of new work and/or as shown on the Contract Documents.

B. Remove other items indicated, for salvage, relocation, and recycling.

C. Provide bracing and shoring for all elements to remain.

3.2 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.

2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
3. Provide, erect, and maintain temporary barriers and security devices.
4. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
5. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
6. Do not close or obstruct roadways or sidewalks without permit.
7. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.

B. Do not begin removal until receipt of notification to proceed from Owner.

C. Do not begin removal until built elements to be salvaged or relocated have been removed.

D. Do not begin removal until vegetation to be relocated has been removed and specified measures have been taken to protect vegetation to remain.

E. Protect existing structures and other elements that are not to be removed.
1. Provide bracing and shoring for all building elements to remain including elements above the existing ceiling.
2. Prevent movement or settlement of adjacent structures.
3. Stop work immediately if adjacent structures appear to be in danger.

F. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

G. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.

H. Perform demolition in a manner that maximizes salvage and recycling of materials.
1. Dismantle existing construction and separate materials.
2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

I. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.

3.3 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

3.4 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as shown.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Separate areas in which demolition is being conducted from other areas that are still occupied.
   1. Provide, erect, and maintain temporary dustproof partitions to prevent dust and debris from impacting areas outside the project limits.

C. Remove existing work as indicated and as required to accomplish new work.
   1. Remove items indicated on drawings.

D. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
   2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
   3. See Section 01 1000 for other limitations on outages and required notifications.
   4. Verify that abandoned services serve only abandoned facilities before removal.
   5. Remove abandoned pipe, ducts, conduits, low voltage wiring and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.

E. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.
   4. Patch as specified for patching new work.

3.5 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

06 10 00 - ROUGH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Non-structural dimension lumber framing.

B. Preservative treated wood materials.

C. Concealed wood blocking, nailers, roof curbs, and supports.

1.2 RELATED REQUIREMENTS

A. Section 09 2116 - Gypsum Board Assemblies.

1.3 REFERENCE STANDARDS

A. AFPA (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; American Forest and Paper Association; 2012.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

C. AWPA U1 - Use Category System: User Specification for Treated Wood; American Wood Protection Association; 2012.

D. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology, Department of Commerce; 2010.

1.4 SUBMITTALS

A. See Section 01 3300 - Submittal Procedures, for submittal procedures.

B. Product Data: Provide technical data on wood preservative materials and application instructions.

1.5 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. Species: Douglas Fir-Larch, unless otherwise indicated.
   2. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
   3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

B. Lumber fabricated from old growth timber is not permitted.

2.2 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

A. Sizes: As required for application.

B. Moisture Content: S-dry or MC19.

C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No. 2 or Standard Grade.
   2. Boards: Standard or No. 3.

2.3 ACCESSORIES

A. Fasteners and Anchors:
   1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.

2.4 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
   1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

B. Preservative Treatment:
   1. Manufacturers:
      a. Arch Wood Protection, Inc: www.wolmanizedwood.com.
      b. Viance, LLC: www.treatedwood.com.
      c. Osmose, Inc: www.osmose.com.
   2. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative to 0.25 lb/cu ft (4.0 kg/cu m) retention.
      a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
      b. Treat lumber exposed to weather.
      c. Treat lumber in contact with roofing, flashing, or waterproofing.
      d. Treat lumber in contact with masonry or concrete.

PART 3 EXECUTION

3.1 PREPARATION

A. Where wood framing bears on cementitious foundations, install full width sill flashing continuous over top of foundation, lap ends of flashing minimum of 4 inches (100 mm) and seal.

B. Install sill gasket under sill plate of framed walls bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts.

C. Coordinate installation of rough carpentry members specified in other sections.

3.2 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.3 FRAMING INSTALLATION

A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.

B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.

C. Install structural members full length without splices unless otherwise specifically detailed.

D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AFPA Wood Frame Construction Manual.

E. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.

F. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

3.4 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.

C. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

D. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

3.5 ROOF-RELATED CARPENTRY

A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

B. Provide wood curb at all roof openings except where prefabricated curbs are specified and where specifically indicated otherwise. Form corners by alternating lapping side members.

3.6 TOLERANCES

A. Framing Members: 1/4 inch (6 mm) from true position, maximum.

B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet (2 mm/m) maximum, and 1/4 inch in 30 feet (7 mm in 10 m) maximum.

END OF SECTION

07 8400 - FIRESTOPPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Firestopping systems.

B. Firestopping of all joints and penetrations in fire resistance rated and smoke resistant assemblies, whether indicated on drawings or not.

C. Smoke seal at floor penetrations.

1.2 RELATED REQUIREMENTS

A. Section 09 2116 - Gypsum Board Assemblies: Gypsum wallboard fireproofing.

1.3 REFERENCE STANDARDS

A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2015.

B. ASTM E814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops; 2013a.

C. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies; 2013.

D. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015.

E. ITS (DIR) - Directory of Listed Products; current edition.

F. FM (AG) - FM Approval Guide; current edition.

G. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition.

H. UL 1479 - Standard for Fire Tests of Penetration Firestops; Current Edition, Including All Revisions.

I. UL (FRD) - Fire Resistance Directory; current edition.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.

C. Product Data: Provide data on product characteristics, performance ratings, and limitations.

D. Sustainable Design Submittal: Submit VOC content documentation for all non-preformed materials.

1.5 QUALITY ASSURANCE

A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.

1. Listing in UL (FRD), FM (AG), or ITS (DIR) will be considered as constituting an acceptable test report.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section and:
   1. Verification of minimum three years documented experience installing work of this type.

1.6 FIELD CONDITIONS

A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation. Maintain minimum temperature before, during, and for 3 days after installation of materials.

B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Firestopping Manufacturers:
   1. 3M Fire Protection Products; www.3m.com/firestop.
   2. Hilti, Inc: www.us.hilti.com/#sle.
   3. Tremco Commercial Sealants & Waterproofing; TREMstop Acrylic: www.tremcosealants.com/#sle.

2.2 MATERIALS

A. Volatile Organic Compound (VOC) Content: Provide products having VOC content lower than that required by SCAQMD 1168.

B. Mold and Mildew Resistance: Provide firestoppping materials with mold and mildew resistance rating of zero(0) in accordance with ASTM G21.

C. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.

D. Fire Ratings: Refer to drawings for required systems and ratings.

2.3 FIRESTOPPING ASSEMBLY REQUIREMENTS

A. Head-of-Wall Joint System Firestopping at Joints Between Fire-Rated Wall Assemblies and Non-Rated Horizontal Assemblies: Use any system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of floor or wall, whichever is greater.

B. Through Penetration Firestopping: Use any system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.

2.4 FIRESTOPPING PENETRATIONS THROUGH GYPSUM BOARD WALLS

A. Blank Openings:
   1. 2 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.
   2. 1 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.

B. Penetrations By:
   1. Multiple Penetrations in Large Openings:
      a. 2 Hour Construction: UL System W-L-8079; Hilti FS-ONE MAX Intumescent Firestop Sealant.
      b. 1 Hour Construction: UL System W-L-8079; Hilti FS-ONE MAX Intumescent Firestop Sealant.
   2. Uninsulated Metallic Pipe, Conduit, and Tubing:
      a. 2 Hour Construction: UL System W-L-1506; Hilti CFS-D Firestop Cable Disc.

b. 1 Hour Construction: UL System W-L-1506; Hilti CFS-D Firestop Cable Disc.

3. HVAC Ducts, Insulated:
   a. 2 Hour Construction: UL System W-L-7156; Hilti FS-ONE MAX Intumescent Firestop Sealant.
   b. 1 Hour Construction: UL System W-L-7156; Hilti FS-ONE MAX Intumescent Firestop Sealant.

2.5 FIRESTOPPING SYSTEMS

A. Firestopping: Any material meeting requirements.
   1. Fire Ratings: Use any system that is listed by FM (AG), ITS (DIR), or UL (FRD) and tested in accordance with ASTM E814, ASTM E119, or UL 1479 with F Rating equal to fire rating of penetrated assembly and minimum T Rating Equal to F Rating and in compliance with other specified requirements.

B. Firestopping Between Top of Partition Wall and Roof Slab: Fiber firestopping with smoke seal coating; provide at locations indicated on drawings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify openings are ready to receive the work of this section.

3.2 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter that could adversely affect bond of firestopping material.

B. Remove incompatible materials that could adversely affect bond.

3.3 INSTALLATION

A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.

B. Do not cover installed firestopping until inspected by authorities having jurisdiction.

C. Install labeling required by code.

3.4 CLEANING

A. Clean adjacent surfaces of firestopping materials.

3.05 PROTECTION

A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

07 90 05 - JOINT SEALERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Sealants and joint backing.

B. Sealants at millwork and dissimilar materials.

1.2 RELATED REQUIREMENTS

A. Section 09 2116 - Gypsum Board Assemblies: Acoustic sealant.

1.3 REFERENCE STANDARDS

A. ASTM C834 - Standard Specification for Latex Sealants; 2010.

B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.

C. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.

D. ASTM D1667 - Standard Specification for Flexible Cellular Materials--Poly(Vinyl Chloride) Foam (Closed-Cell); 2005 (Reapproved 2011).

E. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with other sections referencing this section.

1.5 SUBMITTALS

A. See Section 01 3300 - Submittal Procedures, for submittal procedures.

B. Product Data: Provide data indicating sealant chemical characteristics.

1.6 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Gunnable and Pourable Sealants:
   1. BASF Construction Chemicals-Building Systems: www.buildingsystems.basf.com.
   2. Dow Corning Corporation: www.dowcorning.com.
   3. Pecora Corporation: www.pecora.com.
   4. Tremco Global Sealants: www.tremcosealants.com.
   5. Substitutions: See Section 01 6000 - Product Requirements.

B. Preformed Compressible Foam Sealers:
   1. EMSEAL Joint Systems, Ltd: www.emseal.com.
   2. Sandell Manufacturing Company, Inc: www.sandellmfg.com.
   3. Dayton Superior Corporation: www.daytonsuperior.com.
   4. Tremco Global Sealants: www.tremcosealants.com.
   5. Substitutions: See Section 01 6000 - Product Requirements.

2.2 SEALANTS

A. Sealants and Primers - General: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.

B. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, Type OP, Grade NF single component, paintable.
   1. Color: Match adjacent finished surfaces.
   2. Applications: Use for:
      a. Interior wall and ceiling control joints.
      b. Joints between door and window frames and wall surfaces.
      c. Other interior joints for which no other type of sealant is indicated.
   3. Products:
      a. Pecora Corporation; AC-20 + Silicone Acrylic Latex Caulking Compound: www.pecora.com.
      b. Sherwin-Williams Company; White Lightning 3006 Siliconized Acrylic Latex Caulk: www.sherwin-williams.com.
      c. Substitutions: See Section 01 6000 - Product Requirements.

2.3 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

B. Verify that joint backing and release tapes are compatible with sealant.

3.2 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean and prime joints in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Protect elements surrounding the work of this section from damage or disfigurement.

3.3 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Install bond breaker where joint backing is not used.

D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

E. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

F. Tool joints concave.

3.4 CLEANING

A. Clean adjacent soiled surfaces.

3.5 PROTECTION

A. Protect sealants until cured.

END OF SECTION

08 12 13 - HOLLOW METAL FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Non-fire-rated steel frames for non-steel doors.

B. Interior glazed light frames.

1.2 RELATED REQUIREMENTS

A. Section 08 7100 - Door Hardware: Hardware and accessories.

B. Section 08 8000 - Glazing: Glass for borrowed lites and transoms.

C. Section 09 9000 - Painting and Coating: Field painting of frames.

1.3 REFERENCE STANDARDS

A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.

B. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 1998 (R2011).

C. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames; 2006.

D. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; 2007.

1.4 SUBMITTALS

A. See Section 01 3300 - Submittal Procedures, for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced grade standard.

C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store in accordance with NAAMM HMMA 840.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Steel Frames with Integral Casings:
   1. Steelcraft, an Allegion brand: www.allegion.com/us.
      a. Product: DW Series, Drywall Frame

2. Assa Abloy Ceco, Curries, or Fleming: www.assaabloydss.com.
3. Substitutions: See Section 01 6000 - Product Requirements.

2.2 STEEL DOOR FRAMES - GENERAL REQUIREMENTS

A. Refer to Door and Frame Schedule on the drawings for frame sizes, fire ratings, sound ratings, finishing, door hardware to be installed, and other variations, if any.

B. Door Frame Type: Provide steel door frames with integral casings, for field finishing.

C. Accessibility: Comply with ANSI/ICC A117.1.

D. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.

E. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

F. Hardware Preparation: In accordance with BHMA A156.115, with reinforcement welded in place, in addition to other requirements specified.

G. Frames for Interior Glazing or Borrowed Lights: Construction and face dimensions to match door frames, and as indicated on drawings.

2.3 STEEL DOOR FRAMES WITH INTEGRAL CASINGS

A. Finish: Factory primed, for field finishing.

B. Interior Door Frames, Non-Fire-Rated: Fully welded type.
   1. Finish: Factory primed, for field finishing.

C. Frames Wider than 48 Inches (1200 mm): Reinforce with steel channel fitted tightly into frame head, flush with top.

2.4 ACCESSORY MATERIALS

A. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.

B. Temporary Frame Spreaders: Provide for all factory- or shop-assembled frames.

2.5 FINISH MATERIALS

A. Primer: Rust-inhibiting, complying with ANSI A250.10, door manufacturer's standard.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

3.2 INSTALLATION

A. Install frames in accordance with manufacturer's instructions and recommendations and as follows.

B. Coordinate frame anchor placement with wall construction.

C. Coordinate installation of glazing.

D. Coordinate installation of hardware.

3.3 TOLERANCES

A. Maximum Diagonal Distortion: 1/16 inch (1.5 mm) measured with straight edges, crossed corner to corner.

END OF SECTION

08 14 16 - FLUSH WOOD DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Flush wood doors; flush and flush glazed configuration.

1.2 RELATED REQUIREMENTS

A. Section 08 1213 - Hollow Metal Frames.

B. Section 08 7100 - Door Hardware.

C. Section 08 8000 - Glazing.

1.3 REFERENCE STANDARDS

A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2009.

B. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.

Association; 2012.

C. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

1.4 SUBMITTALS

A. See Section 01 3300 - Submittal Procedures, for submittal procedures.

B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.

D. Specimen warranty.

E. Samples: Submit One samples of veneer, 6 by 6 inch.

F. Warranty, executed in Owner's name.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 5 years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Package, deliver and store doors in accordance with specified quality standard.

B. Accept doors on site in manufacturer's packaging. Inspect for damage.

C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

1.7 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Interior Doors: Provide manufacturer's warranty for the life of the installation.

C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Wood Veneer Faced Doors:
   1. Graham Wood Doors: www.grahamdoors.com.
   2. Eggers Industries: www.eggersindustries.com.
   3. Haley Brothers: www.haleybros.com.
   4. Marshfield Door Systems, Inc: www.marshfielddoors.com.

2.2 DOORS AND PANELS

A. All Doors: See drawings for locations and additional requirements.
   1. Quality Level: Economy Grade, in accordance with AWI/AWMAC/WI Architectural Woodwork Standards.
   2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.

B. Interior Doors: 1-3/4 inches (44 mm) thick unless otherwise indicated; flush construction.
   1. Provide solid core doors at all locations.
   2. Wood veneer facing with factory transparent.

2.3 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated above.

2.4 DOOR FACINGS

A. Wood Veneer Facing for Transparent Finish: Species to match existing doors in adjacent spaces, veneer grade as specified by quality standard, match veneer pattern of existing doors; unless otherwise indicated.

2.5 ACCESSORIES

A. Glazing Stops: Wood, of same species as door facing, butted corners; prepared for countersink style tamper proof screws.

2.6 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.

B. Cores Constructed with stiles and rails.

C. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

D. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
   1. Exception: Doors to be field finished.

E. Provide edge clearances in accordance with the quality standard specified.

F. Sound Transmission Coefficient: STC-45 min.

2.7 FACTORY FINISHING - WOOD VENEER DOORS

A. Finish work in accordance with AWI/AWMAC/WI Architectural Woodwork Standards, Section 5 - Finishing for Grade specified and as follows:
   1. Transparent:
      a. System - 12, Polyurethane, Water-based.
      b. Sheen: Semigloss.

B. Factory finish doors to match existing doors.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.2 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.

B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.

C. Use machine tools to cut or drill for hardware.

D. Coordinate installation of doors with installation of frames and hardware.

E. Coordinate installation of glazing.

3.3 TOLERANCES

A. Conform to specified quality standard for fit and clearance tolerances.

B. Conform to specified quality standard for telegraphing, warp, and squareness.

3.4 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

B. Adjust closers for full closure.

3.5 SCHEDULE - SEE DRAWINGS

END OF SECTION

08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes

1. Furnishing and installation of all mechanical and electrical finish hardware necessary for all doors, and hardware as specified herein and as enumerated in hardware sets and as indicated and required by actual conditions at the building. The hardware shall include the furnishing of all necessary screws, bolts, expansion shields, drop plates, and all other devices necessary for the proper application of the hardware. Installation shall include field modification and preparation of existing doors and/or frames for new hardware being installed. Provide necessary fillers, Dutchmen, reinforcements, and fasteners for mounting new hardware and to cover existing door/frame preps.

B. Related Sections

1. Division 8 Section - Hollow Metal Frames
2. Division 8 Section - Wood Doors
3. Division 26 Section - Electrical

1.03 REFERENCES

A. Applicable state and local building codes and standards.

B. FIRE/LIFE SAFETY

1. NFPA - National Fire Protection Association
2. NFPA 70 – National Electric Code
3. NFPA 80 - Standard for Fire Doors and Fire Windows
4. NFPA 101 - Life Safety Code
5. NFPA 105 - Smoke and Draft Control Door Assemblies

C. UL - Underwriters Laboratories

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

D. Accessibility

1. ADA - Americans with Disabilities Act
2. Rhode Island Accessibility Code – SBC-14, 15, 16

E. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule

2. Recommended Locations for Builders Hardware

F. ANSI - American National Standards Institute

1. ANSI/BHMA A156.1 - A156.29, and ANSI A156.31 - Standards for Hardware and Specialties

1.04 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 requirements. Prior to submittal field verify existing doors and/or frames receiving new hardware and/or existing conditions receiving new openings. Verify new hardware is compatible with the existing door/frame preparation and/or existing conditions. Advise architect within the submittal package of incompatibility or issues.

B. Catalog Cuts: Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.

C. Final Hardware Schedule Content: Submit schedule with hardware sets in vertical format as illustrated by the Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, Include the following information:

1. Door Index; include door number, heading number, and Architects hardware set number.
2. Opening Lock Function Spreadsheet; list locking device and function for each opening.
3. Type, style, function, size, and finish of each hardware item.
4. Name and manufacturer of each item.
5. Fastenings and other pertinent information.
6. Location of each hardware set cross-referenced to indications on Drawings.
7. Explanation of all abbreviations, symbols, and codes contained in schedule.
8. Mounting locations for hardware.
9. Door and frame sizes and materials.
10. Name and phone number for the local manufacturer's representative for each product.
11. Operational Description of openings with any electrified hardware (locks, exits, electromagnetic locks, electric strikes, automatic operators, door position switches, magnetic holders or closer/holder units, and/or access control components). Operational description should include how the door will operate on egress, ingress, and/or fire/smoke alarm connection.

D. Key Schedule: After a keying meeting between representatives of the Owner, Architect, hardware supplier, and, if requested, the representative for the lock manufacturer, provide a keying schedule, listing the levels of keying, as well as an explanation of the key system's function, the key symbols used, and the door numbers controlled. Utilize ANSI A156.28 “Recommended Practices for Keying Systems” as a guideline for nomenclature, definitions, and approach for selecting the optimal keying system.

E. Samples: If requested by the Architect, submit production sample or sample installations as requested of each type of exposed hardware unit in the finish indicated, and tagged with a full description for coordination with the schedule.

1. Samples will be returned to the supplier in like-new condition. Units that are acceptable to the Architect may, after final check of operations, be incorporated into the Work, within limitations of key coordination requirements.

F. Templates: After final approval of the hardware schedule, provide templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware.

G. Riser and Wiring Diagrams: After final approval of the hardware schedule, submit riser and wiring diagrams as required for the proper installation of complete electrical, electromechanical, and electromagnetic products.

H. Operations and Maintenance Data: Provide in accordance with Division 1 and include the following:

1. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
2. Catalog pages for each product.
3. Name, address, and phone number of local representative for each manufacturer.
4. Parts list for each product.
5. Copy of final approved hardware schedule, edited to reflect “As installed.”
6. Copy of final keying schedule.
7. As installed “Wiring Diagrams” for each opening connected to power, both low voltage and 110 volts.
8. One (1) complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.
9. Copy of warranties including appropriate reference numbers for manufacturers to identify the project.

I. Certificates of Compliance: Upon request of Architect or Authority Having Jurisdiction certificates of compliance for fire-rated hardware and installation instructions shall be made available.

1.05 QUALITY ASSURANCE

A. Substitutions: Products are to be those specified to ensure a uniform basis of acceptable materials. Requests for substitutions must be made in accordance with Division 1 requirements. If proposing a substitute product, submit product data for the proposed item with product data for the specified item and indicate basis for substitution and savings to be made. Provide sample if requested. Certain products have been selected for their unique characteristics and particular project suitability.

1. Items specified as "no substitute” shall be provided exactly as listed.
2. Items listed with no substitute manufacturers listed have been requested by the Owner or Architect to match existing for continuity and/or future performance and maintenance standards or because there is no known equal product.
3. If no other products are listed in a category, then "no substitute" is implied.

B. Supplier Qualifications: A recognized architectural hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project

and that provides a certified Architectural Hardware Consultant (AHC) available to the Owner, Architect, and Contractor, at reasonable times during the course of the Work for consultation.

C. Single Source Responsibility: Obtain each type of hardware (latch and locksets, hinges, exit devices, closers, etc.) from a single manufacturer.

D. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and are identical to products tested by Underwrites Laboratories, Intertek Testing Services, or other testing and inspecting organizations acceptable to the authorities having jurisdiction for use on types and sizes of doors indicated in compliance with requirements of fire-rated door and door frame labels.

E. Electronic Security Hardware: When electrified hardware is included in the hardware specification, the hardware supplier must employ an individual knowledgeable in electrified components and systems, who is capable of producing wiring diagrams and consulting as needed. Coordinate installation of the electronic security hardware with the Architect and electrical engineers and provide installation and technical data to the Architect and other related subcontractors. Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Tag each item or package separately with identification related to the final hardware schedule, and include installation instructions with each item or package.

B. Each article of hardware shall be individually packaged in manufacturer's original packaging.

C. Contractor will provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.

D. Items damaged in shipment shall be replaced promptly and with proper material and paid for by whomever did the damage or caused the damage to occur.

E. Hardware shall be handled in a manner to avoid damage, marring, or scratching. Irregularities that occur to the hardware after it has been delivered to the Project shall be corrected, replaced, or repaired by the Contractor. Hardware shall be protected against malfunction due to paint, solvent, cleanser, or any chemical agent.

F. No direct shipments will be allowed unless approved by the Contractor.

1.07 WARRANTY

A. Provide manufacturer's warrantees as specified in Division 1 and as follows:

1. Closers: 30 years, except electronic closers, 2 years.
2. ND Locksets: 10 years, except electrified locksets, 1 year.
3. Other hardware: 1 year.

B. No liability is to be assumed where damage or faulty operation is due to improper installation, improper use, or abuse.

C. Products judged to be defective during the warranty period shall be replaced or repaired in accordance with the manufacturer's warranty, at no additional cost to the Owner.

1.08 MAINTENANCE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The Awarding Authority has determined that certain products should be selected for their unique characteristics and particular project suitability to insure continuity of existing and future performance and maintenance standards. After investigating available product offerings the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: "No Substitute" (NO OTHER PRODUCTS WILL BE CONSIDERED FOR THOSE LISTED IN PROJECTS DOCUMENTS.)

B. Approval of manufacturers other than those listed shall be in accordance with paragraph 1.05.A.

C. Note that even though an acceptable substitute manufacturer may be listed, the product must provide all the functions and features of the specified product or it will not be approved.

Item	Scheduled Manufacturer	Acceptable Substitute
Hinges	Ives (IVE)	Hager, Stanley
Locksets	Schlage (SCH)	Best, Sargent
Electric Strikes	Von Duprin (VON)	HES, Folger Adam
Door Closers	LCN (LCN)	No Substitute
Protection Plates	Ives (IVE)	Burns, Rockwood
Overhead Stops	Glynn-Johnson (GLY)	Rixson, Sargent
Stops & Holders	Ives (IVE)	Burns, Rockwood
Thresholds & Weatherstrip	Zero (ZER)	National Guard, Reese
Silencers	Ives (IVE)	Burns, Rockwood
Door Contacts	Schlage Electronics (SCE)	GE, Sargent
Cylinders & Keying	Medeco (MED) (RIC Standard-No Substitutions)	Corbin-Russwin

D. Hand of Door: Drawings show direction of slide, swing, or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.

E. Where the hardware specified is not adaptable to the finished shape or size of the members requiring hardware, furnish suitable types having the same operation and quality as the type specified, subject to the Architect's approval.

2.02 MATERIALS

A. Fasteners

1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent that no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of reinforcing the work adequately to fasten the hardware securely. Review door specification and advise Architect if thru-bolts are required.
4. Hardware shall be installed with the fasteners provided by the hardware manufacturer.

B. Hinges

1. Provide five-knuckle, ball bearing hinges of type, material, and height as outlined in the following guide for this specification:

   a. 1-3/4 inch thick doors, up to and including 36 inches wide:

   Exterior: standard weight, bronze/stainless steel, 4-1/2 inches high

   Interior: standard weight, steel, 4-1/2 inches high

   b. 1-3/4 inch thick doors over 36 inches wide:

   Exterior: heavy weight, bronze/stainless steel, 5 inches high

   Interior: heavy weight, steel, 5 inches high

   c. 2 inches or thicker doors:

   Exterior: heavy weight, bronze/stainless steel, 5 inches high

   Interior: heavy weight, steel, 5 inches high
2. Provide three hinges per door leaf for doors 90 inches or less in height, and one additional hinge for each 30 inches of additional door height.
3. Where new hinges are specified for existing doors and/or existing frames, the new hinge size must be identical to hinge preparation present in the existing door and/or existing frame.
4. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:

   a. Steel Hinges: Steel pins

   b. Non-Ferrous Hinges: Stainless steel pins

   c. Out-Swinging Exterior Doors: Non-removable pins

   d. Out-Swinging Interior Lockable Doors: Non-removable pins

e. Interior Non-lockable Doors: Non-rising pins

5. The width of hinges shall be 4-1/2 inches at 1-3/4 inch thick doors, and 5 inches at 2 inches or thicker doors. Adjust hinge width as required for door, frame, and/or wall conditions to allow proper degree of opening.
6. Provide hinges with electrified option where specified. Provide with sufficient number and gage of concealed wires to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to the electrified locking component.
7. Provide mortar guard for each electrified hinge specified, unless specified in hollow metal frame specification.
8. Acceptable manufacturers and/or products: Ives 5BB series, Hager BB series, Stanley FBB Series.

C. Cylindrical Locks - Grade 1

1. Provide cylindrical locks conforming to ANSI A156.2 Series 4000, Grade 1. Cylinders: Refer to 2.04 KEYING.
2. Provide locks with a standard 2-3/4 inches backset, unless noted otherwise, with a 1/2 inch latch throw. Provide proper latch throw for UL listing at pairs.
3. Provide locksets with a separate anti-rotation throughbolts, and shall have no exposed screws. Levers shall operate independently, and shall have two external return spring cassettes mounted under roses to prevent lever sag.
4. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
5. Provide electrical options as scheduled.
6. Lever trim shall be solid cast levers without plastic inserts, and wrought roses on both sides. Locksets shall be thru-bolted to assure proper alignment.
   a. Lever design shall be Schlage Rhodes.
   b. Lever trim on the secure side of doors serving rooms considered by the authority having jurisdiction to be hazardous shall have a tactile warning.
7. Acceptable manufacturers and/or products: Schlage ND series, Best 93K series, Sargent 10-Line.

D. Electric Strikes

1. Provide electric strikes designed for use with the type locks shown at each opening.
2. Provide electric strikes UL Listed as burglary-resistant electric door strikes and where required shall be UL Listed as electric strikes for fire doors and frames. Provide fail-secure type electric strikes, unless specified otherwise.
3. Provide transformers and rectifiers for each strike as required. Verify voltage with electrical contractor.
4. Acceptable manufacturers and/or products: Von Duprin 6000 series, Folger Adam 300 series, HES 1006 series.

E. Door Closers

1. Provide door closers certified to ANSI/BHMA A156.4 Grade 1 requirements by a BHMA certified independent testing laboratory. Surface mounted mechanical closers shall be certified to exceed ten million (10,000,000) full load cycles by a recognized independent testing laboratory. Closers shall be ISO 9000 certified. Units shall be stamped with date of manufacture code.
2. Door closers shall have fully hydraulic, full rack and pinion action with a high strength cast iron cylinder, and shall utilize full complement bearings at shaft. Cylinder body shall be 1-1/2 inch diameter, and double heat-treated pinion journal shall be 11/16 inch diameter.
3. Provide hydraulic fluid requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F. Fluid shall be fireproof and shall pass the requirements of the UL10C "positive pressure" fire test.
4. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force as required by accessibility codes and standards. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed, and backcheck.
5. Provide closers with a solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers. When closers are parallel arm mounted, provide closers which mount within a 6-inch top rail without the use of a mounting plate so that closer shall not be visible through vision panel from pull side.
6. Closers shall not incorporate Pressure Relief Valve (PRV) technology.
7. Closer cylinders, arms, adapter plates, and metal covers shall have a powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117, or shall have special rust inhibitor (SRI).
8. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other finish hardware items interfering with closer mounting.
9. Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Closers shall not be visible in corridors, lobbies and other public spaces unless approved by Architect.
10. Door closers meeting this specification: LCN 4010/4110 series, No Substitute.

F. Protection Plates

1. Provide kick plates, mop plates, and armor plates minimum of 0.050 inch thick as scheduled. Furnish with machine or wood screws, finished to match plates. Sizes of plates shall be as follows:
   a. Kick Plates – 8 inches high x 2 inches less width of door on single doors, 1 inch less width of door on pairs.
2. Acceptable manufacturers and/or products: Ives, Burns, Rockwood.

G. Overhead Stops and Overhead Stop/Holders

1. Provide heavy duty concealed mounted overhead stop or overhead stop/holder as specified for exterior and interior vestibule single acting doors.
2. Provide heavy or medium duty and concealed or surface mounted overhead stop or overhead stop/holder for interior doors as specified. Provide medium duty surface

mounted overhead stop for interior doors and at any door that swings more than 140 degrees before striking a wall, open against equipment, casework, sidelights, and/or where conditions do not allow a wall stop or a floor stop presents a tripping hazard.

3. Where overhead holders are specified provide friction type at doors without a closer and positive type at doors with a closer.
4. Acceptable manufacturers and/or products: Glynn-Johnson, Rixson, Sargent.

H. Door Stops and Holders

1. Provide door stops for all doors in accordance with the following requirements:
   a. Provide wall stops wherever possible. Provide convex type where mortise type locks are used and concave type where cylindrical type locks are used.
   b. Where wall stops cannot be used, provide dome type floor stops of the proper height.
   c. At any opening where a wall or floor stop cannot be used, a medium duty surface mounted overhead stop shall be used.
2. Acceptable manufacturers and/or products: Ives, Burns, Rockwood.

I. Thresholds, Seals, Door Sweeps, Automatic Door Bottoms, and Gasketing

1. Provide thresholds, weatherstripping (including door sweeps, seals, astragals) and gasketing systems (including smoke, sound, and light) as specified and per architectural details. Match finish of other items as closely as possible. Size of thresholds shall be as follows:
   a. Exterior Saddle Thresholds – 1/2 inch high x jamb width x door width
   b. Interior Saddle Thresholds – ¼ inch high x jamb width x door width
   c. Bumper Seal Thresholds – 1/2 inch high x 5 inches wide x door width
2. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
3. Acceptable manufacturers and/or products: Zero, Reese, National Guard.

J. Silencers

1. Provide "Push-in" type silencers for each hollow metal or wood frame. Provide three for each single frame and two for each pair frame. Omit where gasketing is specified or required by code.
2. Acceptable manufacturers and/or products: Ives, Burns, Rockwood.

K. Door Contacts

1. Provide recessed or surface mounted type door position switches as specified.
2. Switches shall be installed as recommended by manufacturers installation instructions and coordinated with other hardware being installed on the opening. Coordinate door and frame preparations with door and frame suppliers. If separate switches are being used with a magnetic locking device provide a minimum of 4 inches between the switch and the magnetic locking device.
3. Acceptable manufacturers and/or products: Schlage Electronics, GE-Interlogix, Sargent.

2.03 FINISHES

A. Finish of all hardware shall be US26D with the exceptions as follows:
   1. Exterior Butts - Solid Bronze - Dull Chrome Plate
   2. Interior Butts - Steel, Dull Chrome Plate
   3. Door Closers - Sprayed Aluminum
   4. Push Plates & Kick Plates - Stainless Steel US32D
   5. Door pulls - Stainless Steel US 32D
   6. Door Push Plates - Stainless Steel US32D
   7. Aluminum Door Cylinders - Chrome US26D

2.04 KEYING

A. Provide cores and cylinders for the Owner's Existing Medeco key system conforming to the following requirements:
   1. Provide removable core cylinders at all keyed devices, locksets, cylinder dogging, and exit device trim. Provide construction cores with construction master keying for use during construction. The hardware supplier, accompanied by the Owner or Owner's security agent, shall install permanent keyed cores upon completion of the project. The temporary construction cores are to be returned to the hardware supplier.
   2. Provide permanent cores and cylinders keyed by the manufacturer or authorized distributor into the existing key system as directed by the Owner. Provide owner with a copy of the bitting list, return receipt requested.
   3. The hardware supplier, accompanied by a qualified factory representative for the manufacturer of the cores and cylinders, shall meet with Owner and Architect to review keying requirements and lock functions prior to ordering finish hardware. Submit a keying schedule to Architect for approval.
   4. Provide keys as follows
      a. Four Suite level master keys for each set.
      b. Four keys per core and/or cylinder.
      c. Two construction core control keys
      d. Four construction master keys for each type (Contractor is to provide one set of construction keys to Architect)
   5. Visual key control:
      a. Keys shall be stamped with their respective key set number and stamped "DO NOT DUPLICATE".
      b. All keys shall be stamped with their respective key set letters.
      c. Do not stamp any keys with the factory key change number.
      d. Do not stamp any cores with key set on face (front) of Core. Stamp on back or side of cores so not to be visible when core is in cylinder.
   6. Deliver all keys and/or key blanks from the factory or authorized distributor directly to the Owner in sealed containers, return receipt requested. Failure to comply with these requirements may be cause to require replacement of all or any part of the keying system that was compromised at no additional cost to the Owner.

7. Approved products: Medeco X4 SFIC, Corbin-Russwin.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to installation of any hardware, examine all doors, frames, walls and related items for conditions that would prevent proper installation of finish hardware. Correct all defects prior to proceeding with installation.

3.02 INSTALLATION

A. Coordination:

1. Prior to installation of hardware, schedule and hold a meeting for the purpose of instructing installers on proper installation and adjustment of finish hardware. Representatives of locks, exit devices, closers, automatic operators, and electrified hardware shall conduct training; provide at least 10 days notice to representatives. After training a letter of compliance, indicating when the training was held and who was in attendance, shall be sent to the Architect.

2. Prior to ordering electrified hardware, schedule and hold a meeting for the purpose of coordinating finish hardware with security, electrical, doors and frames, and other related suppliers. A representative of the supplier of finish hardware, and doors and frames, the electrical subcontractor, and the Owner's security contractor shall meet with the Owner, Architect, and General Contractor prior to ordering finish hardware. After meeting a letter of compliance, indicating when the training was held and who was in attendance, shall be sent to the Architect.

B. Hardware will be installed by qualified tradesmen, skilled in the application of commercial grade hardware. For technical assistance if necessary, installers may contact the manufacturer's rep for the item in question, as listed in the hardware schedule.

C. Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.

D. Install each hardware item in compliance with the manufacturer's instructions and recommendations, using only the fasteners provided by the manufacturer.

E. Do not install surface mounted items until finishes have been completed on the substrate. Protect all installed hardware during painting.

F. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

G. Operating parts shall move freely and smoothly without binding, sticking, or excessive clearance.

H. Wire (including low voltage), conduit, junction boxes, and pulling of wire is by Division 26, Electrical. Electrical Contractor shall connect wire to door position switches and run wire to central room or area as directed by the Architect. Wires shall be tested and labeled with the Architects opening number. Connections to/from power supplies to electrified hardware and any connection to fire/smoke alarm system, and/or smoke evacuation system where specified is by Division 26 Electrical.

3.03 ADJUSTING, CLEANING, AND DEMONSTRATING

A. Adjust and check each operating item of hardware and each door, to insure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly.

B. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make a final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

C. Clean adjacent surfaces soiled by hardware installation.

D. Instruct Owner's personnel in the proper adjustment, lubrication, and maintenance of door hardware and hardware finishes.

3.04 FIELD QUALITY CONTROL

A. Prior to Substantial Completion, the installer, accompanied by representatives of the manufacturers of locks, exit devices, closer, and any electrified hardware, shall perform the following work:

1. Examine and re-adjust each item of door hardware as necessary to restore function of doors and hardware to comply with specified requirements.
2. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures.
3. Replace hardware items that have deteriorated or failed due to faulty design, materials, or installation of hardware units.
4. Prepare a written report of current and predictable problems of substantial nature in the performance of the hardware.
5. At completion of project, a qualified factory representative for the manufacturers of locksets, closer, exit devices, and access control products shall arrange and hold a training session to instruct the Owner's personnel on the proper maintenance, adjustment, and/or operation of their respective products. After training a letter of compliance, indicating when the training was held and who was in attendance, shall be sent to the Architect.

3.05 PROTECTION

A. Provide for the proper protection of complete items of hardware until the Owner accepts the project as complete. Damaged or disfigured hardware shall be replaced or repaired by the responsible party.

3.06 HARDWARE SCHEDULE

A. Provide hardware for each door to comply with requirements of Section "Finish Hardware," hardware set numbers indicated in door schedule, and in the following schedule of hardware sets.

B. It is intended that the following schedule includes complete items of finish hardware necessary to complete the work. If a discrepancy is found in the schedule, such as a missing item, improper hardware for a frame, door or fire codes, the preamble will be the deciding document.

C. Locksets, exit devices, and other hardware items are referenced in the Hardware Sets for series, type, and function. Refer to the preamble for special features, options, cylinders/keying, and other requirements.

D. Hardware Sets

HEADING # 01

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 SERIES AS SPECIFIED	652	IVE
1	EA	LOCK	ND50 RHO	626	SCH
1	EA	GASKETING	485A	A	ZER
1	EA	DOOR SWEEP	328AA	AA	ZER
1	EA	SURFACE CLOSER	4111 EDA	689	LCN
1	EA	KICK PLATE	8400 8" LDW	630	IVE
1	EA	STOP	FS436 AS SPECIFIED	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

END OF SECTION

08 8000 - GLAZING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Glass.

B. Glazing compounds and accessories.

1.2 RELATED REQUIREMENTS

A. Section 08 1416 – Flush Wood Doors

1.3 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.

B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014a.

C. ASTM C1036 - Standard Specification for Flat Glass; 2016.

D. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.

E. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2014.

F. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.

G. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.

H. GANA (GM) - GANA Glazing Manual; 2009.

I. GANA (SM) - GANA Sealant Manual; 2008.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with GANA Glazing Manual and GANA Sealant Manual for glazing installation methods.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

1.6 FIELD CONDITIONS

A. Do not install glazing when ambient temperature is less than 50 degrees F (10 degrees C).

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.7 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide a five (5) year warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.

PART 2 PRODUCTS

2.1 GLAZING UNITS

A. Single Safety Glazing: Non-fire-rated.
   1. Application: Provide this type of glazing in the following locations:
      a. Glazed lites in doors.
   2. Type: Fully tempered float glass as specified.
   3. Tint: Clear.
   4. Thickness: 1/4 inch (6 mm).

2.2 GLASS MATERIALS

A. Tempered Float Glass: Provide float glass-based glazing unless noted otherwise.
   1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality-Q3.
   2. Heat-Strengthened and Fully Tempered Types: ASTM C1048, Kind HS and Kind FT.

2.3 GLAZING COMPOUNDS

A. Manufacturers:
   1. Bostik Inc: www.bostik-us.com.
   2. Momentive Performance Materials, Inc (formerly GE Silicones): www.momentive.com.
   3. Pecora Corporation: www.pecora.com.
   4. BASF Construction Chemicals-Building Systems: www.buildingsystems.basf.com.
   5. Substitutions: Refer to Section 01 6000 - Product Requirements.

B. Glazing Putty: Polymer modified latex recommended by manufacturer for outdoor use, knife grade consistency; grey color.

C. Silicone Sealant : Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C920, Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color to be selected from full range.

2.4 GLAZING ACCESSORIES

A. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot (25 mm for each square meter) of glazing or minimum 4 inch (100 mm) x width of glazing rabbet space minus 1/16 inch (1.5 mm) x height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch (75 mm) long x one half the height of the glazing stop x thickness to suit application, self-adhesive on one face.

C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; hardness range of 5 to 30 cured Shore A durometer; coiled on release paper; black color.

D. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color to be selected from full range of options.

E. Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that openings for glazing are correctly sized and within tolerance.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.2 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant.

D. Install sealants in accordance with ASTM C1193 and GANA Sealant Manual.

E. Install sealants in accordance with manufacturer's instructions.

END OF SECTION

09 2116 - GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Performance criteria for gypsum board assemblies.

B. Non-structural interior metal stud wall framing.

C. Acoustic insulation.

D. Gypsum wallboard.

E. Joint treatment and accessories.

1.2 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.

1.3 REFERENCE STANDARDS

A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2012.

B. AISI SG02-1 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2001 with 2004 supplement. (replaced SG-971)

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

D. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.

E. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2014.

F. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.

G. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2015.

H. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2013.

I. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2015.

J. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2014.

K. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2013.

L. ASTM C1280 - Standard Specification for Application of Gypsum Sheathing Board; 2013.

M. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2014a.

N. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2016.

O. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).

P. ASTM E413 - Classification for Rating Sound Insulation; 2010.

Q. GA-216 - Application and Finishing of Gypsum Board; 2013.

R. UL (FRD) - Fire Resistance Directory; current edition.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum 5 years of experience.

PART 2 PRODUCTS

2.1 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.

B. Interior Partitions, Indicated as Acoustic: Provide completed assemblies with the following characteristics:
   1. Acoustic Attenuation: STC of 45-49 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.

C. Fire Rated Assemblies: Provide completed assemblies with the following characteristics:
   1. Fire Rated Partitions: UL listed assemblies as noted on the drawings.
   2. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).

2.2 METAL FRAMING MATERIALS

A. Manufacturers - Metal Framing, Connectors, and Accessories:
   1. Clarkwestern Dietrich Building Systems LLC; www.clarkdietrich.com.
   2. Marino; www.marinoware.com.

B. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf (L/120 at 240 Pa).
   1. Studs: "C" shaped with flat or formed webs with knurled faces.
   2. Runners: U shaped, sized to match studs.
   3. Ceiling Channels: C-shaped.
   4. Furring: Hat-shaped sections, minimum depth of 7/8 inch (22 mm).
   5. Resilient Furring Channels: 1/2 inch (12 mm) depth, for attachment to substrate through both legs; both legs expanded metal mesh.
      a. Products:
         1) Same manufacturer as other framing materials.

2.3 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
   1. American Gypsum Company; www.americangypsum.com.
   2. CertainTeed Corporation; www.certainteed.com.
   3. Georgia-Pacific Gypsum; www.gpgypsum.com.

4. National Gypsum Company; www.nationalgypsum.com/#sle.
5. USG Corporation; www.usg.com.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Use for wall surfaces, unless otherwise indicated.
   2. Provide Type X where required
   3. Thickness:
      a. Wall Surfaces: 5/8 inch.

2.4 ACCESSORIES

A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: to fill wall cavity.

B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.

C. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
   1. Tape: 2 inch (50 mm) wide, coated glass fiber tape for joints and corners, except as otherwise indicated.

D. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch (0.84 mm) in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.

E. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch (0.84 to 2.84 mm) in Thickness: ASTM C954; steel drill screws, corrosion resistant.

F. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.2 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.

B. Studs: Space studs at 16 inches on center (at 406 mm on center).
   1. Extend partition framing to structure where indicated and to ceiling in other locations.
   2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
   3. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.

3.3 ACOUSTIC ACCESSORIES INSTALLATION

A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

B. Acoustic Sealant: Install in accordance with manufacturer's instructions.

3.4 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

3.5 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
   1. Not more than 30 feet (10 meters) apart on walls and ceilings over 50 feet (16 meters) long.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.6 JOINT TREATMENT

A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.

B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch (0.8 mm).

3.7 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet (3 mm in 3 m) in any direction.

END OF SECTION

09 5100 - ACOUSTICAL CEILINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Suspended metal grid ceiling system.

B. Acoustical ceiling tiles.

1.2 RELATED REQUIREMENTS

A. Section 23 0000 – Mechanical: Diffusers in ceiling system.

B. Section 26 0000 – Electrical: Light fixtures in ceiling system.

1.3 REFERENCE STANDARDS

A. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2013a.

B. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2014.

C. UL (FRD) - Fire Resistance Directory; current edition.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Do not install acoustical units until after interior wet work is dry.

1.5 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate grid layout and related dimensioning.

C. Product Data: Provide data on acoustical ceiling tiles and suspension system components.

1.6 QUALITY ASSURANCE

A. Fire-Resistive Assemblies: Complete assembly listed and classified by UL (FRD) for the fire resistance indicated.

B. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.7 FIELD CONDITIONS

A. Maintain uniform temperature of minimum 60 degrees F (16 degrees C), and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.1 ACOUSTICAL UNITS

A. Manufacturers:

1. Basis of Design: Armstrong World Industries, Inc: www.armstrong.com.
   a. Product: Clean Room FL Panels with Clean Room 15/16” suspension system.

2. Other Acceptable Manufacturers:
   a. USG: usg.com
   b. CertainTeed: certainteed.com

B. Acoustical Tile: Painted mineral fiber, ASTM E1264 Type III, Class A fire rating, with the following characteristics:
   1. Size: 24 by 24 inches.
   2. Thickness: 3/4 inches.
   3. Edge: Square Lay-In
   4. Surface Color: White.

2.2 SUSPENSION SYSTEM(S)

A. Manufacturers:
   1. Same as for acoustical tile.
   2. Substitutions: See Section 01 6000 - Product Requirements.

B. Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.

C. Exposed Steel Suspension System : Formed steel, commercial quality cold rolled; heavy-duty.
   1. Profile: Tee; 9/16 inch (14 mm) wide face.
   2. Construction: Double web.
   3. Finish: White painted.

2.3 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

3.2 INSTALLATION - SUSPENSION SYSTEM

A. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

B. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.

C. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

D. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

E. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

F. Support fixture loads using supplementary hangers located within 6 inches (150 mm) of each corner, or support components independently.

G. Do not eccentrically load system or induce rotation of runners.

3.3 INSTALLATION - ACOUSTICAL TILES

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Fit border trim neatly against abutting surfaces.

D. Install units after above-ceiling work is complete.

E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

F. Cutting Acoustical Units:
   1. Make field cut edges of same profile as factory edges.

G. Install hold-down clips on each panel to retain panels tight to grid system; comply with fire rating requirements.

3.4 TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet (3 mm in 3 m).

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

09 6500 - RESILIENT FLOORING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Resilient sheet flooring.

B. Resilient base.

C. Installation accessories.

1.2 RELATED REQUIREMENTS

A. None.

1.3 REFERENCE STANDARDS

A. ASTM F1303 - Standard Specification for Sheet Vinyl Floor Covering with Backing; 2004 (Reapproved 2009).

B. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile; 2004 (reapproved 2010).

C. ASTM F1861 - Standard Specification for Resilient Wall Base; 2008 (Reapproved 2012).

D. BAAQMD 8-51 - Bay Area Air Quality Management District Regulation 8, Rule 51, Adhesive and Sealant Products; www.baaqmd.gov; 2002.

E. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings; Resilient Floor Covering Institute; October 2011.

F. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 6000 - Product Requirements, for additional provisions.

D. Samples: Provide two full size samples of each type of resilient flooring.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect roll materials from damage by storing on end.

1.6 WARRANTY

A. 10 years Limited Commercial Warranty

1.7 FIELD CONDITIONS

A. Maintain temperature in storage area between 55 degrees F (13 degrees C) and 90 degrees F (72 degrees C).

B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 65 degrees F (18 degrees C) to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F (13 degrees C).

2.1 SHEET FLOORING

A. Resilient Homogeneous Vinyl Sheet Flooring:
   1. Fire Performance: Class 1.
   2. Wear Layer Thickness: 0.125 mm minimum.
   3. Total Thickness: 2.0 mm minimum.
   4. Pattern/Color:
      a. LIN-1: Match Tarkett iQ Optima Egyptian Scrolls WG #246
      b. LIN-2: Match Tarkell iQ Optima Raw Ivory W #32420862
   5. Seams: Heat welded.
   6. Manufacturers:
      a. Tarkett: www.commercial.tarkett.com
      b. Substitutions: See Section 01 6000 - Product Requirements.

2.2 RESILIENT BASE

A. Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove, and as follows:
   1. Height: 4 inch (100 mm).
   2. Thickness: 0.125 inch (3.2 mm) thick.
   3. Product: Match Johnsonite Black #40
   4. Accessories: Premolded external corners and end stops.
   5. Manufacturers:
      a. Johnsonite
      b. Armstrong
      c. Mannington

2.3 ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.

B. Primers, Adhesives, and Seaming Materials: Waterproof; types recommended by flooring manufacturer.
   1. Provide only products having lower volatile organic compound (VOC) content than required by the more stringent of the South Coast Air Quality Management District Rule No.1168 and the Bay Area Air Quality Management District Regulation 8, Rule 51.

C. Moldings, Transition and Edge Strips: Same material as flooring, profile as indicated or required for a smooth transition.

D. Sealer and Wax: Types recommended by flooring manufacturer.

E. Weld Rods: Heat weld flooring seams with color match weld rod.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

C. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for resilient flooring installation by testing for moisture and pH.

1. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

3.2 PREPARATION

A. Remove existing resilient flooring and flooring adhesives; follow the recommendations of RFCI Recommended Work Practices for Removal of Resilient Floor Coverings.

B. Prepare floor substrates as recommended by flooring and adhesive manufacturers.

C. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.

D. Prohibit traffic until filler is cured.

E. Clean substrate.

3.3 INSTALLATION

A. Starting installation constitutes acceptance of sub-floor conditions.

B. Install in accordance with manufacturer's instructions.

C. Spread only enough adhesive to permit installation of materials before initial set.

D. Fit joints tightly.

E. Set flooring in place, press with heavy roller to attain full adhesion.

F. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.

G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.

H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

I. Finish with (3) coats of floor finish per Manufacturer's recommendations.

3.4 SHEET FLOORING

A. Lay flooring with joints and seams parallel to longer room dimensions, to produce minimum number of seams. Lay out seams to avoid widths less than 1/3 of roll width; match patterns carefully at seams.

B. Seams are prohibited in custodial closets.

C. Double cut sheet at seams.

D. Lay flooring with tightly butted seams, without any seam sealer.

3.5 RESILIENT BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches (45 mm) between joints.

B. Install base on solid backing. Bond tightly to wall and floor surfaces.

3.6 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean in accordance with manufacturer's instructions.

3.7 PROTECTION

A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

09 7200 - WALL COVERINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Wall covering and borders.

1.2 RELATED REQUIREMENTS

A. Section 09 2116 – Gypsum Board Assemblies

1.3 REFERENCE STANDARDS

A. ASTM D1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes; 2002 (Reapproved 2013).

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2016.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on wall covering and adhesive.

C. Shop Drawings: Indicate wall elevations with seaming layout.

D. Maintenance Data: Submit data on cleaning, touch-up, and repair of covered surfaces.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Inspect roll materials at arrival on site, to verify acceptability.

B. Protect packaged adhesive from temperature cycling and cold temperatures.

C. Do not store roll goods on end.

1.7 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the adhesive or wall covering product manufacturer.

B. Maintain these conditions 24 hours before, during, and after installation of adhesive and wall covering.

1.8 WARRANTY

A. Furnish one-year guarantee against defects in material and workmanship.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Marlite – marlite.com

B. Substitutions: See Section 01 6000 - Product Requirements.

2.2 MATERIALS

A. Basis for Design: Marlite – Envue FRP Panels

1. Custom graphic panel purchased and installed by contractor. RIC to provide design file only.
   a. Fire rating: Class I/A
   b. Flexural Strength - 1.7 x 104 psi per ASTM D 790.
   c. Flexural Modulus – 6.0 x 105 psi per ASTM D 790.
   d. Tensile Strength – 8.0 x 103 psi per ASTM D 638.
   e. Tensile Modulus – 9.43 x 103 psi per ASTM D 638.
   f. Water Absorption - 0.17% per ASTM D 570.
   g. Barcol Hardness (scratch resistance) 22 - per ASTM D 2583.
   h. Izod Impact Strength – 7.0 ft. lbs./in ASTM D 256.
   i. Mold & Mildew – pass per ASTM D 3273.
2. Marlite Edge Trim #F570, on all four (4) sides – Black Satin Anodized Aluminum.

B. Adhesive: Type recommended by wall covering manufacturer to suit application to substrate.

C. Substrate Filler: As recommended by adhesive and wall covering manufacturers; compatible with substrate.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate surfaces are prime painted and ready to receive work, and conform to requirements of the wall covering manufacturer.

B. Measure moisture content of surfaces using an electronic moisture meter. Do not apply wall coverings if moisture content of substrate exceeds level recommended by wall covering manufacturer.

C. Verify flatness tolerance of surfaces does not vary more than 1/8 inch in 10 feet (3 mm in 3 m) nor vary at a rate greater than 1/16 inch/ft (1.5 mm/300 mm).

3.2 PREPARATION

A. Fill cracks in substrate and smooth irregularities with filler; sand smooth.

B. Wash impervious surfaces with tetra-sodium phosphate, rinse and neutralize; wipe dry.

C. Surface Appurtenances: Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.

D. Surfaces: Correct defects and clean surfaces that affect work of this section. Remove existing coatings that exhibit loose surface defects.

E. Vacuum clean surfaces free of loose particles.

3.3 INSTALLATION

A. Apply adhesive and wall covering in accordance with manufacturer's instructions.

3.4 CLEANING

A. Clean wall coverings of excess adhesive, dust, dirt, and other contaminants.

B. Reinstall wall plates and accessories removed prior to work of this section.

END OF SECTION

09 9000 - PAINTING AND COATING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints, stains, varnishes, and other coatings.

C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.

D. Do Not Paint or Finish the Following Items:
   1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Floors, unless specifically so indicated.
   6. Glass.
   7. Concealed pipes, ducts, and conduits.

1.2 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.

1.3 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of all products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.

C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
   1. Where sheen is specified, submit samples in only that sheen.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

1.5 MOCK-UP

A. See Section 01 4000 - Quality Requirements, for general requirements for mock-up.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.7 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.

B. Provide all paint and coating products from the same manufacturer to the greatest extent possible.

C. Paints:
   1. Benjamin Moore & Co: www.benjaminmoore.com.
   2. PPG Paints: www.ppgpaints.com.
   3. Pratt & Lambert Paints: www.prattandlambert.com.
   4. Sherwin-Williams Company: www.sherwin-williams.com.
   5. Substitutions: See Section 01 6000 - Product Requirements.

2.2 PAINTS AND COATINGS - GENERAL

A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
   1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Supply each coating material in quantity required to complete entire project's work from a single production run.
   3. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

B. Primers: As follows unless other primer is required or recommended by manufacturer of top coats; where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

C. Volatile Organic Compound (VOC) Content:
   1. Provide coatings that comply with the most stringent requirements specified in the following:

a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.

2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

D. Colors: As indicated on drawings

1. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.

2.3 PAINT SYSTEMS - INTERIOR

A. Paint I-OP - All Interior Surfaces Indicated to be Painted, Unless Otherwise Indicated: Including gypsum board, concrete, concrete masonry, brick, wood, plaster, uncoated steel, shop primed steel, galvanized steel, and aluminum.

1. Two top coats and one coat primer.
2. Eggshell: MPI gloss level 3; use this sheen at all locations.
3. Primer(s): As recommended by manufacturer of top coats.

B. Paint I-OP-MD-DT - Medium Duty Door/Trim: For surfaces subject to frequent contact by occupants, including metals, and wood:

1. Medium duty applications include doors, door frames, guardrails, and balustrades.
2. Two top coats and one coat primer.
3. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.

C. Paint MI-OP-2L - Ferrous Metals, Primed, Latex, 2 Coat:

1. Touch-up with latex primer.
2. Semi-gloss: Two coats of latex enamel.

D. Paint MgI-OP-3L - Galvanized Metals, Latex, 3 Coat:

1. One coat galvanize primer.
2. Semi-gloss: Two coats of latex enamel.

E. Paint GI-OP-2L - Gypsum Board/Plaster, Latex, 2 Coat:

1. One coat of alkyd primer sealer.
2. Eggshell: One coat of latex enamel.

2.4 ACCESSORY MATERIALS

A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. Test shop-applied primer for compatibility with subsequent cover materials.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Gypsum Wallboard: 12 percent.
   2. Plaster and Stucco: 12 percent.
   3. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
   4. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

3.2 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to coating application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

F. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.

G. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.

H. Plaster Surfaces to be Painted: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

I. Aluminum Surfaces to be Painted: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.

J. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.

K. Corroded Steel and Iron Surfaces to be Painted: Prepare using at least SSPC-SP 2 (hand tool cleaning) or SSPC-SP 3 (power tool cleaning) followed by SSPC-SP 1 (solvent cleaning).

L. Uncorroded Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand or power tool wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.

M. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.

N. Interior Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.

3.3 APPLICATION

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Apply products in accordance with manufacturer's instructions.

C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

D. Apply each coat to uniform appearance.

E. Sand wood and metal surfaces lightly between coats to achieve required finish.

F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

G. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.4 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.5 PROTECTION

A. Protect finished coatings until completion of project.

B. Touch-up damaged coatings after Substantial Completion.

3.6 SCHEDULE

A.	PT-1	Field Paint	Match Benjamin Moore #860 - Apparition
B.	PT-2	Whiteboard Paint	Match Benjamin Moore Notable Dry Erase 0500
C.	PT-3	Door Frame Paint	Match Benjamin Moore #1603 - Graphite

END OF SECTION

10 14 00 - SIGNAGE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Room and door signs.

B. Glass decal signage.

1.2 RELATED REQUIREMENTS

A. 09 9000 – Painting and Coating

1.3 REFERENCE STANDARDS

A. 36 CFR 1191 - Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities; Final Rule; current edition; (ADA Standards for Accessible Design).

B. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.

1.4 SUBMITTALS

A. See Section 01 3300 - Submittal Procedures, for submittal procedures.

B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.

C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.

1. When room numbers to appear on signs differ from those on the drawings, include the drawing room number on schedule.
2. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
3. Submit for approval by Owner through Architect prior to fabrication.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Package signs as required to prevent damage before installation.

B. Package room and door signs in sequential order of installation, labeled by floor or building.

C. Store tape adhesive at normal room temperature.

1.7 FIELD CONDITIONS

A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.

B. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Flat Signs:
   1. Best Sign Systems, Inc; www.bestsigns.com.
      a. Product: Lucent
   2. Substitutions: See Section 01 6000 - Product Requirements.

C. Window Decal :
   2. 3M; 3m.com
   3. Substitutions: See Section 01 6000 - Product Requirements.

2.2 FLAT SIGNS

A. Impact resistant thermoformed acrylic with raised lettering, braille and solid color background.

B. Tactile characters/symbols shall be raised from sign plate face. Signs shall be of one-piece construction; added-on and/or engraved characters are unacceptable.

C. Text shall be accompanied by Grade 2 braille.

D. All letters, numbers and/or symbols shall contrast with their background – dark characters on a light background. Characters and background shall have matte finish. Characters shall have raised text and all signs shall have braille.

E. Signs shall be clear acrylic with stipple surface texture, grade-2 domed Braille and beige second surface with colored letters.

2.3 SIGNAGE APPLICATIONS

A. Accessibility Compliance: All signs are required to comply with ADA Standards for Accessible Design and ANSI/ICC A 117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.

B. Room and Door Signs: Provide a sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.
   1. Office Doors: Identify with room numbers to be determined later, not the numbers shown on the drawings; in addition, provide "window" section for replaceable occupant name.
   2. Conference and Meeting Rooms: Identify with room numbers to be determined later, not the numbers shown on the drawings; in addition, provide "window" section with sliding "In Use/Vacant" indicator.
   3. Toilet Rooms: Identify with graphics room names and numbers (numbers to be determined later, not those shown on the drawings.)

C. Interior Directional and Informational Signs:
   1. Sign Type: Same as room and door signs.

2.4 SIGN SIZE

A. Room name/number signs shall be 8" x 8". Match existing RIC standard room signs.

2.5 ACCESSORIES

A. Tape Adhesive: Double sided tape or permanent adhesive. Mounting on glass to be accompanied by a blank plate on other side of glass.

2.6 WINDOW DECAL

A. Basis of Design: #M Changeable Graphic Film #IJ61

B. Provide custom window decal full length and width of door glass.

C. Install on inside face of glass.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install neatly, with horizontal edges level.

C. Locate signs where indicated:
   1. Room and Door Signs: Locate on wall at latch side of door with centerline of sign at 60 inches (1525 mm) above finished floor.
   2. If no location is indicated obtain Architect’s instructions.

D. Protect from damage until Substantial Completion; repair or replace damage items.

3.03 SIGN SCHEDULE

A. Produced by vendor and submitted for approval by Owner and Architect.

END OF SECTION

11 5313 - LABORATORY FUME HOODS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Standard laboratory fume hoods.

1.2 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Blocking and nailers for anchoring fume hoods.

1.3 REFERENCE STANDARDS

A. ASHRAE Std 110 - Methods of Testing Performance of Laboratory Fume Hoods; 2016.

B. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; 2019.

C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

D. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2018.

E. SEFA 1 - Laboratory Fume Hoods; 2010.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate installation of fume hoods with laboratory casework and other laboratory equipment.

B. Preinstallation Meeting: Conduct preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

C. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

1.5 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide fume hood exterior and interior dimensions and construction, and utility/service requirements and locations.

C. Shop Drawings: Indicate locations, large scale plans, elevations, cross sections, rough-in and anchor placement dimensions and tolerances, clearances required, locations and types of service fittings.

D. Operation Data: Include description of equipment operation and required adjusting and testing.

E. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

F. Project Record Documents: Record actual locations of concealed utility connections.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with minimum three years of documented experience.

C. Preconstruction Testing: Factory-test hood as per referenced standard.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect finished surfaces during handling and installation with protective covering of polyethylene film or another suitable material.

1.8 FIELD CONDITIONS

A. Ambient Conditions: Maintain temperature and relative humidity at occupancy levels during and after installation of fume hoods.

1.9 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide one year manufacturer warranty for manufacturer's standard items (listed by part number in manufacturer's official publication).

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Labconco 4’ Protector XStream Laboratory Hood. Model #110 41 0000

2.2 VARIABLE AIR VOLUME (VAV) FUME HOODS

A. Restricted-Bypass Fume Hoods:
   1. Provide a compensating bypass arrangement above the sash to open after sash is closed to less than 20 percent open. Bypass to maintain exhaust capacity of at least 25 CFM per square foot (127 L/s per square meter) of work surface regardless of sash position.
   2. Provide an electronic control unit designed to use input from a sensor that monitors face velocity or sash position to modulate a dedicated exhaust damper in order to maintain a near-constant fume hood face velocity.
      a. Provide control unit with a manual-override switch that allows the operator to fully open the exhaust damper.
      b. Provide control unit with outputs for interfacing with building's HVAC control system.

2.3 PERFORMANCE REQUIREMENTS

A. Fume hoods complying with the following when tested in accordance with ASHRAE Std 110:
   1. As-Manufactured (AM) Rating: AM 0.01 (0.01 ppm).
   2. As-Installed (AI) Rating: AI 0.10 (0.10 ppm).
   3. Average Face Velocity: 100 FPM (0.51 m/s) plus or minus 10 percent with sashes fully open.
   4. Face-Velocity Variation: Not more than 10 percent of average face velocity across the face opening with sash(es) fully open.
   5. Release Rate: 4.0 L/min.
   6. Static-Pressure Loss: Not more than 1/2-inch w.g. (124 Pa) at 100 FPM (0.51 m/s) face velocity with sash fully open when measured at four locations 90 degrees apart around the exhaust duct and at least three duct diameters downstream from duct collar.

2.4 FUME HOODS

A. Exterior Superstructure: Double wall construction. 18-gauge cold rolled steel.

B. Interior Superstructure: Galvanized Steel

C. Facia: Powder Coated steel in White

D. Liner Material: Molded Composite Sheet

E. Side Panels: Removable in White

F. Baffles: Molded Composite Sheet

G. Interior Access Panels: Right and Left Sides. Gasket Provided

H. Corner Post with Access Covers: Right and Left Sides. 118-gauge cold rolled steel.

I. Air Foil: Cold rolled steel. Powder coat finish.

J. Sash: Vertical Travel. Tempered Safety Glass. Counter Weighted and Balanced. Pulley System. Sash Stop @ 18".

K. Electrical Fixtures: LED Light and tubes with switch.

L. Wiring: Fume Hood wired at factory. Electrical connection made inside 4x7 junction box. 100-115V, 50/60 Hz.

M. Work Surface: Black Epoxy Work Surface.

N. No gas service, sink, or running water are required.

2.5 FABRICATION

A. General: Assemble fume hoods in factory to greatest extent possible. Disassemble fume hoods only as necessary for shipping and handling limitations, or as necessary to permit movement through door opening.

B. Ends: Fabricated with double-wall end panels. Close area between double walls at front of fume hood and as needed to house sash counterbalance weights, utility lines, and remote-control valves.

C. Lining Assembly: Unless otherwise indicated, assembled with stainless-steel fasteners or epoxy adhesive, concealed where possible. Joints sealed by filling with chemical-resistant sealant during assembly.
   1. Punched fume hood lining side panels for service fittings and remote controls. Removable plug buttons for holes not used for indicated fittings.

D. Rear Baffle: Same material as fume hood lining, unless otherwise indicated, at rear of hood with openings at top and bottom, with corrosion-resistant fasteners. Fabricated for removal to facilitate cleaning behind baffle.

E. Exhaust Plenum: Full width of fume hood, sized and configured to provide uniform airflow, of same material as hood lining, and with duct stub for exhaust connection.
   1. Duct-Stub Material: Epoxy-coated steel, unless otherwise indicated.

F. Airfoil: At bottom of fume hood face opening, with 1 inch (25.4 mm) gap between bottom of airfoil and work top. Sash to close on top of airfoil. Designed to direct airflow across work.
   1. Fabricated from 14 gage, 0.0781 inch (1.98 mm) stainless steel with No.4 finish.

G. Comply with requirements of other sections for factory installation of water and laboratory gas service fittings, piping, electrical devices, and wiring. Securely anchor fittings, piping, and conduit to fume hoods, unless otherwise indicated.

PART 3 EXECUTION

3.1 EXAMINATION

A. Locate concealed framing, blocking, and reinforcements that support fume hoods by field measurements before being enclosed, and indicate measurements on Shop Drawings.

B. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of fume hoods.

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

3.2 INSTALLATION

A. General: Install fume hoods according to manufacturer's written instructions. Install level, plumb, and true; shim as required, using concealed shims, and securely anchor to building and adjacent laboratory casework. Securely attach access panels but provide for easy removal and secure reattachment. Where fume hoods abut other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.

B. Comply with indicated requirements for installing water and laboratory gas service fittings, and electrical and telecommunications devices.

3.3 FIELD QUALITY CONTROL

A. Field test fume hoods as specified below.
   1. General: Test fume hoods as installed to assess airflow velocity. Perform tests with static mode (set sash position) conditions. Conduct testing as outlined below for all hoods provided in the Project.
   2. Preparation:
      a. Inspect each fume hood to confirm its installation complies with drawings and specifications.
      b. Inspect laboratory space to verify that construction complies with drawings and specified requirements.
      c. Do not proceed with fume hood testing until an acceptable TAB report has been received.
      d. Verify that proper temperature and pressurization of the lab space can be maintained, with door(s) to the space in closed and open positions.
      e. Adjust non-complying physical and control systems until conditions favorable to testing fume hoods are present.
   3. Operating Conditions Tests:
      a. Conduct face velocity tests to confirm that target velocities are being achieved within acceptable tolerances.
      b. Conduct airflow indicator/monitor tests to confirm acceptable variation from corresponding measured value. Calibrate and adjust device to function within specified accuracy parameters.
      c. Conduct exhaust flow and static pressure tests of the HVAC system and its controls to confirm flow volume and static pressures are within acceptable tolerances.

d. In projects with VAV lab ventilation systems, conduct response time and stability tests to confirm how the HVAC supply and exhaust systems respond to different sash opening positions.
e. Conduct tests of alarm device by shutting off the fume hood exhaust and verify that the individual fume hood alarm activates and operates in specified manner.
f. Conduct tests of individual controls provided at the fume hood (such as unoccupied cycle override, alarm override, etc.) to verify they operate in specified manner.

4. Containment Performance Tests:
   a. Conduct airflow visualization tests (local smoke challenges) to provide a visual indication of fume hood's capture performance.
      1) Coordinate disabling of local fire alarm system when performing this test.
      2) Compensate for smoke discharge velocity and exposure outside of the fume hood.
      3) If required to be performed, do not proceed with the large volume challenge test if the hood has failed the local challenge test.
      4) Record a video of the test(s).
   b. Conduct tracer gas containment tests, using mannequins to confirm gas concentrations meet (are below) specified criteria.
      1) Use tracer gas agreed-upon with Owner.

3.4 ADJUSTING

A. Adjust moving parts for smooth, near silent, accurate sash operation with one hand only. Adjust sashes for uniform contact of rubber bumpers. Verify that counterbalances operate without interference.

3.5 CLEANING

A. Clean finished surfaces, including both sides of glass; touch up as required; and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

3.6 DEMONSTRATION

A. Demonstrate proper operation of fume hoods and their accessories to Owner's designated representative.

END OF SECTION

12 2400 - WINDOW SHADES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Window shades and accessories.

1.2 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Sequencing:
   1. Do not fabricate shades until field dimensions for each opening have been taken.
   2. Do not install shades until final surface finishes and painting are complete.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets including materials, finishes, fabrication details, dimensions, profiles, mounting requirements, and accessories.

C. Selection Samples: Include fabric samples in full range of available colors and patterns.

D. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of shop drawings.

E. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.

B. Installer Qualifications: Company specializing in performing work of this type with minimum 5 years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver shades in manufacturer's unopened packaging, labeled to identify each shade for each opening.

B. Handle and store shades in accordance with manufacturer's recommendations.

1.7 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide manufacturer's warranty from Date of Substantial Completion, covering the following:
   1. Shade: Lifetime Limited Warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manually Operated Roller Shades:
   1. Rollease Acmeda Contract: rolleaseacmedacontract.com

a. Contract Series One – Medium Fascia Roller Shade

2. Substitutions: See Section 01 6000 - Product Requirements.

B. Shade Fabric:

1. Rollease Acmeda Contract: rolleaseacmedacontract.com

a. SierraSol Blackout Fabric – Mesa Collection (1 Layer)

b. Alkenz SunShadow Solar Screen – 3000 NET (1 Layer)

2. Substitutions: See Section 01 6000 - Product Requirements.

D. Source Limitations: Furnish products produced by a single manufacturer and obtained from a single supplier.

2.2 WINDOW SHADE UNIT

A. Clutch Control

B. Internal Hem Bar

C. Pocket Housing

D. Chainhold

E. Stainless Steel Chain

F. Bracket Color: White

2.3 BLACKOUT SHADE

A. Color: Black

B. Openness Factor: 0%

C. UV Blockage: 100%

2.4 SHADE

A. Color: White/Gray

B. Openness Factor: 5%

2.5 ACCESSORIES

A. Brackets and Mounting Hardware: As recommended by manufacturer for mounting configuration and span indicated.

B. Fasteners: Non-corrosive, and as recommended by shade manufacturer.

2.6 FABRICATION

A. Fabricate shades to fit openings within specified tolerances.

1. Vertical Dimensions: Fill openings from head to sill.

B. Dimensional Tolerances: As recommended in writing by manufacturer.

C. At openings requiring continuous multiple shade units with separate rollers, locate roller joints at window mullion centers; butt rollers end-to-end.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions and approved shop drawings, using mounting devices as indicated.

B. Installation Tolerances:

1. Maximum Offset From Level: 1/16 inch (1.5 mm).

C. Adjust level, projection and shade centering from mounting bracket. Verify there is no telescoping of shade fabric. Ensure smooth shade operation.

3.2 CLEANING

A. Clean soiled shades and exposed components as recommended by manufacturer.

B. Replace shades that cannot be cleaned to "like new" condition.

3.3 CLOSEOUT ACTIVITIES

A. See Section 01 7800 - Closeout Submittals, for closeout submittals.

3.4 PROTECTION

A. Protect installed products from subsequent construction operations.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

12 31 00 MANUFACTURED WOOD CASEWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Cabinets.

B. Countertops.

1.2 RELATED REQUIREMENTS

A. Section 07 9005 – Joint Sealers.

B. Section 09 6500 – Resilient Flooring: Base material

1.3 REFERENCE STANDARDS

A. ANSI A208.2 – American National Standard for Medium Density Fiberboard for Interior Use; 2009 American National Standards Institute (ANSI).

B. Architectural Woodwork Institute (AWI) Architectural Woodwork Quality Standards Illustrated, latest edition.

C. National Electrical Manufacturers Association:

1. NEMA LD 3 – High Pressure Decorative Laminates.

D. Composite Panel Association Buyer's & Specifier's Guide.

1.4 SUBMITTALS

A. See Section 01 3300 - Submittal Procedures, for submittal procedures.

B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.

1. Minimum Scale of Detail Drawings: 1-1/2 inch to 1 foot (1:8).
2. Provide the information required by AWI/AWMAC/WI Architectural Woodwork Standards.
3. Include certification program label.

C. Product Data for each product.

D. Samples for each product.

1.5 QUALITY ASSURANCE

A. Manufacturers shall be members of AWI, have established quality control criteria.

B. Casework shall meet or exceed load tests as outlined in ANSI A161.1.

C. Manufacturers shall comply, per architect's specifications with special requirements related to the Americans with Disabilities Act, 28 CFR Part 36, ADA Standards for Accessible Design.

D. Items shall suite space conditions and where equipment is intended to occupy fixed locations, the physical conditions, roughing-in, etc., of the building are to control the absolute sizes and arrangements.

E. Stock numbers of items of equipment, as indicated on drawings, have been selected from one manufacturer's catalog for design purposes only.

F. Units by approved manufacturer, other than the Basis of Design, need not be identical to the items indicated, however, they must satisfy the same requirements, provide the same facilities (doors, drawings, etc.), and fulfill the same functions as the specified items.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Provide warranty for manufactured product.
B. Accept casework on site; inspect on arrival for damage.
C. Store and handle casework in a manner to prevent damage and deterioration.
D. Provide packaging such as cardboard or other containers, separators, banding, spreaders, and paper wrappings to protect metal items.
E. Store casework in a protected dry area, provided by RIC, away from direct sunlight, with temperature 70 degrees F and relative humidity of 25-50%. Casework shall be stored elevated above moisture contact. Storage area must be isolated from outside weather conditions. Casework shall be installed only in areas where temperature and humidity are maintained within the above-stated range. Storage and installations in conditions other than those stated above will void all product warranties.
F. All cabinets to be complete with hardware attached (or provided loose where not practical to ship attached) with all necessary scribes, fillers and molding; all items to be marked on outside of packaging for identification.
G. Protect exposed finish surfaces by suitable means.
H. Coordinate size of access and route to place of installation.

1.7 FIELD CONDITIONS

A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.
B. Verify that field measurements are as indicated on Shop Drawings.

1.8 WARRANTIES

A. The manufacturer shall guarantee the casework against defects in materials and workmanship for a period of one year from date of acceptance.
B. Warranty shall cover the repair or replacement, at the manufacturer's discretion of defective material.
C. Non-manufactured components and accessories, such as faucets, fittings and fume hoods, shall be covered by the specific manufacturer's warranty.

PART 2 PRODUCTS

2.1 CASEWORK

A. Manufacturers:
   1. Basis of Design: Wood-Metal Industries, 100 East Sherman Street, Selinsgrove, PA 17870, (570) 374-1176.
   2. Substitutions: See Section 01 6000 - Product Requirements.
B. Finish: Wilsonart 7987-38 Palisades Oak.
C. Plastic Laminate Casework:
   1. Surfaces: Plastic laminate surface of exposed faces, edges and backs of cabinet doors with high pressure laminate materials conforming to NEMA LD3. Plastic laminate

material shall be solid color throughout the thickness of the material. Cabinet interiors to have white melamine. High-pressure plastic laminate shall be nominally 0.028" in thickness.

2. Core: The core shall be plywood, close grained hardwood faced plywood, not less than 5-ply and graded not less than B-B, with both sides sanded. Particle board is not acceptable.
3. Backing Sheet: Backing sheet shall be not less than .020 inch balancing sheet plastic laminate. All laminated plastic laminated boards shall have backing sheets.
4. Adhesive: Type I waterproof glue manufactured for veneering plastic laminate to core material.
5. Fasteners and Accessories: Provide the required anchors, plates, clips, screws and accessories for a concealed fastening system and as required for a complete and finished installation.
6. Drawers and Doors: Overlay Square Edge
7. Shelving: Provide a minimum of one (1) adjustable shelf for each upper and each lower cabinet. Provide a minimum of six (6) adjustable shelves for tall cabinets. Shelves to be a minimum of 1" thick. Exposed shelves and interior cabinets shall match exterior finish.

D. Finish Cabinet Hardware:

1. Provide finish hardware for cabinets as required to complete the work whether specified or not.
2. Each cabinet door shall be provided with appropriate hinges, pull, catches and stops. Include key operated locks.
3. Finish: The finish of all hardware shall be US32D or US26D.
4. Hinges: Heavy Duty European style concealed self-closing type, steel with polished finish. Standard hinges for wall cabinets, base cabinets and tall cabinet doors shall be of the heavy-duty, wrap around, institutional type with five knuckles, non-removable pin and rounded ends. Hinges for overlay door construction shall be 2-¾" high by .095" thick and hinges for lipped radius construction shall be 2-½" high by .072 thick. Hinge swing shall be 270 degrees.
5. Hinge screws shall be concealed when door is closed.
6. Doors less than 40-¼" high shall have 2 hinges and those 40-¼" high and over shall have three hinges.
7. Provide concealed hinges shall be available with either 120 or 170-degree swing.
8. Door Pulls: ADA standard pulls shall be satin aluminum bent wire style with 4" centers.
9. Standards slides shall be single extension, bottom-mounted, epoxy powder-coated with positive in stop, out-stop and out keeper, lift-out disconnect, stay-closed design. Slides shall have captive nylon rollers both front and rear, 100 pound load rating and manufacturer's lifetime warranty.
10. Catches shall be double-action, spring tension, nylon roller catch.
11. On all tall cases, catches shall be heavy-duty nylon roller type.

12. Adjustable Shelf Supports: Standard side-mounted system using recessed metal shelf standards or multiple holes for pin supports and coordinated self rests, polished chrome finish, for nominal 1 inch (25 mm) spacing adjustments. Load rating shall be minimum 300 pounds per shelf support.
13. Door Lock: Heavy Duty cabinet locks by Haefele or equal. Locks shall be of a removable core design with 5-disk tumbler. Cabinets to be keyed alike per room.
14. Two (2) keys shall be provided per lock with up to six (6) master keys, per usergroup requirements.

2.2 CASEWORK ACCESSORIES

A. Adhesive: Type recommended by fabricator to suit application.

B. Fasteners: Size and type to suit application.

C. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.

D. Concealed Joint Fasteners: Threaded steel.

E. Grommets: Standard plastic, painted metal, or rubber grommets for cut-outs, in color to match adjacent surface. Coordinate locations in field with Usergroup and Architect, minimum of six (6) locations.

2.3 EPOXY COUNTERTOPS

A. Basis of Design: Duratop Epoxy; Total Laboratory Solutions, Scottsdale, AZ 85266; Duratop-Epoxy.com; (480) 488-6421; David@DuratopEpoxy.com

B. General: Material shall be a monolithic, cast epoxy resin product and shall consist of a polymerized cast resin material and asbestos free inert materials shall be oven-cured in molds to obtain maximum chemical resistance, then removed from the molds and oven tempered to achieve maximum physical strength and stability. Surfaces shall have a uniform low-sheen surface and the finished material shall be extremely hard and resistant to scratches and abrasion.

1. Thickness: 1 inch thick (25mm).
2. Edges and Comers: 1/8" (3mm) bevel machine top edge with blended radius corners. Chamfer underside exposed edges.
3. Surface: Work surfaces shall be furnished flat.
4. Backsplashes: Supplied loose for field application in the same material and thickness as countertops. Curbs as installed shall be 4" high (100mm) typical, unless otherwise indicated on drawings. Curbs will be bonded to the tops at the jobsite. Include top mounted end curb where work surfaces abut walls, fume hoods, and locations detailed on drawings.
5. Color: Black Onyx.
6. Warpage: Check work surface for warpage before fabrication or installation. Measure in unrestrained conditions. Work surface will be accepted for use if there is no gap exceeding 1/16" in a 36" span.
7. Fabrication: Provide in longest practical lengths, 96" being max available. All joints shall

be bonded with a highly chemical and corrosion resistant epoxy adhesive. Provide 1/8" drip groove on underside of exposed edges set back ½" from edge at all sink areas and where shown on drawings. All exposed edges to be molded or finished.

8. Thickness Tolerances: Each top corner shall not deviate more than plus/minus 1/16" from nominal.
9. Size Tolerances: Length, plus/minus 1/8" width, plus/minus 1/16".
10. Squareness: Compare the diagonal corner-to-corner measurements across the width of each work surface. The diagonal measurements must be within 1/16".
11. Penetrations: Location of cutouts and drillings: Plus/minus 1/8". Cutout sizes and drillings: Plus/minus 1/16".

C. Chemical Resistance

1. Test Methods:
   a. Volatile chemicals (organic solvents): A cotton ball, saturated with the test chemical reagent is placed in a one-ounce bottle with a reservoir of liquid above the ball. The container is inverted on the test material for a period of24 hours at a standard temperature of 23 degrees plus/minus 2 degree C.
   b. Non-Volatile Chemicals: Five drops of the test chemical are placed on the test material surface. The chemical is covered with a 1" watch glass for a period of no less than 24 hours at a standard temperature of 23F degrees plus/minus 2 degree C.

2.4 EPOXY SINKS

A. Basis of Design: Duratop Epoxy; Total Laboratory Solutions, Scottsdale, AZ 85266; Duratop-Epoxy.com; (480) 488-6421; David@DuratopEpoxy.com

B. Description: 14” x 14” x 5” Integrally molded from modified thermosetting epoxy resin, and oven cured. Nominal wall thickness of ½" with all interior corners coved to 1 to 1 ½" radius and bottoms pitched to the outlet opening.

1. Lipped drop-in epoxy sinks to be installed into a factory routed groove in countertop to receive sink rim. Set sink in adhesive and fill remainder of groove with silicone sealant or epoxy resin adhesive to create a chemical liquid seal.
2. Remove excess adhesive or sealant while still wet and finish joint for neat appearance.
3. Sink Color: Black Onyx

C. Sink Outlet / Waste:

1. Molded Polypropylene Model #EF-PPSW-85
2. Sink outlets shall accommodate a plastic disc strainer. Provide outlet with 1.93" outlet opening and 1.5" NPSM threads.
3. Outlet Color: Black.

D. Sink Overflows:

1. Molded polypropylene Model #EF-PPWT-158.
2. Sink outlets shall accommodate a plastic disc strainer. Provide outlet with 1.93" outlet opening and 1.5" NPSM threads.
3. Overflow Color: Black.

E. Stoppers:
   1. Molded polypropylene Model #EF-PPPG-150.
   2. Stopper color: Black

F. Bottle Traps:
   1. Molded Polypropylene Model #EF-PPBT-190
   2. Size 1.57" to 4.00" adjustable inlet bottle trap, with integrated 1.5'' NPSM threads.
   3. Bottle Trap Color: Black

2.5 EPOXY PEGBOARD

A. Duratop Epoxy Resin Pegboards / Drying racks:
   1. Molded of same material as counter tops and sinks from modified thermosetting epoxy resin, and oven cured. Nominal thickness of 1" (25mm).
   2. Pre-Drilled 2 Prong holes to hold 5"; 6.5"; or 8" Polyethylene pegs.
   3. Peg colors black or White, as specified in plans.
   4. Pegboard color: Black Onyx

PART 3 EXECUTION

3.1 CASEWORK FABRICATION

A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.

B. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.

C. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.

D. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet (600 mm) from sink cut-outs.
   1. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.

E. Provide cutouts for plumbing fixtures. Verify locations of cutouts from on-site dimensions. Prime paint cut edges.

3.2 CASEWORK EXAMINATION

A. Verify adequacy of backing and support framing.

B. Verify location and sizes of utility rough-in associated with work of this section.

3.3 CASEWORK INSTALLATION

A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.

B. Use fixture attachments in concealed locations for wall mounted components.

C. Use concealed joint fasteners to align and secure adjoining cabinet units.

D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch (1 mm). Do not use additional overlay trim for this purpose.

E. Secure cabinets to floor using appropriate angles and anchorages.

F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

G. Install casework, components, and accessories under manufacturer under manufacturer representative's supervision whenever possible, using skilled labor especially trained for this work.

H. Cabinets are to be installed in a professional and industry-accepted manner, including all scribes, moldings and necessary trim, complete and in operating condition according to outlined plans and specifications.

I. Set casework items plumb and square, securely anchored to building structure.

J. Furnish casework complete with trim strips, fillers, backs, etc., as may be required; all cutouts required for trim, sinks, etc., shall be made by the casework supplier.

3.4 CASEWORK ADJUSTING

A. Adjust installed work.

B. Adjust moving or operating parts to function smoothly and correctly.

C. Adjust doors, drawers, hardware and other moving or operating parts to function smoothly.

D. Adjustable shelves shall be installed consistent with the shop drawings.

3.5 CASEWORK CLEANING

A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

B. All packaging material and installation-related debris shall be placed in an owner-provided dumpster on the construction site. The work area shall be left broom clean.

C. Installer shall remove all pencil marks, adhesive and sawdust resulting from this work.

D. Plastic laminate casework shall be cleaned inside and out to remove the installation related dust and debris.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

A. Protection of installed casework shall be the responsibility of the general contractor or owner's representative. The owner's representative shall provide materials and labor.

3.7 EPOXY MATERIAL STORAGE

A. Store products in enclosed area protected from ultraviolet.

B. Store products in supplier's unopened packaging until ready for installation.

C. Store panels using protective dividers to avoid damage or scratching of surfaces.

D. Do NOT store sheets or fabricated panels vertically.

3.8 EPOXY MATERIAL INSTALLATION

A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas. Examine shop-fabricated work for completion and complete work as required, including removal of packing and back priming.

B. Do not drag or slide counter tops across the exposed faced of another counter to prevent scratching. Lift edges and sheets with proper mechanical lifting equipment.

C. Install counter tops in accordance with supplier's instructions and approved shop drawings.

D. Install tops plumb and level. Shim where necessary.

E. Scribe to adjacent surfaces in accordance with supplier's recommendations.

END OF SECTION

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SECTION 22 0000
PLUMBING

PART 1 - GENERAL

1.01 GENERAL

A. General Conditions, Supplementary Conditions and applicable parts of Division 1 form a part of this specification and the Contractor shall consult them in detail for instructions.

B. The drawings on which this contract is based are listed in Section 00860. Consult all drawings, note all conditions that may affect the work and care for same in executing the contract.

1.02 APPROVALS

A. Obtain necessary approvals from authorities with jurisdiction, as required to perform work in accordance legal requirements and specification, drawings, addenda and change orders all of which are part of contract documents.

1.03 SCOPE

A. Work shall include, but not be limited to, the following.

1. Lab system connecting to existing.
2. Lab waste and vent piping system.
3. Indirect waste piping.
4. All cold and hot water piping
5. All hot water return piping
6. Final connections to all equipment.
7. Hose bibs.
8. Insulation.
9. Valves.
10. Water hammer arresters.
11. All specialty and control valves.
12. Sterilization of water lines.
13. Plumbing fixtures and trim.
14. Natural gas piping system.
15. Compressed air piping.
16. Fitting unions, flanges and couplings.
17. Roughing and final connections to laboratory equipment.
18. Hangers, plates and inserts.
19. Cleaning, testing and disinfection of piping systems.
20. All supplementary steel for piping and equipment support.

21. All hoisting and rigging for all plumbing and equipment installation.
22. All scaffolding and staging required for the installation of all plumbing systems.
23. Guarantees.
24. Drilling for installation of inserts.
25. Fire seal off all penetrations in floors and walls to the rating of the barrier.
26. Coordinate with specifications for coordination drawing requirements.
27. Temporary connections during construction.
28. Provide each system complete and ready for use.
29. Inspect, test and obtain approval of all piping before burying, covering or concealing. No exceptions will be made.
30. Other items in the work covered in other sections of the specifications, as shown and specified herein.
31. Final connections to plumbing fixtures as specified herein and all equipment requiring such connection

B. Provide all manufactured items and equipment in accordance with manufacturer's recommendations. Provide all necessary specialties and accessories, including anchors and supports.

C. Examine all sections of specification and drawings for requirements affecting the work of this section, as shown and specified herein.

D. Include in the bid price all utility company and municipal back charges for all materials furnished and work performed by them in conjunction with this contract.

E. Furnish following items for installation under other Sections:

1. Access panels.

F. Install the following items furnished under other Sections or by the Owner.

1.04 WORK BY OTHERS

A. The following work is not included in this section and shall be performed under other sections:

1. Cutting, coring, drilling and patching of holes and openings for plumbing work shall be performed by the General Contractor. Refer to Section 01045-Cutting and Patching.

2. Painting, except as specified.

3. Power wiring, conduits, etc. for equipment and fixtures including all low-voltage wiring.

1.05 SHUTDOWNS

A. Coordinate all phases of the work with Owner and do all work with the least inconvenience to the Owner.

B. Coordinate all shutdowns with Owner and do all work, etc., under Owner's approved schedule.

C. Coordinate all shutdowns with Owner and do all work, etc., under Owner's approved schedule, including requirements for overtime.

1.06 EXISTING CONDITIONS

A. Bidders are advised to visit the site and inform themselves as to the existing conditions under which this work will be performed prior to submitting prices. Failure to do so, will, in no way relieve the successful bidder from the responsibility of furnishing any materials or performing any work in accordance with the true intent and meaning of the drawings and specifications.

B. No claim for extra compensation will be recognized if difficulties are encountered which an examination of the site conditions and contract documents prior to executing the contract would have revealed.

C. This Contractor shall be responsible for ordering and furnishing the correct quantity of material required. Routing and equipment arrangements shown on the drawings are approximate only and are not warranted to be accurate.

D. Arrangements shall be made with the Owner prior to the site visit for inspection of the existing buildings.

E. Prior to submitting proposal, visit job site, verify and inspect existing conditions.

F. Examine building before commencing work and make known any damaged fixtures and/or piping which exists.

G. Field verify all inverts, sizes, locations, etc. at each location, prior to starting work.

H. Do not reuse piping, unless otherwise noted.

I. Provide temporary lines required during construction to keep existing systems in proper working order all at no additional cost.

J. Correct and repair any damage to fixtures and piping at no additional cost.

K. Remove and dispose of piping in way of new construction. Cap or plug, as required.

L. Relocate piping, to remain, in way of new construction at no additional cost.

M. Test all water lines being reused and repair all leaks that develop at no additional cost.

N. Before starting any work, this contractor is to verify existing conditions and document with owner and general contractor any damaged piping, fixtures, etc.

O. Before starting any work, this contractor is to verify all new piping connections to existing systems. This contractor is to verify connection sizes, inverts, etc. for new piping connections.

1.07 RELATED SECTIONS

A. Cutting and patching - Division 1.

B. Coring of holes and saw cutting in concrete - Division 1.

C. Concrete work - Division 3.

D. Masonry work - Division 4.

E. Field painting of piping, hangers, etc. - Division 9.

F. Chilled water supply and return piping - Division 23.

G. Condensate piping - Division 23.

H. Heating connections, thermostats - Division 23.

I. Electrical connections - Division 26.

J. Section 01030 – Alternates

1.08 CODES, STANDARDS, AND AUTHORITES

A. Perform work in accordance with rules, regulations, standards, codes, ordinances, and laws of local and federal governments, and other authorities with lawful jurisdiction, and be responsible for compliance therewith.

B. All work performed under this section of the specifications shall be done in accordance with the applicable National, Rhode Island Plumbing, Fuel Gas and Energy Codes and local codes, laws and ordinances.

C. Material and equipment shall be Underwriters Laboratories, UL-listed and ASME-approved, as applicable for service intended.

D. Where code references are given, the latest issue of that code in effect at the time of bidding shall be used. Code references given to indicate the minimum quality and performance acceptable. Where specifications and/or drawings indicate more stringent requirements, the specification shall govern.

E. Permits and inspections: Be responsible for filing all documents, payment of all fees and securing of all permits and scheduling of all required inspections and approvals necessary for the installation and operation of all systems furnished under this section.

F. Conform to applicable code for installation of backflow prevention devices. Provide certificate of compliance from authority having jurisdiction indicating approval of installation of backflow prevention devices.

G. All required permits and inspection certificates shall be obtained and made available at the completion of the work. Refer to Section 00100 for instruction to bidders regarding waiver of municipal fees.

H. All materials and work provided shall be in accordance with, but not limited to, the following:

1. American National Standards Institute (ANSI).
2. American Society for Testing and Materials (ASTM)
3. American Society of Mechanical Engineers (ASME)
4. International Code Council (ICC)
5. National and State Electrical Code (NEC)
6. National Electrical Manufacturer's Association (NEMA
7. National Fire Protection Association Codes and Standards (NFPA)
8. Occupational Safety and Health Act (OSHA)
9. State Building and Handicapped Codes
10. Standards of Underwriters Laboratories (UL)
11. All products used on the project are to be on the State of Massachusetts Product Approval List
12. Narragansett Bay Commission Rules and Regulations
13. Providence Water Supply Board Rules and Regulations

1.09 CUTTING AND FITTING

A. Do the cutting and fitting necessary for the installation of the plumbing work and maintain fire integrity of floor to floor construction.

B. Take care to prevent injury, discoloration or defacement of other finish materials; and do no cutting or fitting of finish material.

1.10 GUARANTEE

A. Guarantee work of this section in writing for one year from date of final acceptance by Owner.

1.11 DRAWINGS

A. The drawings are diagrammatic, and not intended to show every detail of construction or arbitrary location of piping. Where building construction makes it advisable or

necessary to change location of piping or fixtures, without increasing the scope of work, perform such work without additional cost, on written order or consent of the Engineer.

B. Install the work as shown. In case of conflict with building parts, or the work of other trades, immediately request a decision be rendered so that there may be no delay in the building construction.

C. Submit for written approval, single line diagrams of any proposed changes or modification to the drawings, at least one week before prices are due.

1.12 QUALITY ASSURANCE

A. Submit catalog cuts and brochures for approval of all proposed materials to be used on the project.

B. Materials and equipment under the section shall be new and of the best grade.

1. Materials shall conform to the requirement of the State of Rhode Island Plumbing Code, local city requirements, and standards listed such as commercial USAS or ASTM and requirements specifically stipulated herein.

C. All plumbing products used within the domestic water system are to meet or exceed NSF/ANSI 61 Standard requirements for lead-free products.

D. Unless otherwise specified, apply and pay for all necessary permits, fees, and inspections required by any public authority having jurisdiction.

E. If conflicts occur within these specifications or on the drawings, or either between the items of greater quality or higher cost shall be bid and provided.

F. Where items of equipment and/or materials are specified or materials are specified or identified herein by manufacturer's names, model or catalog numbers, only such specified items may be used.

G. Submit, in booklet form, all plumbing fixtures and related accessories for any fixtures and/or equipment.

H. Submit, in booklet form, all plumbing fixtures and related accessories for any fixtures and/or equipment different than the manufacturers listed. Submit catalog cuts of both manufacturers.

I. Submit complete maintenance and operational charts and manuals for all equipment and fixtures specified, indicated or required for this work.

J. Keep on file, at job site, a clean set of prints to clearly and accurately note all changes, wherever work is installed other than shown. After completion of work, provide a

corrected set of drawings in PDF format on CD labeled "Record Drawings" and (2) sets of prints.

K. Installer shall be qualified, licensed within the jurisdiction, and familiar with the installation of cold press mechanical joint systems. Mega-Press G, Stainless Steel and or Pro-Press fittings shall be installed using the proper tools, actuator, jaws and rings as instructed by the press fitting manufacturer.

1. Installation of Pro-Press and or Mega-Press G is to conform to the requirements of the Plumbing Code and or Fuel Gas Code and manufacturer's installation requirements.
2. Pipe shall be shipped to the job site by truck or in such a manner to protect the pipe. The pipe and fittings shall not be handled roughly during shipment. The pipe and fittings shall be unloaded with reasonable care.
3. Protect the stored pipe from moisture and dirt. Elevate above grade. When stored inside, do not exceed the structural capacity of the floor.
4. Protect fittings and piping specialties from moisture and dirt.

L. The installation of black steel pipe in natural gas systems shall conform to the requirements of the State of Rhode Island Fuel Gas Code.

1.13 ACCESSIBILITY

A. Be responsible for sufficiency of shafts and chases, with adequate clearances for the proper installation of the work. Cooperate with all other contractors, whose work is in the same space, and advise the Contractor of all requirements. Keep such spaces and clearances to the minimum size required.

B. Locate all equipment, which must be operated, serviced or maintained, in fully accessible locations. Equipment includes, but is not limited to: valves, traps, cleanouts and drain points. If required for better accessibility, provide access doors. Make minor deviations to allow for better accessibility, however, review such changes with the Architect/Engineer.

1.14 SUBMITTALS

A. Definitions

1. Shop Drawings are information prepared by the Contractor to illustrate portions of the work in more detail than shown in the Contract Documents.
2. Coordination Drawings are detailed, large-scale layout Shop Drawings showing HVAC, Electrical, Plumbing and Fire Protection work superimposed in order to identify conflicts and ensure inter-coordination of Mechanical, Electrical, Architectural, Structural and other work.

B. Submittal Cover Sheet

1. Shop Drawings shall be submitted according to specification section with a separate cover sheet completed for each product, rather than one cover sheet for multiple products, whether or not supplied by one manufacturer or vendor.

C. Submittal Procedures and Format

1. Review submittal packages for compliance with the Contract Documents and then submit to Architect for review.
2. Provide additional copies of reviewed shop drawings as required for full distribution.
3. Shop Drawings showing layouts of systems shall contain sufficient plans, elevations, sections, details and schematics to describe work clearly. They shall be 1/4” = 1’-0” scale unless specified otherwise. Sheet metal shop drawings shall be 3/8” = 1’-0” and shall indicate work of other sections where interferences are possible. Provide larger scale details as necessary. Sheet metal drawings shall show elements of Architects reflected ceiling plan, exposed ductwork, walls, and partitions, diffusers, registers, grilles, fire dampers, sleeves and other aspects of construction as necessary for coordination.
4. ALL FIREWALLS AND SMOKE PARTIONS MUST BE HIGHLIGHTED ON THE SHEET METAL DRAWINGS FOR APPROPRIATE COORDINATION.
5. Shop drawings showing manufacturer’s product data shall contain detailed dimensional drawings, accurate and complete description of construction materials, manufacturer’s published performance characteristics and capacity ratings (performance data, alone, is not acceptable), electrical requirements and wiring diagrams. Drawings shall clearly indicate location (terminal block or wire number), voltage and function for all field terminations, and other information necessary to demonstrate compliance with all requirements of Contract Documents.
6. Provide shop drawing submittals showing details of piping connections to all equipment. If connection details are not submitted and connections are found to be installed incorrectly in the field, this contractor shall reinstall them within the original contract price.

D. Acceptable Manufacturers

1. Alternate Manufacturers are acceptable only if, as a minimum, they:
2. Meet all performance criteria listed in the schedules and outlined in the specification.
3. Have identical operating characteristics to those called for in the specification.
4. Fit within the available space it was designed for, including space for maintenance and component removal, with no modification to either space or the product. Clearances to walls, ceilings and other equipment shall be at least equal to those shown on the design drawings.
5. For rooftop, mounted equipment and for equipment mounted in areas where structural matters are a consideration, the products must have a weight no

greater than the product listed in the schedules or specifications.

6. Products must adhere to all architectural considerations including, but not limited to: being of the same color as the product scheduled or specified, fitting within architectural enclosures and details, and for diffusers, lighting and plumbing fixtures-being the same size and of the same physical appearance as schedule or specified products.

E. Deviations

1. Refer to General Conditions (and Supplementary Conditions) for substitution of equipment.
2. Concerning deviations other than substitutions, proposed deviations from Contract Documents shall be requested individually in writing whether deviations result from field conditions, standard shop practice, or other cause. Submit letter with transmittal of Shop Drawings, which flags the deviation to the attention of the Architect.
3. Without letters flagging the deviation to the Architect, it is possible that the Architect may not notice such deviation or may not realize its ramifications. Therefore, if such letters are not submitted to the Architect, the contractor shall hold the Architect and his consultants harmless for any and all adverse consequences resulting from the deviations being implemented. This shall apply regardless of whether the Architect has reviewed or approved shop drawings containing the deviation and will be strictly enforced.
4. Approval of proposed deviations, if any, will be made at the discretion of the Architect.
5. If apparatus or materials are substituted for those specified under this section, and such substitutions necessitate changes in or additional connects, supports or construction, same shall be provided at no additional cost to the Owner. This Contractor shall assume cost and entire responsibility thereof. Architect's permission to make such substitution shall not relieve this Contractor from full responsibility for work.

F. Responsibility

1. Intent of Submittal review is to check for capacity, rating, and certain construction features. Contractor shall ensure that work meets requirements of Contract Documents regarding information that pertains to fabrication processes or means, methods, techniques, sequences and procedures of construction; and for coordination of work of this and other Sections. Work shall comply with submittals marked "REVIEWED" to extent that they agree with Contract Documents. Submittal review shall not diminish responsibility under this Contract for dimensional coordination, quantities, installation, wiring, supports and access for service, nor shop drawing errors or deviations from requirements of Contract Documents. The Architect's noting of some errors while overlooking others will not excuse the contractor from proceeding in error. Contract Documents requirements are not limited, waived nor superseded in any way by review.

2. Inform subcontractors, manufacturers, suppliers, etc. of scope and limited nature of review process and enforce compliance with contract documents.
3. Changes to work already performed made necessary by delays in shop drawing review are the responsibility of this Contractor.
4. Copies of equipment and system guarantees shall be submitted with shop drawing package.
5. Schedule: Incorporate shop drawing review period into construction schedule so that work is not delayed. Contractor shall assume full responsibility for delays caused by not incorporating the following shop drawing review time requirements into his project schedule. Working days listed reference the time in the Engineer's office. It does not include transmittal time for review each time shop drawing is submitted or resubmitted.
6. If submitted product is different from the manufacturer specified provide in booklet form, all plumbing fixtures, etc. and related accessories and/or equipment different than the manufacturers listed. Submit catalog cuts of both manufacturers addressing point by point comparison addressing each of the specified manufacturer's specific requirements vs the submitted manufacturer and that the submitted product is equal to the specified models, etc.

G. List of Proposed Equipment and Materials

1. Refer to General Conditions (and Supplementary Conditions), Shop Drawings, Product Data and Samples and add the following:
2. Within thirty (30) days after the date of notice to proceed and before purchasing any materials or equipment, submit to the Architect for review, a complete list, in six (6) copies, of all materials to be incorporated in the work. This listing shall be arranged by the order of occurrence in the specifications, followed by the items on the drawings not specifically included in the specifications.
3. After the list has been processed by the Architect, submit complete shop drawings and product data of all equipment. These submittals shall be submitted within thirty (30) days after the processing date of the original submittal list.
4. All submittals shall be complete and shall be in three-ring loose-leaf binders or PDF format. No consideration will be given to partial submittals, except with prior approval of the Architect. Each item shall have a cover page stating project, specification and paragraph reference number, of drawing reference number, and scheduled equipment identification number, if applicable.
5. The review of submittals does not relieve this Contractor from the responsibility of shop drawing errors in details, sizes, quantities, wiring diagram arrangements and dimensions which deviate from the specifications, contract drawings, and/or job conditions as they exist.
6. Changes to work already performed made necessary by delays in shop drawing review are the responsibility of this Contractor.
7. Copies of equipment and system guarantees shall be submitted with shop drawing package.
8. No consideration will be given to partial lists submitted out of sequence.

H. Material and equipment requiring Shop Drawing Submittals shall include, but not be limited to:

1. Plumbing fixtures and trim.
2. Hose bibs.
3. Piping.
4. Fittings, unions, flanges and couplings.
5. Insulation.
6. Sleeve packing.
7. Valves.
8. Water hammer arresters.
9. Hangers, plates and inserts.
10. Access panels.
11. Lab waste piping.
12. Fire rated penetration assemblies indicating ASTM E814 (UL 1479) classification for the application involved. Submittals of individual components or products (i.e., mortars or sealants) without detailed installation drawings shall be rejected as incomplete as incomplete submittals.
13. Lab Control Panel

1.15 REFERENCES

A. ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings Class 25, 125, 250 and 800.

B. ASME B16.3 - Malleable Iron Threaded Fittings.

C. ASME B16.4 - Cast Iron Threaded Fittings Class 125 and 250.

D. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.

E. ASME B16.22 - Wrought Copper and Bronze Solder Joint Pressure Fittings.

F. ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings - DWV.

G. ASME B16.26 - Cast Bronze Fittings for Flared Copper Tubes.

H. ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV.

I. Soil Pipe and Fittings.

J. ASTM A234/A234M - Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures.

K. ASTM B32 - Solder Metal.

L. ASTM B42 - Seamless Copper Pipe.

M. ASTM B43 - Seamless Red Brass Pipe.

N. ASTM B68 - Seamless Copper Tube (ASTM B68M - Seamless Copper Tube).

O. ASTM B75 - Seamless Copper Tube (ASTM B75M - Seamless Copper Tube).

P. ASTM B251 - Wrought Seamless Copper and Copper-Alloy Tube (ASTM B251M - Wrought Seamless Copper and Copper-Alloy Tube).

Q. ASTM B302 - Threadless Copper Pipe (TP).

R. ASTM F708 - Design and Installation of Rigid Pipe Hangers.

S. ASME A112.18.1 - Finished and Rough Brass Plumbing Fixture Fittings.

1.16 DELIVERY, STORAGE, AND PROTECTION

A. Accept fixtures and equipment on site in shipping containers with labeling in place. Inspect for damage.

B. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

C. Protect materials, fixtures and fittings. Temporarily close all pipe openings to prevent obstruction and damage. Maintain in place until installation. Board over, water closets, lavatories and sinks and protect other fixtures with pasted-on paper.

D. Store lab waste pipes protected from direct sunlight. Support to prevent sagging and bending.

E. Post notices prohibiting the use of the fixtures prior to completion.

1.17 WARRANTY

A. Refer to General Conditions and add the following:

1. Standard equipment guarantees offered by the manufacturer for on (1) year or greater shall be in addition to that as required by this contract.
2. Copy of manufacturer’s equipment guarantees shall be submitted with this Contractor’s written guarantee.
3. All pipe and fittings manufacturer shall warrant that the pipe and fittings are free from defects and conform to the designated standard. The warranty shall only be applicable to pipe and fittings installed in accordance with the manufacturer’s installation instructions.

1.18 ALTERNATES

A. The Bid forms for General Bidders and Sub-Bidders provide space for the insertion of the amount to be added to or deducted from the Base Bid if the following alternates are accepted.

PART 2 - PRODUCTS

2.01 STAINLESS STEEL UTILITY CONTROL PANEL AT LAB ENTRANCE

A. GENERAL

1. Related Documents:

   a. Drawings and general provisions of Contract, including General and Supplementary Conditions, Division 1 Specifications and Section 16010, apply to this Section.

2. Section Includes:

   a. Furnishing and installation of the Laboratory Safety Device System as shown on the Drawings as herein specified.

3. Related Sections:

   a. Basic Mechanical Requirements – Section 22000

   b. Basic Electrical Requirements - Section 260000

   c. Raceways and Conduits - Section 260000

   d. Wires and Cables - Section 260000

   e. Any requirements for additional systems indicated by the plans and specifications.

4. Codes and Regulations:

   a. NFPA 70, National Electrical Code.

   b. NFPA 72, National Fire Alarm Code.

   c. Americans with Disabilities Act.

   d. Local and State Building Codes.

   e. All requirements of the local Authority Having Jurisdiction.

5. Warranty:

   a. Provide a 1-year minimum warranty from date of acceptance of project.

6. Manufacturer:

   a. ISIMET - Naples, TX - (903)897-0737

7. Submittals:

   a. Submittal procedures: See Section 16010.

   b. Product Data:

      1) Manufacturer

      2) Model Number

      3) Indicate all options and accessories

      4) Catalog data sheet with photographs

   c. Submit complete submittal package within 30 calendar days after award of this work for approval. Equipment is not to be ordered without approval.

8. Scope of Work:

   a. Utility Controller where shown on the Drawings and herein specified shall operate as an independent Control System

   b. Plumbing:

      1) It shall be the responsibility of the Plumbing Contractor to provide in his base bid all devices and other provisions for the Laboratory Safety Device System as outlined in the Drawings and Specifications and make piping connections for all plumbing devices.

   c. Electrical:

      1) It shall be the responsibility of the Electrical Contractor to provide in his base bid all devices, conduit systems, standard electrical boxes, operating power, all low voltage control wiring for the Laboratory Safety Device System as outlined in the Drawings and Specifications and equipment.

B. PRODUCTS

1. All Products and Devices for a complete Laboratory Safety Device System shall be provided as shown on Drawings and as listed in the Equipment Schedule of the Section.

   a. Utility Controller:

      1) At lab and as shown on Drawings, provide a Utility Controller model UTC-1-2-0-20 (natural gas, air, electric) with door panel

mounted switches to activate remote solenoids and relays to control the natural gas, compressed air and electrical convenience outlets or other indicated services or devices. Utility Controller shall comply with Underwriter's Laboratory UL916 Standards. Controller shall have integral printed circuit board with Microprocessor with built-in programming features. Unit to provide low voltage signals for output circuits. Unit shall control utility outlets at student workstations or other locations as indicated by Drawings. The Controller shall be equipped with an enabling key switch that restricts activation of output circuits to the Instructor. Deactivation of output circuits shall not require engagement of enabling key. Controller shall be provided with a door panel mounted momentary panic button assembly.

b. E - Series Enclosures:

1) As shown on Drawings, provide an E-Series Enclosure model E-1-08-K with mechanically held contacts for each circuit as shown on Drawings. The enclosure shall be integrated with Utility Controller as shown on Drawings. Number of contacts are as noted on Drawings and Electrical Load Control Schedule. Locate enclosure as shown on Drawings. Enclosure shall be furnished under this section and provided to the Electrical Contractor for installation.

c. S - Series Solenoid Enclosure:

1) At location shown on Drawings, provide an S-Series Enclosure. Provide with integral in-line filters for each domestic water service assembly. Enclosure shall be integrated with Utility Controller as shown on Drawings. Number of solenoid assemblies, intended use and pipe sizes are as noted in Equipment Schedule. Locate enclosure as shown on Drawings. Provide shock arrestor in flow stream at each domestic water service assembly. Provide each solenoid with a reset fuse/switch.

d. Fuel Gas Sensor

1) Where shown on Drawings and in Equipment Schedule, furnish and install a Fuel Gas Sensor in order to detect raw fuel gas within the classroom. Make connection at the Utility Controller, Terminal 1.

C. INTEGRATION AND CONFIGURATION

1. Integration with Other Building Systems:

a. CAUTION – Operation of emergency devices, including emergency showers and eyewashes, shall not be integrated with this system for either activation or deactivation.

2. System Configuration:

a. Utility Controllers shall be factory configured to the specified configurations and shall be capable of field adjustments to meet specific project modification requirements. Configurations shall be limited to jumper placement on the circuit board and specific program position changes made via selector buttons and digital display at PC Board without requirement for additional modifications to equipment.

b. Classroom Utilities:

1) Each utility service with outlets shall be controlled by independent output circuit at the Utility Controller. Control of services shall not be combined onto one output circuit unless indicated on Drawings. Services shall be activated by Controller door panel switches and the engaging of the service enabling key. Activation of utility services shall be restricted to the Instructor by means of the enabling key switch. Where shown on drawings, compressed air system shall be controlled by an auxiliary output circuit.

c. Panic Reset:

1) Unless stated elsewhere on Drawings, the Utility Controller shall be configured so that reset of Panic State may occur at service enabling key switch on door panel. Where LX Model is specified, reset shall occur at interior reset button located on PC Board.

d. Fire Alarm Reset:

1) Unless stated elsewhere on Drawings, the Utility Controller shall be configured so that continued fire alarm signal to enclosure shall prevent reset.

e. Panic Button Assemblies:

1) Each Utility Controller System shall be configured so that pressing the panic button will disable all utilities at all student work-stations and any integrated demonstration stations.

Integrated Monitoring shall become active. Panic shall provide 5 VDC output alarm signal. Remote Panic Assemblies, including Demonstration Station, shall function like door mounted assembly.

3. Fuel Gas Sensor:

a. Unit shall integrate with Controller and turn OFF designated outputs.

D. EXECUTION

1. Installation:

a. Install in accordance with manufacturer's recommendations and instructions.

b. Verify manufacturer's mounting heights to comply with ADA or other standards.

c. Furnish and install all devices as shown on Drawings and as specified herein. Where device is to be installed by other trades, furnish and then turn over to appropriate trade for installation.

d. Furnish, install and make final connections to monitoring and remote panic assembly panels as indicated on Drawings and specified herein. Furnish and install low voltage control wiring from Utility Controller to connection point of Energy Management Control System and Building Alarm. Final connection by others.

2. Plumbing:

a. Make final connections to all piping systems where indicated by Drawings and specifications. Install in accordance with SECTION 15060 – PIPE AND PIPE FITTINGS.

3. Electrical:

a. Electrical Contractor shall furnish all conduit and wiring, making final wiring connections to all equipment as indicated by Drawings and specifications. Contractor shall be responsible for all system configurations, integration, test and start-up.

4. Conduit:

a. Unless otherwise specified for wiring systems, provide conduits for control and integration wiring from point of connection to each device to accessible point above ceiling. Provide separate conduit for each device that is controlled and integrated with Controller. Conduits for

monitoring panels, arrays and panic assemblies shall be separate from line voltage, control wiring and integrated systems wiring. Where system components are mounted along side the Controller within a common wall, install conduct for low voltage control wiring between the devices.

5. Wiring:

a. Operating Power:

1) Provide dedicated electrical service to each Utility Controller. Verify wiring requirements with Manufacturer's requirements. Minimum 20 amp circuit.

b. Low Voltage Control Wiring:

1) Provide 24 VAC control wiring from Utility Controller to each controlled utility or device. Make connections at controlled device and terminate at output terminal on Controller's control panel. Minimum wiring, 18 AWG, plenum rated cable. Provide cable with required conductors plus two spares.

c. Integrated Systems:

1) Provide low voltage wiring for integration to other systems as shown on Drawings. Verify voltage and wire sizes to comply with requirements of each system.

E. SYSTEM TEST AND START-UP

1. Prior to placing the Utility Controller System into service, perform ALL Start-up procedures and Checklists as stated in Manufacturer's Operations and Maintenance Procedure literature.

2. Verify that all components and control devices comply with manufacturer's requirements and recommendations and that all devices and installations conform to Drawings and Specification requirements.

a. Verify that all controlled piping systems have been thoroughly cleaned.

b. Verify that all controlled devices and circuits are ON.

c. Verify that connections to all integrated systems are complete.

d. Verify that all monitoring systems respond to Panic.

e. Verify that remote panic assemblies activate the Panic State.

f. Verify that service to emergency showers and eyewashes are not affected by operation of system.

3. Upon completion of ALL Start-up tests, place the system into service. Complete all warranty registration documents. Submit originals with other project related closeout and O & M documentation. Review all operating procedures with a representative of the Owner. Provide all System keys to the Owner's representative.

4. Notes for Fuel Gas Sensors:

a. Gas Sensors for Natural Gas (Methane) should be wall mounted about one foot below the ceiling.

2.02 CLEANOUTS

A. Provide raised square head cleanout plugs, where possible.

2.03 TRAPS

A. Provide standard N.Y. Reg. "P" traps.

B. All fixtures with waste connections shall be properly trapped and vented in accordance with the requirements of the State Plumbing Code and Plumbing Inspector.

2.04 SLEEVES, INSERTS, FIRE STOPPING AND ESCUTCHEONS

A. All pipes passing through walls, or partitions shall be provided with sleeves having an internal diameter one inch larger than the outside diameter of the pipe.

B. Pipe Sleeve Materials:

1. Sleeves through fire-rated construction shall be hot-dipped galvanized Schedule 40 steel pipe.
2. Sleeves through partitions and non-fire rated construction shall be 26-gauge galvanized steel with lock longitudinal seams or approved plastic pipe.

C. Fire stop penetration seals in fire-rated construction shall be products of Hilti, STl Spec-Seal, 3M, Pro-set Systems Fire-fill, or Dow and shall be installed in accordance with the latest requirements of ASTM E814 (UL 1479). Fire stop penetration sealants for non-metallic and insulated piping shall be intumescent (STl Spec-Seal Series 100 Sealant, or Spec-Seal Collar, or approved equal). Provide mineral fiber board, matting or putty for damming and forming. Finish seals flush to wall surface and fill gaps with silicone adhesive sealant caulking (Dow 96-081 RTV or approved equal). Provide 1" thick ceramic fiber board on both sides of penetrations in 2- and 3-hour rated walls and floors less than 8" thick.

D. Install all fire stopping in accordance with manufacturer's printed instructions to meet hourly rating requirements.

E. Fire stopping is to meet UL rated assembly details for each penetration type and material for floors, walls, and ceilings. Coordinate with Architectural Drawings for exact requirements and hourly ratings at various conditions.

F. Packing for sleeves that do not require maintenance of fire rating shall be oakum, silicate foam, ceramic fiber, or mineral fiber with approved sealant. Pack or foam to within one inch of both wall surfaces. Seal penetration packing with approved caulking and paintable waterproof mastic surface finish or silicone caulking.

G. Inserts shall be individual or strip type of pressed steel construction with accommodation for removable nuts and threaded rods up to ¾ inch diameter, permitting lateral adjustment. Individual inserts shall have an opening at the top to allow reinforcing rods up to ½ inch diameter to be passed through the insert body. Strip inserts shall have attached rods with hooked ends to allow fastening to reinforcing rods.

H. Unless otherwise specified herein, escutcheons shall be cast brass chrome plated and provided with a set screw to properly hold escutcheon in place.

I. Fit all exposed uncovered pipes passing through walls, in cabinets, floors and ceilings with chromium plated spun or split type escutcheons with clamping device for holding in position.

2.05 HANGERS AND ANCHORS

A. Provide adjustable clevis hangers for hangers Support piping from building structure to maintain required grade and pitch of pipe lines, prevent vibration, secure piping in place, and provide for expansion and contraction.

B. Hangers on all pipe shall be clevis type.

C. Provide vertical brackets and guides for horizontal piping where it is racked along walls. Trapeze hangers may be used where conditions permit. Provide all necessary pipe clips, anchors and sundries for proper alignment and support of piping system.

D. Hangers for copper piping shall be coated for dielectric isolation.

E. Hangers for polypropylene, and other plastic piping shall be extended V-shape, with angle iron pipe supports where required by pipe manufacturer as necessary.

F. Hangers for gas piping shall be steel hangers.

G. Hanger rods shall have machine threads. Beam clamps, concrete inserts, and expansion shields shall be provided as required. No ramset or short shields will be allowed.

H. Hanger spacing shall meet requirements of state and local plumbing codes. In no case, shall horizontal piping be supported at intervals greater than 10'-0".

I. Pipe supports shall not bear on sleeves.

J. Horizontal piping shall be suspended from building structure by mild steel rod connecting pipe hanger to inserts, beam clamps, angle brackets, and lag screws as required by Building Construction in accordance with the following:

Rod Size	Pipe Size
3/8"	½" to 2"
½"	2 ½" to 4"
5/8"	5" to 12"
¾"	15"

K. Hangers on insulated lines shall be sized to fit the outside diameter of pipe insulation. Provide hangers for insulated piping with 12" long, 18-gauge galvanized insulation shields.

L. Hangers on glass drain lines for acid waste and vent drainage system shall be spaced 8' on centers and at all changes in direction. Insert felt or tape padding between hanger and pipe. Hangers with factory-applied plastic cover are hereby authorized.

M. Piping at equipment and control valves shall be supported to prevent strains or distortions in connected equipment and control valves. Piping at equipment shall be supported to allow for removal of equipment, valves, and accessories with a minimum of dismantling and without requiring additional support after these items are removed.

N. Piping installed under this Section shall be independently supported from building structure by means of beam attachments and not from piping, ductwork, or conduit of other trades. Supplementary steel, including factory-fabricated channels, required to meet the requirements specified herein, shall be provided by the Plumbing Contractor.

O. Maximum spacing of hangers on runs of steel, copper, or brass, PVC and cast iron pipe shall be as follows:

Schedule – Hanger Spacing in Feet/Pipe Material

Pipe Size (inches)	Steel (feet)	Copper or Brass (feet)	LAB
½" to 1"	7	5	
1 ¼"	10	6	3
1 ½"	10	8	3
2"-8"	10	10	4

P. Provide hangers with double nuts.

Q. Maximum spacing of hangers on acid resisting pipe shall be 5’ and hangers shall be provided at all changes in direction.

R. All thermoplastic piping systems shall be hung in strict accordance with manufacturer’s recommendations.

2.06 ABOVE GROUND WATER PIPING

A. Install all piping in accordance with manufacturer's published recommendations and requirements and governing water department.

B. Provide fittings, bends, offsets, flanges, etc. of approved pattern. Make branch connections from hot water risers to fixtures with appropriate joints to receive expansion stresses.

C. Provide ASTM B 88, Type L copper tubing, hard temper for all domestic water piping systems, i.e. cold, hot, and hot water returns.

1. No bent tubing will be accepted.

2. Coordinate with drawings and this section for additional locations of water hammer arrestors.

D. Use SilvaBrite 100 Lead-Free solder on cold water and hot water piping. Provide non-corrosive, lead-free type flux conforming to ASTM B813 washable.

E. Provide pipe manufactured by Cerro, Mueller, Anaconda, and Cambridge-Lee Industries with streamlined sweat fittings at each change in direction.

K. COPPER PRESS TYPE FITTINGS:

1. Manufactures, Copper Press Fittings:

a. Viega North America, 3 Alfred Circle, Bedford, MA 10730, 877- 843-4262 or Ridge Tool Co., 400 Clark Street, Elyria, OH 44036, 800-519-3456

2. Material:

a. ASTM B88 and ANSI/ASME B16.22. O-rings for copper press fittings shall be EPDM.

b. Press connections for domestic water copper piping ½” to 2”:

c. Copper press fittings and installation are to be made in strict accordance with the manufacture’rs installation instructions. All tubing is to be reamed and de-burred prior to the installation of the fitting. The tubing

shall be fully inserted into the fitting and the tubing marked at the shoulder of the fitting. The fitting alignment shall be checked against the mark on the tubing to assure the tubing is fully engaged (inserted) in the fitting. The joints shall be pressed using the tool approved by the manufacturer.

d. All valves used within a copper press-fit piping system are to be sweat type as specified under the valve section of this specification. Provide all adaptors necessary to provide sweat ball valves all sizes.

e. Provide copper press fit type system on domestic water piping only for pipe sizes ½" to 2".

2.07 WATER HAMMER ARRESTORS

A. Provide water hammer arresters at fixtures with automatic solenoid or cylinder operated valves, automatic flush valves quick-closing valves, or solenoid valves.

B. Fixtures and equipment in battery installation may use single water hammer arrester properly sized for connected load and installed per manufacturer's requirements.

C. Provide proper access to water hammer arresters in chases, utilizing a minimum 12" x 12" stainless steel access panel furnished and installed by this contractor.

D. Water hammer arresters shall be installed in accordance with manufacturer's recommendations and not less than one installed per core piping hot system and core cold system. Arresters shall be equal to J.R. Smith Hydrotrol Series 5000, Zurn Series 1700 or Josam Series 75000 complete with adaptors.

E. Water hammer arresters shall be all stainless-steel construction with nesting type bellows contained within casing having sufficient displacement volume to dissipate the calculated kinetic energy in the piping system.

F. Provide water hammer arrestors at all fixture batteries with more than two (2) fixtures, unless noted otherwise.

2.08 DIELECTRIC FITTINGS

A. Provide NSF/ASSI 61 approved dielectric fittings when changing from ferrous to non-ferrous piping, fittings, valves, etc.; as manufactured by Watts, LF-3000 Series.

B. Where copper or brass contact ferrous material, provide protective wrapping rubber wrapped around either to avoid electrolysis.

2.09 VALVES

A. The entire plumbing system shall be provided with valves located to permit easy operation, replacement and repair and to permit complete control of all systems under

this heading.

B. Swing check valves shall be installed in all lines where flow may reverse from that intended.

C. Check Valves: up to 3" size Nibco S-413-B-LF Apollo or Watts.

D. Ball Valves (Watts, Apollo or Nibco):

1. 1/2" to 2" - Watts No. LF-B-6080, Apollo 77FLF full port.

E. Provide holes drilled in valve handles for valve tags.

F. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers typical all systems.

2.10 NATURAL GAS PIPING

A. Provide Schedule 40 black steel piping (ASTM 120) with black 125# malleable fittings, for piping above slab.

B. Pitch piping for drainage; install drip and valve and plug at all low points.

C. Gas piping 2” and smaller is to be schedule 40 steel pipe and with screwed pipe fittings.

D. Valves 1" and smaller: gas cock tee handle Rockford #141 with check pin.

E. Valves on gas piping are to be same manufacturer as those used on water piping, including holes in handles for valve tags.

F. MEGA-PRESS G PRESS PIPE AND FITTINGS:

1. Material:

a. Pipe: Black steel pipe shall conform to ASTM A53, A106 A135 or A795. Pipe schedule (pipe wall thickness) shall conform to the standard referenced dimensions for schedule 40.

b. Cold Press Mechanical Joint Fitting shall conform to material requirements of ASTM A420 or ASME B16.3 and performance criteria ANSI/CSA LC4. Sealing elements for press fittings shall be HNBR. Sealing elements shall be factory installed or an alternative supplied by fitting manufacturer. Press ends shall have SC (Smart Connect™) feature design (leakage path). Mega-Press fittings with the Smart Connect Feature assure leakage of liquids and/or gases from inside the system past the sealing element of an un-pressed connection. The function of this feature is to provide the installer quick and easy identification of connections which have not been pressed prior to putting the system

into operation.

c. Note: Verify pipe and fittings with applicable codes.

d. Piping and fittings shall comply with CSA LC-4 and the latest edition of NFPA-54.

2.11 INSULATION

A. Insulation shall be installed by insulation firm regularly specializing in this work with employees particularly skilled therein. No covering applied by plumber's helpers will be acceptable.

B. Insulation installation shall meet manufacturer's recommendations. No insulation shall be applied until piping has passed tests as required by authorities that have jurisdiction.

C. Insulation, jackets and adhesives shall be flame retardant and shall have ASTM E-84 fire hazard ratings of 25 flame spread, 50-smoke developed and 50 fuel contributed.

D. Cold, and hot water supply piping shall be insulated with heavy density fiberglass with self-sealing lap and service jacket (ASJ). Continuous vapor barrier shall be maintained.

E. Cold Water: ½" inch fiberglass or approved equal, low pressure pipe insulation, fire retarded with Universal (white) vapor barrier finish. Provide material by Owens-Corning, Manville or Certain-Teed.

1. Provide insulation on all piping in accordance with energy code requirements.

F. Hot Water: Insulation similar to cold water.

1. Provide 1" thick insulation on all pipe sizes up to 1½" for all piping.

G. Fittings and Valve Insulation:

1. Insulating cement applied to thickness equal to that of adjoining pipe insulation and shall be covered with glass cloth jacket.

2. Molded or fabricated fitting covers of equal thickness and identical in composition to adjacent pipe insulation and thickness.

3. Zeston-Premolded Fittings.

4. All materials, including vapor barrier jackets, glass cloth jackets, adhesives, etc. shall be fire-retardant.

H. Insulate all water pipe, valves and fittings, etc.

I. Installation shall be in strict accordance with manufacture's written instructions, as shown on the approved shop drawings.

J. Reinstall existing pipe covering damaged, disturbed, or removed during the course of construction at no additional cost. Identically match existing insulation thickness.

2.12 ACCESS PANELS

A. Provide Type "A" Milcor Style "K" or "M" access panels, Karp or Acudor; sizes as required to obtain access to concealed valves, water hammer arrestors, traps and cleanouts. Provide rated panels in rated walls. Provide stainless steel panels where located in Toilet Rooms.

B. Coordinate installation of access panels with the work of Division 9

C. All access panels shall be provided by General Contractor. However, the Plumbing Contractor shall inform GC what sizes and locations are required.

2.13 PLUMBING FIXTURES

A. Plumbing fixtures specified, on the drawings.

B. Plumbing fixtures and equipment shall be as shown on the drawings or approved equal

C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

D. Accept fixtures and equipment on site in factory packaging. Inspect for damage.

E. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

F. All exposed piping to be chrome plated.

2.14 MISCELLANEOUS

A. Provide chrome escutcheons and exposed piping.

B. Provide all fixtures supported from wall with 2" x 6" wood blocking concealed, built into wall, and securely fastened. (Unless fixture supports are specified elsewhere.)

C. Provide McGuire heavy duty supplies and stops.

2.15 EQUIPMENT (BY OTHERS)

A. Provide all connections with necessary wastes, traps, backflow preventers, cold and hot water, gas, supplies and stops at each piece of equipment or outlet so that each facility can be separately shut down.

2.16 HOSE BIBBS

A. Chicago Faucet #293 or Woodford Model 24, loose key lock shield with handle attached, hose end; chrome finish with Watts #8 backflow preventer.

2.17 COMPRESSED AIR PIPING

A. Pipe Material: Schedule 40 carbon steel ASTM A53 Grade B, A106 Grade A or A120 galvanized.

B. Fitting Material: Screwed 150# malleable iron A105 Grade II.

C. Pipe joint:150 # raised face, screwed, A105.

D. Valves:

1. Locate valves as indicated and at each piece of equipment.
2. 2” and smaller shall be Watts ES-B-6400-SE-VT all bronze, standard port, PTFE seats thread ends, 600 psi working pressure.
3. Take care that all dirt is removed from lines prior to operation.
4. Provide valve and plug on all low points.
5. Provide drip leg on any trapped portion of the main. Install at low point for drainage.
6. All valves same manufacturer as water piping.
7. Ball valves are to be similar to water piping except to have exhaust port.

2.18 ACID WASTE AND VENT PIPING

A. Accepted Manufacturer’s

The system shall be complete and supplied by one of the following manufacturer’s:

1. Enfield-Enfield Industrial Corp.
2. Fuseal-GSR Sloane Corp.
3. Orion-Orion Fittings Inc.
4. Zurn Manufacturing

B. Above Ground: Polypropylene, Schedule 40 pipe conforming to ASTM F-1412 standard. Piping is to be fire-retardant with heat fused joints or mechanical joints. Install entire system in accordance with manufacturer's recommendations.

C. Supply in 10'-0" lengths and manufactured with a chemically resistant polypropylene material conforming to ASTM D-4101 standard.

D. Provide all piping in straight, cylindrical pipe to meet published standards. Finish is to be smooth and free of roughness or ripples.

E. Fittings: Polypropylene, Schedule 40 DWV Pattern conforming to ASTM F-1412 standard. Fittings are to be fire-retardant with heat fused joints or mechanical joints. Install entire system in accordance with manufacturer's recommendations. Provide fittings manufactured with a chemically resistant polypropylene material conforming to ASTM D-4101 standard. Fittings are to be based on laying length dimensions in ANSI B16-12. Wall thickness shall conform to ASTM D 2122, Section4.

F. Pipe Joint: Fusion method with fusion coils or fixed fusion fittings fabricated in accordance with the manufacturer’s recommendations. Joints made between PP pipe and dissimilar materials shall be joined with proper adapters and transition fittings according to manufacturer’s recommendations.

G. Piping and fitting in all Plenum Spaces: Polyvinylidene (PVDF) flame-retardant, Schedule 40 pipe and fittings conforming to ASTM E-84 and UL-723 standards. Piping is to be fire-retardant with heat fused joints or mechanical joints are acceptable Install entire system in accordance with manufacturer's recommendations.

H. PROVIDE PVDF ACID WASTE AND VENT PIPE AND FITTINGS ABOVE ALL CEILINGS USED AS A PLENUM FOR ALL ACID WASTE SYSTEM PIPING AND CONTINUE PIPING UP THROUGH FLOOR TO NEXT FITTING. COORDINATE WITH DRAWINGS AND MECHANICAL CONTRACTOR TO VERIFY ALL PLENUM CONDITIONS BEFORE STARTING ANY WORK.

I. Support pipe with conventional hangers, wrapped or PVC coated, spaced as required by piping manufacturer. The working temperature of the installation is considered to be 150 degrees, install the pipe so a minimum of movement as a result of thermal change is allowed. Hangers are to allow for the free movement of pipe. Support vertical piping in accordance with manufacturer’s recommendations. Install sleeves where pipe passes through floors, walls or partitions.

1. Provide all manufacturers approved adaptors, fittings, as necessary to match the type of piping system.

2. Notes: Interior lab waste and vent branch piping under lab benches shall be made with FRPP pipe and mechanically joined DMV chemical waste pipe fittings.

J. Support pipe with conventional hangers, wrapped or PVC coated, spaced as required by piping manufacturer. The working temperatures of the installation are considered to be 150 degrees, install the pipe so a minimum of movement as a result of thermal change is allowed. Hangers are to allow for the free movement of pipe. Support vertical piping in accordance with manufacturer’s recommendations. Install sleeves where pipe passes through floors, walls or partitions.

K. Traps: Acid waste traps of the same manufacturer as piping system.

L. Support horizontal piping continuously with "U" or "V" shaped channels of 18-gauge sheet metal; with sizes and hangers as required by pipe manufacturer.

PART 3 - EXECUTION

3.01 TESTING, ADJUSTING, AND BALANCING

A. Provide testing of plumbing systems as specified and as required by authorities with jurisdiction including Owner and Architect.

B. Test all piping and make water-or-gas-tight before insulation is applied, or before concealment.

C. Pressure test new piping only. Do not test any existing piping. All system leaks which occur due to testing are to be repaired at no additional cost to the Owner.

D. Lab Waste Piping: Before the installation of any fixtures, cap the ends of the system and fill all lines with water, 10 LF head will be acceptable, and let stand for 2 hours or until a thorough inspection has been made by Local Inspector and the Engineer.

E. Before date of acceptance, furnish Architect with certificates of testing and inspection for plumbing systems indicating approval of authorities with jurisdiction and conformance with requirements of contract documents.

F. Test domestic water piping to 150 psi for a minimum of 2 hours.

G. Test gas piping to 25 psi of air for a period of six (6) hours for above ground installation,

H. Test compressed air piping system with oil free air or nitrogen to 150 psi for one hour or at 1½ times system pressure for one hour.

3.02 PIPING PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.03 PLUMBING FIXTURES AND EQUIPMENT

A. Verify that electric power is available and of the correct characteristics.

B. Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.

C. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

D. Install each fixture with trap, easily removable for servicing and cleaning.

E. Provide chrome plated rigid or flexible supplies to fixtures with loose key stops, reducers, and escutcheons.

F. Install components level and plumb.

3.04 INSTALLATION

A. Install all plumbing system products, equipment provided by others in accordance with manufacturer's instructions.

B. Fixture Heights: Install fixtures to heights above finished floor as directed by the Architect.

C. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.

D. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

E. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

F. Install piping to maintain headroom, conserve space, and not interfere with use of space.

G. Group piping whenever practical at common elevations.

H. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

I. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

J. Provide access where valves and fittings are not exposed.

K. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting.

L. Install bell and spigot pipe with bell end upstream.

M. Install valves with stems upright or horizontal, not inverted.

N. Pipe Hangers and Supports

1. Support horizontal piping as scheduled.
2. Install hangers to provide minimum ½ inch space between finished covering and adjacent work.
3. Place hangers within 12 inches of each horizontal elbow.

4. Use hangers with 1-1/2-inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
5. Support riser piping independently of connected horizontal piping.
6. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
7. Provide copper plated hangers and supports for copper piping.

3.05 TRAPS AND VENTS

A. Separately trap every fixture, vent all traps.

B. Install all trap screws (brass) below water line.

C. Install vent piping penetrating roofed areas to maintain integrity of roof assembly.

3.06 JOINTS

A. Threaded Joints:

1. American National taper screw threads, with graphite and oil compound applied to the male threads or Teflon tape.

2. Provide Blue Magic for all gas piping and Select Whyte for all other piping; as manufactured by Whitlaw.

B. Ream ends of pipes and tubes and remove burrs. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Alternate copper piping joints according to the following:

1. Copper-Tubing, Pressure-Sealed Joints: Use proprietary crimping tool and procedure recommended by copper, pressure-seal-fitting manufacturer.

D. VALVES

1. Provide each fixture supply with a separate angle or straight stop, finished like the pipe it serves.

3.07 WATER PIPING

A. Install in strict accordance with all rules, laws, and ordinances pertaining to the installation of water lines.

B. Ream all cut tube to full inside diameter of pipe. Install all piping in accordance with manufacturer's recommendations and requirements, and local water company standards.

3.08 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Prior to starting work, verify system is complete, flushed and clean.

B. Ensure PH. of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).

C. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residuals.

D. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.

E. Maintain disinfectant in system for 24 hours.

F. If final disinfectant residual tests less than 25 mg/L, repeat treatment.

G. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.

H. Take samples no sooner than 24 hours after flushing, from 5 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

3.09 INTERFACE WITH OTHER PRODUCTS

A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough in and installation.

3.10 ADJUSTING

A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.11 CLEANING

A. Clean plumbing fixtures and equipment.

3.12 INTERPRETATION OF THE DRAWINGS AND SPECIFICATIONS

A. As used in the drawings and specifications for this work, certain non-technical words shall be understood to have specific meanings as follows regardless of indications to the contrary in the general conditions or other documents governing the work.

"Furnish" Purchase and deliver to the project site complete with every necessary appurtenance and support, all as part of this work. Purchasing shall include payment of all sales taxes and other surcharges as may be required to assure that purchased items are free of all liens, claims or encumbrances.

"Install" Unload at the delivery point at the site and perform every operation necessary to establish secure mounting and correct operation at the proper location in the project, all as part of this work.

"Provide" "Furnish" and "Install".

"New" Manufactured within the past two years and never before used.

B. The term "capped flush" on existing piping means cap existing lines, concealed, beyond finish wall, ceiling or floor line, so proper finish can be applied.

C. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, and unheated spaces immediately below roof, spaces above ceiling, unexcavated spaces, crawl spaces, and tunnels.

D. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms

E. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.

F. Piping shall mean and include pipe, fittings, hangers, and valves.

G. Tempered water shall be considered the same as hot water throughout the specifications.

H. Except where modified by a specific notation to the contrary, it shall be understood that the indication and/or description of any item in the drawings or specifications for this work carries with it the instruction to furnish, install and connect the items as part of the work, regardless of whether or not this instruction is explicitly stated.

I. To the extent that they govern the basic work, the specifications also govern change order work.

J. No exclusion from, or limitation in, the symbolism used on the drawings for this work or the language used in the specifications for this work shall be interpreted as a reason for omitting the appurtenances or accessories necessary to complete any required system or item of equipment.

K. The drawings for this work utilize symbols and schematic diagrams which have no dimensional significance. The work shall, therefore, be installed to fulfill the diagrammatic intent expressed on the drawings, but in conformity with the dimensions indicated on the final working drawings; field layouts and shop drawings of all trades.

L. Certain details appear on the drawings for this work which are specific with regard to the dimensions and positioning of the work. These are intended only for general

information purposes. They do not obviate field coordination for individual items of the indicated work.

M. Information as to general construction and architectural features and finishes shall be derived from structural and architectural drawings and specifications only.

N. The use of words in the singular shall not be considered as limiting where other indications denote that more than one item is referred.

3.13 COORDINATION

A. Work shall be performed in cooperation with other trades on the project and so scheduled as to allow speedy and efficient completion of the project.

B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

C. Coordinate requirements for access panels and doors for plumbing items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section “Access Doors and Frames.”

D. This Contractor shall furnish to other trades advance information on locations and sizes of all frames, boxes, sleeves, and openings needed for his own work, and also furnish information and shop drawings necessary to permit trades affected by this Contractor's work to install their work properly and without delay.

E. Where there is evidence that work of this Contractor will interfere with the work of other trades, this Contractor shall assist in working out space conditions to make satisfactory adjustments.

F. This Contractor shall, with the approval of the Engineer and without extra cost to the Owner, make modifications in his work as required by structural interferences. This Contractor shall pay all expenses to the General Contractor for additional openings, or relocating or enlarging existing openings through concrete floors, walls, beams and roof required for this work, which was not properly coordinated.

G. If this Contractor installs his work before coordinating with other trades so as to cause interference with the work such trades, he shall make all necessary changes in his work to correct the conditions without extra cost to the Owner.

H. This Contractor shall visit the site to ascertain and apprise himself of the actual field conditions under which the work has to be performed. All work shown on the drawings is diagrammatic in nature and their actual location and elevation shall be verified in the field. Any deviations necessary as a result of field interferences shall be brought to the attention of the Engineer and resolved expeditiously, at no additional cost to the Owner.

I. The Contractor shall protect all materials and work of other trades form damage that may be caused by his work and shall be responsible for repairing any damages without

extra cost to the Owner.

J. Sleeves, inserts, anchor bolts and similar items set into the masonry structure or the work of other trades shall be furnished and installed by this Contractor. This Contractor shall be responsible for all such items necessary to hanged or support his equipment.

K. When, in order to accommodate this Contractor's work, finished materials and work of other trades must be cut or fitted in the shop this Contractor shall furnish the necessary drawings for transmittal to the trades whose materials must be cut or fitted.

L. All refuse shall be placed in dumpsters provided by the General Contractor

M. All work shall be installed so that parts requiring periodic inspection, operation, maintenance and repair are readily accessible. Minor deviation from the drawings may be made to accomplish this, but changes of substantial magnitude shall not be made prior to written approval from the Engineer.

3.14 TAGS, VALVES EQUIPMENT, AND INSTRUMENTS

A. Upon completion of work, attach engraved laminated plastic tags to all valves, and instrumentation. Equipment shall bear a stamped stainless tag. Tags shall have black characters on white face, consecutively numbered and prefixed with letter P for general valves.

B. Provide two (2) typewritten charts (framed and glazed) showing all valve numbers with their location and riser controls. Identify all equipment with laminated plastic (lamicoid) nameplates fastened to the equipment as approved. These numbered valves to be shown on Record Drawings.

C. Embossed or engraved aluminum or brass tags may be substituted if desired. Tags shall be at least 1/8” thick.

D. Tags shall be at least 1” diameter with numerals at least 3/8” high and attached by S hooks and chains.

E. Coordinate numbering system with existing piping tags as not to duplicate numbers.

3.15 GAS SERVICE PIPING

A. Piping shall be done by licensed gas fitter.

B. Gas piping shall pitch to drain and shall have drip pockets at least 6” long nipple with removable caps at low points. Branch connections shall be taken from top or side of horizontal running main. Provide gas cock or valve on connections to fixtures or equipment. Install piping free from traps with drain pocket at low points for inside building and drip pot for underground piping. Install drips at points where condensate may collect, including service-meter outlets. Locate where accessible to permit cleaning

and emptying. Do not install where condensate is subject to freezing.

C. Provide union connection between shut-off cock and equipment to permit disconnection of equipment.

D. Gas piping and safety devices shall meet requirements of NFPA No. 54 and shall be subject to inspection and approval of State Gas Regulatory Board.

E. Provide a gas valve at each branch runout from main serving gas outlets.

F. Piping shall be securely fastened, separately hung and shall not support any other weight or piping. Piping dropping in concrete block walls shall be factory wrapped for corrosion protection.

G. Gas valves shall not be concealed and shall be readily accessible for inspection and repair.

H. Do all work in accordance with the State of Rhode Island Fuel Gas Code and A.G.A. regulations and local ordinances for underground and above ground piping systems.

I. Examine roughing-in for natural-gas piping system to verify actual locations of piping connections before equipment installation. Proceed with installation only after unsatisfactory conditions have been corrected.

J. Close equipment shutoff valves before turning off natural gas to premises or piping section.

K. Do not use natural-gas piping as grounding electrode.

L. Install piping free of sags and bends. Install fittings for changes in direction and branch connections.

M. Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with approved fire-stop materials coordinate sleeving requirements with fire-stopping contractor.

N. Ream ends of pipes and tubes and remove burrs.

O. This contractor is to be responsible to verify proper operation of all existing gas-fired equipment effected by proposed new gas line tie-in to the existing system. The work is to include all labor, parts, etc. necessary to put existing gas fired equipment back in operation.

P. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

3.16 EQUIPMENT CONNECTIONS

A. Connect plumbing lines to all mechanical equipment and all fixtures of this and other sections of this specification. Provide necessary traps, backflow preventers, tail pieces, stops and supplies, to heating equipment and other appurtenances necessary for a complete installation. All exposed piping in finished rooms to be chrome on brass.

3.17 INSTRUCTION OF OWNER'S PERSONNEL

A. Fully instruct the Owner's representative in the complete operation, adjustment and maintenance of the entire installation as directed. Arrange with the suppliers of installed equipment and/or systems to provide the services of expert technicians to instruct owner's operating personnel in the use, care and emergency repair of equipment and/or systems. The period of instruction will be as to satisfy the Architect and/or Engineer that such instructions have accomplished their purpose.

3.18 INSTRUCTION MANUAL

A. One month prior to the completion of all work and the final inspection of the installation by the Owner, submit for approval two copies of a complete Instruction Manual, bound in a three-ring binder, typewritten and suitably indexed, containing the following minimum data:

1. Brief description of each system covering its basic operating characteristics.
2. List of all equipment with manufacturer's name and model number of each item.
3. Manufacturer's literature describing each item of equipment.
4. Copy of each valve chart.
5. Copy of each automatic control diagram with respective sequence of operation.
6. Parts list of each major item of equipment.
7. Detailed step-by-step instructions for starting and shut down of each system.
8. Detailed maintenance instructions for each system.

END OF SECTION

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SECTION 23 0000
HEATING, VENTILATING AND AIR CONDITIONING

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

A. All sections of Division I General Condition requirements shall hereby be made part of this section of the specification.

B. Examine all drawings and all other sections of the specification for the requirements for the work of this section.

C. All work shown in the drawings and specifications shall be included under the base bid, except where there is specific reference to exclusion and incorporation in other quotations.

D. HVAC work is indicated diagrammatically. Exact locations of all components shall be determined in the field and by actual building conditions. Equipment or ducts interfering with other installations shall be relocated as required at no additional cost to the owner.

1.02 DESCRIPTION OF WORK

A. The HVAC scope for this project includes generally, but is not limited to the following:

1. Demolition
2. Medium pressure ductwork distribution systems
3. Low pressure ductwork distribution systems
4. Hot water piping and accessories
5. Piping specialties, expansion tanks, air separators
6. Piping insulation systems
7. Ductwork insulation systems
8. Air terminal units.
9. Laboratory airflow control system excluding fume hood (By Owner)
10. Rigging
11. Testing and balancing – Air and water systems
12. Automatic Temperature Controls (ATC)

1.03 CODES, PERMITS, AND INSPECTIONS

A. All work shall meet or exceed the latest requirements of all national, state, country municipal and other authorities exercising jurisdiction over construction work of the project.

B. All required inspection certificates shall be obtained, paid for, and made available at the completion of the work. Municipal permit and inspection fees are waived although all

applicable permits and inspections are required.

C. Any portion of the work, which is not subject to the approval of an authority having jurisdiction, shall be governed by the applicable sections of the overall National Fire Protection Association.

D. Installation procedures, methods, and conditions shall comply with the latest requirements of the Federal Occupational Safety and Health Act (OSHA).

1.04 GUARANTEES AND CERTIFICATIONS

A. The HVAC contractor shall guarantee work in writing for one year from date of final acceptance against defects in materials, workmanship and installation. The HVAC contractor shall correct defective work at no additional cost to the owner and provide equipment warranties to the owner in full force. Provide five-year warranty for compressors. See product specification paragraphs for more information on warranties.

B. Certification shall be submitted attesting to the fact that specified performance criteria are met by all items of heating and air conditioning equipment.

1.05 SHOP DRAWINGS AND OTHER INFORMATION REQUIRED

A. Prior to purchasing any equipment or materials, six (6) copies of complete submittals shall be submitted for review, including the following minimum information:

1. Drawings, dimensions, and weights.

2. Minimum clearances for proper operation and service.

3. Minimum performance data as required by the drawings and specifications. Submitted information shall include symbols shown on drawing EF-1, RTU-1, etc. The purpose of showing the symbols is identification which specified product is submitted for review. Without proper symbols indicated, the submittals will not be reviewed.

B. Prior to assembling or installing the work, the following shall be submitted for review:

1. Scale drawings showing all piping and duct runs with sizes and elevations shown on composite drawings with indication of coordination with other trades. This submission shall consist of 3 paper prints. If requested by General Contractor, AutoCad files of MEP/FP drawings will be made available for a cost of $50.00 per drawing. Files will be made available after General Contractor signs a WB&A disclaimer provided by WB&A.

2. Catalog information, factory assembly drawings and field installation drawings as required for a complete explanation and description of all items of equipment.

Note: The HVAC contractor shall provide a duplicate copy of the operating manuals for all controls, a duplicate copy of the maintenance manuals for all equipment and controls, and reduced scale drawings showing the HVAC distribution system.

C. It shall be the responsibility of the Contractor to review all drawings and specifications thoroughly during BID process. The contractor shall notify the Engineer/Architect via RFI (request for information) if any conflicts arise. Failure to identify the discrepancies during the BID process shall disqualify the Contractor for claiming any additional compensation.

1.06 SEPARATION OF WORK BETWEEN TRADES

A. The following items shall be furnished and installed by the HVAC contractor:

1. Motors for mechanical equipment
2. Controls for mechanical equipment
3. Hoisting and rigging
4. Fastenings and supports
5. Roof opening flashing
6. Field touch up painting of damaged shop coats
7. Rubbish removal

B. The following items shall be furnished and installed by other trades:

1. Cutting of openings in floor, walls and roof
2. Louvers in outside walls and roof vents
3. Enclosure/shafts of ducts
4. Piping enclosures
5. Concrete pads for equipment
6. Power for HVAC equipment

C. The Heating, Ventilating and air Conditioning Trade is required to supply all necessary supervision and coordination information to any other trades who are to supply work to accommodate the Heating, Ventilating and Air Conditioning installations.

1.07 EQUIPMENT AND MATERIALS

A. All equipment and materials shall be new and without blemish or defect.

B. It is the intent of these specifications that wherever a manufacturer of a product is specified, and the terms “other approved” or “or approved equal” or “equal” are used, the substituted item must conform in all respects to the specified item.

C. Substituted equipment or optional equipment where permitted and approved, must conform to space requirements. Any substituted equipment that cannot meet space requirements, whether approved or not, shall be replaced at the Contractor's expense. Any modifications of related systems as a result of substitutions shall be made at the Contractor's expense.

1.08 INTERPRETATION OF THE DRAWINGS AND SPECIFICATIONS

A. As used in the drawings and specifications for this work, certain non-technical words shall be understood to have specific meanings as follows regardless of indications to the contrary in the general conditions or other documents governing the work.

"Furnish" Purchase and deliver to the project site complete with every necessary appurtenance and support, all as part of this work. Purchasing shall include payment of all sales taxes and other surcharges as may be required to assure that purchased items are free of all liens, claims or encumbrances.

"Install" Unload at the delivery point at the site and perform every operation necessary to establish secure mounting and correct operation at the proper location in the project, all as part of this work.

"Provide" "Furnish" and "Install".

"New" Manufactured within the past two years and never before used.

B. Except where modified by a specific notation to the contrary, it shall be understood that the indication and/or description of any item in the drawings or specifications for this work carries with it the instruction to furnish, install and connect the items as part of the work, regardless of whether or not this instruction is explicitly stated.

C. To the extent that they govern the basic work, the specifications also govern change order work.

D. No exclusion from, or limitation in, the symbolism used on the drawings for this work or the language used in the specifications for this work shall be interpreted as a reason for omitting the appurtenances or accessories necessary to complete any required system or item of equipment.

E. The drawings for this work utilize symbols and schematic diagrams which have no dimensional significance. The work shall, therefore, be installed to fulfill the diagrammatic intent expressed on the drawings, but in conformity with the dimensions indicated on the final working drawings; field layouts and shop drawings of all trades.

F. Certain details appear on the drawings for this work which are specific with regard to the dimensions and positioning of the work. These are intended only for general information purposes. They do not obviate field coordination for individual items of the indicated work.

G. Information as to general construction and architectural features and finishes shall be derived from structural and architectural drawings and specifications only.

H. The use of words in the singular shall not be considered as limiting where other indications denote that more than one item is referred to.

1.09 COORDINATION

A. Work shall be performed in cooperation with other trades on the project and so scheduled as to allow speedy and efficient completion of the project.

B. This Contractor shall furnish to other trades advance information on locations and sizes of all frames, boxes, sleeves, and openings needed for his own work, and also furnish information and shop drawings necessary to permit trades affected by this Contractor's work to install their work properly and without delay.

C. Where there is evidence that work of this Contractor will interfere with the work of other trades, this Contractor shall assist in working out space conditions to make satisfactory adjustments.

D. This Contractor shall, with the approval of the Engineer and without extra cost to the Owner, make modifications in his work as required by structural interference. This Contractor shall pay all expenses to the General Contractor for additional openings, or relocating or enlarging existing openings through concrete floors, walls, beams and roof required for this work which was not properly coordinated.

E. If this Contractor installs his work before coordinating with other trades so as to cause interference with the work such trades, he shall make all necessary changes in his work to correct the conditions without extra cost to the Owner.

F. This Contractor shall visit the site to ascertain and apprise himself of the actual field conditions under which the work has to be performed. All work shown on the drawings is diagrammatic in nature and their actual location and elevation shall be verified in the field. Any deviations necessary as a result of field interferences shall be brought to the attention of the Engineer and resolved expeditiously, at no additional cost to the Owner.

G. The Contractor shall protect all materials and work of other trades form damage that may be caused by his work and shall be responsible for repairing any damages without extra cost to the Owner.

H. Sleeves, inserts, anchor bolts and similar items set into the masonry structure or the work of other trades shall be furnished and installed by this Contractor. This Contractor shall be responsible for all such items necessary to hanged or support his equipment.

I. When, in order to accommodate this Contractor's work, finished materials and work of other trades must be cut or fitted in the shop this Contractor shall furnish the necessary drawings for transmittal to the trades whose materials must be cut or fitted.

J. Cutting, coring, drilling and patching of holes and openings for the work of sub-trades shall be performed by the particular subcontractor when the largest dimension of the opening is less than 4.5 inches. If the largest dimension of the opening is 4.5 inches or

more, the General Contractor shall perform the cutting and patching for the work of the subcontractor. For cutting and patching see Section 01045.

K. Exact location of diffusers, grilles and thermostats shall be approved by the architect before their installation. See architect's drawings for more information.

L. All piping and ductwork shall be insulated as per code. Weather proof material over the insulation shall be provided on components exposed to outside

M. All work shall be installed so that parts requiring periodic inspection, operation, maintenance and repair are readily accessible. Minor deviation from the drawings may be made to accomplish this, but changes of substantial magnitude shall not be made prior to written approval from the Engineer. The contractor shall determine locations of all access panels required for the project. Locations shall be coordinated with the General Contractor and approved by the Architect. Access panels shall be furnished by HVAC trade and installed by General Contractor.

PART 2 - PRODUCTS

2.01 PIPING AND FITTINGS

A. General

1. Pipe materials and fitting materials shall be as indicated in Schedule of Pipe and Fitting Materials. Provide dielectric fitting to connect different piping materials.

2. Steel piping 2-1/2" and larger shall be either welded or Victaulic. Steel piping shall be seamless or electric-resistance welded ASTM A53, Grade B.

3. Pipe take-offs shall have no less than three elbow swings.

B. Special Requirements for Water

1. Provide air vent at each high point and drain valve at each low point for complete system drainage.

2. Equipment condensate drains shall be trapped at equipment connection. Drain lines shall run full size of drain tapping to nearest floor drain or as shown on Drawings with a pitch of 1" in 20 feet.

3. Pitch water piping upwards and condensate pump discharge downward in direction of flow 1" in 40 feet, unless otherwise noted.

C. Schedule of Pipe and Fitting Materials

SERVICE	PIPE MATERIAL WEIGHT	FOR TYPE OF JOINTS	FITTING MATERIAL	PRESSURE RATING PSI SWP. OR WEIGHT
HOT WATER	STEEL ASTM A-53 GR. B SMLS or COPPER Type L	2” and UNDER SCREWED or SOLDERED	MALLEABLE IRON	CLASS 150
HOT WATER	STEEL ASTM A-53 GR. B SMLS or ERW SCHEDULE 40	2 ½” and OVER WELDED or VICTAULIC	STEEL	CLASS 150
CONDENSATE DRAIN	COPPER TYPE L	SOLDERED	WROUGHT COPPER	125
COLD WATER	COPPER TYPE L	SOLDERED	WROUGHT COPPER	125
REFRIGERANT	COPPER TYPE ACR	BRAZED	WROUGHT COPPER	200

D. Connections

1. Provide dielectric fittings at connections of dissimilar materials.

2. Provide eccentric reducing couplings to bring pipes flush on top for water service and flush on bottom for steam service.

3. Branch lines in welded piping shall be made with welding tees except that branch lines less than one-half diameter of main may be made with Weld-O-Lets.

4. Nipples shall be same material, make and thickness as pipe with which they are used. Close nipples shall not be used.

5. Make piping connections 2-1/2" diameter and larger to valves and equipment with flat face welding neck flanges.

6. Make piping connections 2" diameter and smaller to valves and equipment with 300 psi brass seat unions on steel piping and with heavy semi-flushed brass unions on copper tubing.

7. Fit flanged joints with Johns-Manville or approved equal ring gaskets. Flanges shall be faced and drilled to ASA standards and fitted with semi-finished hexagon machine bolts and nuts of proper number and size.

8. Make screw joints tight with Teflon (polytetrafluoroethylene) tape or litharge-glycerin mixture applied to male threads. Use tapered threads.

9. Make fusion welded joints as required by ANSI B31.1. Make changes in direction of pipe with welded fittings only. Bevel connections before welding, mechanically or by flame-cutting.

2.02 PIPE INSULATION

A. Insulation shall be 5 lb./cf nominal fibrous glass insulation with factory-applied fire retardant vapor barrier jacket with K factor of 0.21 at 75 degrees F. mean temperature by Owens Corning, Certain-Teed, Manville or Knauf, installed as required by manufacturer. ASTM E-84 fire hazard ratings shall be 25 flame spread, 50 smoke developed and 50 fuel contributed.

B. Apply insulation after systems have been tested, proved tight and approved by Architect. Remove dirt, scale, oil, rust and foreign matter prior to installation of insulation.

C. No leaks in vapor barrier or voids in insulation will be accepted.

D. Insulation and vapor barrier on piping which passes through walls or partitions shall pass continuously through sleeve, except that piping between floors and through fire walls or smoke partitions shall have space allowed for application of approved packing between sleeves and piping, to provide fire stop as required by NFPA. Seal ends to provide continuous vapor barrier where insulation is interrupted.

E. Insulate flexible connections to same thickness and with same material as adjoining pipe insulation.

F. Provide fibrous dual temperature insulation with factory applied vapor barrier jacket on steam, outdoor condenser water, outdoor cooling tower drain and makeup, condensate, chilled water, drain, hot and cold water piping, except as specified otherwise.

G. Insulation thickness for indoor hot water and cold water piping shall be as follows:

TABLE A INSULATION THICKNESS

PIPING SYSTEM TYPE	FLUID TEMP. RANGE F.	1.25" & LESS	1.50" & ABOVE	INSULATION CONDUCTIVITY AT TEMP F.
HOT WATER	141-200	1.5	2.0	0.27 @ 150
COLD WATER		1.0		0.27 @ 75

H. Provide longitudinal lap and 6" wide vapor barrier joint seal strips secured with approved adhesive.

I. Seal ends of pipe insulation and seal insulation to pipe with approved fire retardant vapor barrier, at flanges, valves and fittings and at intervals of no more than 21 feet on continuous runs of piping.

J. Secure covers on concealed pipe with metal bands at least 3/4" wide and no more than 18" apart, spaced to hold ends and centers of each section.

K. Insulation on Fittings, Valves, and Flanges

1. Fittings, valves and flanges shall be insulated with pre-cut, factory-supplied fibrous glass, by Certain-Teed, Knauf, Owens Corning or Manville.

2. Fittings, valves and flanges shall be insulated with same material and to same thickness as adjoining pipe insulation.

3. Pipe fittings shall be pre-tested, clean and dry before insulation.

4. Installation of insulation on fittings shall be as follows, in order:

   a. Wrap insulation around fitting and tuck ends into fitting throat.
   b. Edges of adjacent insulation shall be tufted and tucked in, to fully insulate fitting to thickness of adjacent pipe insulation. Use two or more thickness is necessary.
   c. If two layers of insulation are used on fittings, wrap and secure first layer with twine before applying second layer.
   d. Top layer of insulation shall be covered with one piece, PVC, molded jacket cover. Secure cover with stainless steel tack fasteners inserted into jacket throat overlap seam.
   e. Tape joints with pressure-sensitive vapor barrier tape; tape shall extend 2" on either side of joint.

5. Prior to taping of joints on chilled water and condenser water lines, apply vapor barrier mastic (brushed on) to fitting cover, throat overlap and edges. Also apply vapor barrier mastic to pipe insulation jacket ends.

L. Insulation for fittings, valves and flanges shall be mitered pipe insulation or molded fittings as follows:

Piping	Requirements
Concealed	Molded fittings made smooth with insulating cement. 8 oz. canvas jacket saturated with approved lagging adhesive.
Exposed	With 1/4" coat of insulating cement over insulation, trowelled smooth. 8 oz. canvas jacket saturated with approved lagging adhesive.
Underground/ Outdoors	Weatherproof, with two 1/8" wet coats of breather type mastic, reinforced with glass fabric extending 2" onto either side of adjacent insulation.

M. Refrigeration Line Insulation

1. Suction lines and outdoor liquid lines shall be insulated with 1” thick rigid closed cell foam insulation, Armstrong Rigid Armaflex, Manville, Owens Corning or Halstead/Nomaco (Insultube).

2. Installation shall meet manufacturer's recommendations. Seal butt joints with insulation manufacturers approved adhesive.

3. Outside above ground insulation shall be protected with two coats of approved vinyl lacquer coating over woven glass mesh adhered to insulation with Insulcolor or approved equal lagging adhesive, as recommended by manufacturer.

2.03 PIPE HANGERS AND SUPPORTS

A. Provide pipe stands, supports, hangers and other supporting appliances as necessary to support work required by Contract Documents.

B. Secure vertical piping to building construction to prevent sagging or swinging.

C. Space hangers for horizontal piping as follows:

PIPE SIZE	ROD DIAMETER	MAXIMUM SPACING
Up to 1-1/4"	3/8"	8'- 0"
1-1/2 and 2"	3/8"	10'- 0"
2-1/2 and 3"	½"	10'- 0"
4 and 5"	5/8"	12'- 0"
6"	3/4"	12'- 0"
8" and over	7/8"	12'- 0"

Horizontal copper tubing shall have maximum hanger spacing of 6' for tubing 1-1/4" dia. and smaller and 10' for tubing 1-1/2" and larger. Maximum spacing for PVC pipe hangers shall be 4'.

D. Reduce spacing to a maximum of 10' - 0" apart, regardless of pipe size, as necessary for fittings, valves and other concentrated loads.

E. Support piping 3" dia. and larger from structure with pipe roll hangers with adjustable steel rod hangers, sized to accommodate insulation.

F. Support piping 2-1/2" dia. and under from structure with Carpenter and Patterson Fig. 100 clevis hangers or approved equal, with one ½" adjustable steel rod; or, from side wall by expansion shields, angle iron brackets and rods.

G. Hangers shall be by Carpenter & Patterson, F & S, or Grinnell Co. Figure numbers of Carpenter and Patterson are specified to establish standards of quality for performance and materials.

H. Provide spring hangers with travel stops as specified in Vibration Isolation Paragraph where necessary and where shown on Drawings.

I. Pipe supports for insulated high-temperature piping shall have welded inserts of equal thickness to insulation to prevent compression of insulation. Other insulated pipe shall have 10" shields at hangers, composed of 180 degree coverage of galvanized sheet metal and high density, pre-formed, rigid insulation. Where rollers are required, shield shall be steel pipe.

J. Hangers for horizontal lines shall be vertically adjustable to obtain pitch requirements of

Piping Paragraph.

2.04 SLEEVES AND PENETRATIONS

A. Pipe Sleeves

1. Sleeves through floors and through exterior, structural and fire-rated construction shall be hot-dipped galvanized Schedule 40 steel pipe.

2. Sleeves through partitions and non-fire-rated construction shall be 26 gauge galvanized steel with lock longitudinal seams, or approved plastic pipe.

3. Provide waterproofing membrane locking devices at floors. Provide 150 lb. slip-on welding flanges at exterior wall penetrations.

B. Duct Sleeves and Openings

1. Sleeves through floors, through exterior structure, through fire-rated construction and through smoke partitions that require smoke dampers shall be Schedule 40 galvanized steel pipe for round duct and shall meet SMACNA Fire Damper and Heat Stop Guide for rectangular and flat oval ducts. Fireproof packing shall be applied to seal any openings between sleeve and wall. Materials shall maintain the fire rating of the wall, and shall be installed in accordance with the SMACNA Fire Damper and Heat Stop Guide.

2. Openings in walls, partitions and other fire-rated construction that do not require smoke dampers shall meet NFPA 90A, Section 3-3.8.

3. Materials for prepared openings in partitions shall match construction penetrated.

C. Pipe Sleeve Packing

1. Packing between the pipe and the sleeve (or wall or slab opening) in fire rated walls or slabs shall be a combination of fireproof insulation and fireproof caulk. The combination of materials shall have the same fire rating, in hours, as the wall or slab, as tested in accordance with the latest edition of ASTME-119. The combination of materials shall be classified by UL, (fill, void or cavity materials) for the fire rating required and shall be listed as a numbered system in the UL Building Materials Directory. Fiberglass shall not be used as the insulation material.

2. Acceptable fireproof insulation materials shall be Kaolin (Kaowool by Babcock and Wilcox); ceramic fiber blanket (Fiberfrax by Standard Oil) or fire rated mineral wool (Thermafiber by USG). Acceptable fireproof caulks shall be Silicone (Firestop by Dow Corning); ceramic fiber (Fyreputty by Standard Oil) or intumescent synthetic elastomer (Fire Barrier Caulk by 3M)

3. Packing for sleeves that do not require maintenance of fire rating shall be oakum, silicate foam, ceramic fiber or mineral fiber with approved sealant. Pack or foam to within 1" of both wall surfaces. Seal penetration packing with approved caulking and paintable waterproof mastic surface finish or silicone caulking.

4. All materials must be installed in accordance with manufacturer's instructions; all gaps must be sealed. Finish caulk flush with wall or slab surface if piping runs exposed.

D. Other Waterproof Pipe Penetrations

1. Modular mechanical penetration seals shall be interlocking synthetic rubber links shaped to fill annular space continuously, with galvanized carbon steel bolts, nuts and pressure plates to expand rubber seal between pipe and sleeve. Sleeve seal shall be watertight.

2. Prefabricated modular sleeves shall be Mason Industries (SWS) or approved equal stiffened galvanized steel sleeves with preformed closed-cell elastomeric seal (non-fire-rated) or preformed mineral fiber or silicone foam seal (fire-rated).

3. Provide waterproof 1" single ring set in silicone and bolted to floor or wall at chipped and drilled penetrations of existing slabs on grade and existing walls below grade.

2.05 PRESSURE GAUGES, THERMOMETERS, AND TEST PLUGS

A. Provide bronze Bourdon tube pressure gauges where shown on Drawings and/or where specified, by U.S. Gauge, Trerice, or Weksler, accurate to approximately 1%.

1. Gauges shall have white faces with black-filled engraved lettering. Gauge bodies shall be set in phenolic cases. Provide siphons and shut-off cocks.

2. Gauges hall be easily accessible and easily read. Gauges readable from floor at less than five feet shall have 4-1/2" dials. Other gauges shall have 6" dials. Gauges graduations shall meet limit requirements of normal operation. Gauge shall indicate at mid-scale.

3. Gauges at pumps shall be liquid-filled.

B. Provide separable well V-case thermometers by U.S. Gauge, Trerice, or Weksler where shown on Drawings and where specified. Thermometers shall have 9" scale and white face with black-filled engraved letters. Thermometers shall be angular or straight

stemmed, as conditions necessitate. Thermometer wells shall be bronze and shall be installed so as to ensure minimum restriction of water flow in pipe.

1. Provide thermometer ahead of and beyond cooling coils, in pump suctions and discharges, and where shown on Drawings. Thermometers shall have scale range of 0 degrees - 120 degrees F. with 2-degree scale division.

2. Provide thermometer in condenser water system at each chiller, cooling tower and pump connection. Scale range shall be 20 degrees - 180 degrees F. with 2" scale division.

3. Provide thermometer in hot water system at each boiler, coil and pump connection, unless specified otherwise. Scale range shall be 30 degrees - 300 degrees F. with 2-degree scale division.

4. Provide additional thermometers where shown on Drawings.

C. Combination Temperature Pressure Test Plugs

1. Provide, where shown on details, combination pressure temperature test plugs by Peterson Equipment Company "Petes Plug" or Sisco, Inc. "P/T Plugs".

2. Plug shall be ¼" or ½" NPT, constructed of solid brass with a Nordel valve core suitable for temperatures up to 350 degrees F. Plug shall be rated zero leakage from vacuum to 1000 psig.

3. Provide extension fitting for each plug suitable for use with 2" maximum pipe insulation.

4. Provide gauge test kit consisting of the following items:

   a. (2) 3-1/2" dial face gauges 0-100 psi and 0-231 feet.
   b. (2) Gauge adaptors with 1/8" O.D. probe.
   c. (2) 5" stem pocket testing thermometers ranges 25-125 degrees F; 0 degrees - 220 degrees F.
   d. (1) Carrying case.
   e. (2) 4' length of flexible hose with adaptors.

2.06 SHEET METAL DUCTWORK

A. Reference Standards

1. Material, construction and installation shall meet requirements of most recent editions of the following standards and references, except for more stringent requirements specified or shown on Drawings.

Standard	As Applicable to

SMACNA HVAC Duct Construction Standards (Metal and Flexible)	Sheet Metal Ductwork; Duct Liners; Adhesives; Fasteners; Flexible Ductwork
SMACNA HVAC Air Duct Leakage Test Manual	Duct Leakage Testing
NFPA 90A	Fire Dampers; Fire Resistance Standards for Ducts and Liners

B. General

1. Provide supporting and hanging devices necessary to attach entire HVAC system including ductwork and equipment, and to prevent vibration.

2. Provide vertical and horizontal supports as required by codes to meet minimum applicable earthquake resistance standards.

3. Ductwork shall be free from vibration under all conditions of operation.

4. Dimensions shown on Drawings for lined ductwork are net inside dimensions. Increase ductwork to accommodate lining requirements.

5. Pipe or conduit crossing duct

   a. No pipe, conduit, hanger, Architectural element nor structural member shall pass through duct without Architect's written approval.
   b. Where it is impossible to re-route pipe or conduit and when written approval has been obtained, increase duct size to maintain constant cross-sectional area at point of interference. Provide streamlined enclosure for pipe or conduit, as illustrated in SMACNA.

6. When making offsets and transformations necessary to accommodate structural conditions, preserve full cross-sectional area of ductwork shown on Drawings.

7. Ductwork Construction

   a. All ductwork systems shall be constructed and sealed in accordance with SMACNA standards for the specified pressure-velocity classifications.
   b. Ductwork systems shall have pressure-velocity classifications as follows:

Duct System	**Material**	**SMACNA Pressure Class**	**Press**	**SMACNA Seal Class**	**Velocity (FPM)**	**Method of Construction**
VAV Supply ductwork downstream of roof top units	Galvanized Steel	4”		A	<4000	
Supply ductwork for low pressure systems	Galvanized Steel	2”	Pos	B	<2500	

Duct System	Material	SMACNA Pressure Class	Press	SMACNA Seal Class	Velocity (FPM)	Method of Construction
and downstream of VAV terminal						
Return air ductwork for low pressure systems	Galvanized Steel	2”	Neg	B	<2500	
General low pressure exhaust ductwork	Galvanized Steel	2”	Neg.	B	<2500	
Toilet exhaust ductwork	Galvanized Steel	2”	Neg.	B	<2500	
Chemical fume hood exhaust ductwork	#14 Gauge, 316 SS	2”	Neg.	A	>2000	

* For negative pressures over 3” w.g., refer to SMACNA Round and rectangular Industrial Duct Construction Standards for joint and intermediate reinforcement requirements.

8. Ducts required to be continuously welded and with all penetrations sealed (damper rods, access doors, etc.) shall be liquid-tight and shall be airtight. The leakage test shall yield a zero leak rate. All welding shall use inert gas shielding with filler rod equal to or exceeding the base metal properties.

9. Support

   a. Space hangers as required by SMACNA (8 ft max) for horizontal duct on 8 ft. centers, unless concentrated loadings require closer spacing.
   b. Support vertical duct on each floor or slab it penetrates.
   c. Supports for ductwork and equipment shall be galvanized unless specified otherwise.

10. Connections

   a. Connect inlets and outlets of heat recovery units and fans to ductwork with flexible connections unless fan has vibration isolator mounts inside unit with flexible connections.
   b. Indoors, flexible connections shall be neoprene-coated fibrous glass fire retardant fabric, by Ventfabrics, or Durodyne. Outdoors, flexible connections shall be Dupont hypalon-coated fibrous glass fire-, weather-, and UV-resistant by Ventfabrics or Durodyne.
   c. Secure flexible connections tightly to air handlers with metal bands. Bands shall be same material as duct construction.
   d. Connections from trunk to branch ducts shall be as detailed on Drawings.

11. Construction

a. No sharp metal edges shall extend into air streams.
b. Install drive slips on air-leaving side of duct with sheet metal screws on 6" centers.
c. Spin in collars shall NOT be used.

12. Joints
a. Longitudinal lock seams shall be double-locked and flattened to make tight joints.
b. Make transverse joints, field connections, collar attachments and flexible connections to ducts and equipment with sheet metal screws or bolts and nuts. Do not use rivets and staples.

13. Prefabricated Transverse Duct Joints

a. Transverse joints in galvanized sheet metal ductwork may be made with galvanized gasketed frame and angle duct joint system by Ductmate, TDF, TDC, or approved equal. Angles shall be at least 20 gauge. Prefabricated transverse duct joints shall not be used for duct 16 GA. and heavier, nor for duct 23 GA. or lighter.
b. Secure angles to duct with screws (using clutched arbor) or spot-welds spaced as recommended by manufacturer for duct pressure class.

14. Elbows and Bends

a. Elbows and bends for rectangular ducts shall have centerline radius of 1.5 times duct width wherever possible. Elbows for grease exhaust shall be full radius. Turning vanes and mitered elbows are not allowed in grease ducts.

b. Where centerline radius is less than 1.5 times duct width (on supply, return and exhaust ductwork), elbows shall be radius throat with radius heel and full length splitter vanes when required. When centerline radius (r) divided by the duct width (w) is less than 1.5, provide the following number of splitter vanes: r/w between 1.49 and 0.7 = 1; r/w between 0.69 and 0.6 = 2; r/w between 0.59 and 0.55 = 3. Minimum inside radius (not centerline) shall be 2". Install vanes in accordance with SMACNA.

c. For round ductwork provide stamped elbows, with centerline radii equal to 1-1/2 times duct diameter, or gored elbows as follows:

Elbow Angle	No. of Gores
0 –36	2
37 –72	3
73 –90	5

15. Access Panels/Doors

    a. Provide proper pressure and leakage rated, gasketed, duct mounted access panels/doors. In insulated ducts, access doors shall be insulated double wall. Gauges of door materials, no. of hinges, no. and type of door locks shall be as required by the SMACNA Duct Construction Standards. Unhinged doors shall be chained to frame with a minimum length of 6" to prevent loss of door. Door metal shall be the same as the attached duct material. The minimum sizes are:

        1) Fire dampers - 12" x 12", or larger.
        2) Automatic control dampers - 6" x 6" minimum.
        3) Manual volume dampers 2 sf and larger - 6" x 6" minimum.
        4) At additional locations indicated on drawings, or specified elsewhere - 12" x 12" minimum.
        5) Flow measuring stations - 12" x 12" or larger.
        6) Provide, as an alternate, access door for all supply air ductwork upstream and downstream of each elbow and tee and at intervals of approximately 40 ft. to allow maximum reach of 20 ft. in straight horizontal runs for cleaning - 24" x 24" unless duct size is smaller in which case largest size possible shall be used (min. 6" x 6").

    b. Access doors are not shown on the drawings, but shall be provided in accordance with the above.

16. Extractors shall have adjusting rod and locknut on outside of duct.

17. Connections to roof fans:

    a. Shall be at least 22 ga. galvanized steel soldered watertight.
    b. Solder side seams at least 12" up from bottom.
    c. Provide suitable dielectric gaskets to join dissimilar materials.

18. Plenums and connections to louvers:

    a. Shall be 18 ga. minimum cross-broken and properly reinforced with galvanized angle irons to SMACNA requirements.
    b. Shall have bottom and corner seams soldered watertight at least 12" up from bottom.
    c. Shall have neoprene gaskets or other non-corrosible material to make connections to louvers watertight.
    d. Shall pitch connection back towards the louver. Provide half-coupling drain connection at bottom of plenum unless noted otherwise. Pipe drain to nearest floor drain.

e. Shall have unused portions of louvers blocked-off with sheet metal; sealed air- and water-tight; insulated with 2" thick 6-lb. density rigid or board insulation.

19. Flexible Ductwork

a. Flexible ductwork, connecting to uninsulated or unlined duct, shall be vinyl coated fiberglass cloth 0.0057" minimum thickness, 25 strands per inch minimum thread count with corrosion-resistant helical wire reinforcement. Flex duct shall be U.L. rated for 12" W.C. positive pressure, 2" W.C. negative pressure with a maximum velocity of 4000 FPM. Flexduct must be listed as a Class 1 Connector according to UL 181 and shall meet the requirements of NFPA 90A - maximum ASTM E-84 fire hazard rating shall be 25 flame spread, 50 fuel contributed and 50 smoke developed. Uninsulated flexible duct shall be equivalent to Flexmaster Type 4.

b. Flexible duct connected to insulated or lined duct shall be insulated with 1-1/2", 1/2 lb. density fiberglass insulation and flame retardant (UL Listed) vapor barrier, meeting ASTM E-84 rating.

c. Submittals shall include data on core, in addition to other data listed above required to ensure that submitted product meets the requirements of these specifications.

d. If flexduct other than the models listed above is submitted, a sample of the flex shall be submitted to the Architect. The Architect shall have sole discretion in determining whether the submitted flex is equivalent to that of the named above.

e. Flexible duct shall be airtight, triple lock mechanically spiral formed with spiral corrugation. Material shall be 3003 zero temper aluminum, .0065" minimum thickness.

f. Provide sealing compound and metal draw bands for installation. See further paragraphs in this specification, and details for other installation requirements.

C. Flexible Duct

1. Provide supports at manufacturer's recommended intervals. Sag shall not exceed ½" per foot of spacing between supports. Ducts shall not exceed 6 feet long and shall be used for straight run only, no offsets or turns.

2. Hanger and saddle in contact with flexible duct shall be wide enough to prevent restriction of internal duct diameter when weight of supported section rests on hanger or saddle material.

3. Factory installed suspension systems integral to flexible duct are acceptable as alternative hanging method when manufacturer's recommended procedures are followed.

4. Collars to which flexible ducts are attached shall be at least 2" long. Sleeves for joining sections of flexible duct shall be at least 4" long.

5. Apply sealing compound to metallic surface at connection of flexible duct with sheet metal ducts, collars and mixing boxes. Slip flexible ductwork over sealing compound. Complete seal with ½" wide, commercially made metal draw bands.

D. Combination Fire/Smoke Dampers

1. Combination Fire/Smoke Dampers shall be provided and installed where indicated on drawings and where required by code and local authorities. Refer to architects construction documents to identify fire rated walls and smoke barriers.

2. The combination fire/smoke damper (FSD) shall be equal to or better than a Ruskin model FSD60 with electronically controlled closure and a TS150 Firestat.

3. Sequence of Operation

a. Smoke condition operation - When smoke is detected (via a smoke detector), during testing or if power failure occurs, the damper will close and remain closed. When the smoke signal ceases (smoke detector reset), the test is completed or power is restored, the damper will automatically reset to the open position. The damper automatically resets if nuisance alarms occur and the system is reset.

b. Fire condition operation – When temperatures in excess of 165°F / 74°C are detected, the damper will close and lock. At no time shall the damper be disengaged from the actuator. Upon cessation of the fire conditions, the damper can be reopened by pressing the reset button located on the damper assembly.

E. Fire Dampers

1. Fire Dampers shall be installed in the Ductwork where indicated on the drawings and required by the code and local authorities. See architect's construction documents to identify fire-rated walls and floors.

2. Fire Dampers shall be constructed and installed with visible fusible links in accordance with the requirements of the National Board of Fire Underwriters and the Underwriters'.

3. Inspection Authorities having jurisdiction in the locality. Fire Dampers shall be Buckley Model 150A or 150B (vertical or horizontal) as manufactured by Buckley Associates (781-878-5000) Sheet Metal Workers Local 17 or approved equal.

4. Dampers shall meet National Fire Protection Association requirements as

outlined in the current N.F.P.A. bulletin 90-A. Dampers shall bear the Underwriters' label. Dampers shall be installed with metal sleeves and framing angles. All Dampers shall be installed in accordance with the means by which they were U.L. tested.

5. Free area must equal or exceed that of the specified product.

6. If additional wall or/and ceiling/floor framing for damper installation is required coordinate framing installation with GC.

7. HVAC contractor shall coordinate fire damper access panel locations with general contractor.

F. Volume Dampers

1. Note: Volume dampers are not shown on Drawings, but dampers shall be provided as necessary for system balancing and as required by this specification.

2. Provide manual adjustable volume dampers, with extended mount indicating and locking quadrants:

   a. On each supply, return and exhaust duct take-off.
   b. At each take-off to register, grille or diffuser (these are not shown on the drawings). Volume damper shall be as far away from diffuser or grille as possible for system balancing.

3. Dampers shall be ½" smaller in both dimensions or 1" smaller diameter than size of duct in which they are installed; e.g., use 23-½" by 23-½" damper for 24" square duct.

4. Dampers larger than 12" in height shall be opposed multi-blade.

5. Damper blades shall be two gauges heavier than adjoining ductwork, and shall be riveted to supporting rods. Hem over edges parallel to rods.

6. Brackets shall be galvanized metal, secured to ductwork with sheet metal screw with locking quadrant arms (see seal class section for additional requirements). Provide 2" handle extension for all dampers on externally insulated ductwork.

G. Gravity Backdraft Dampers

1. Backdraft dampers shall have 12 ga. galvanized steel channel frame with 14 ga. galvanized press formed steel sub frame and 16 ga. reinforced galvanized steel blades with edge seals. Dampers shall be designed for velocities up to 3,500 fpm.

2. Counter-balance arms shall be 2 x ¼ x 12" lg. hot rolled steel bar external to

damper. Counter-weights shall be 2" dia. hot rolled steel bar attached to counter-balance arms. Axles shall be ½" dia. cadmium plated steel continuous rods with ½" dia. ball bearings. Dampers shall have plated steel center brackets; brass pivots; 5/16" plated steel linkage rod. Provide linkage on panels 31" to 48" wide. Damper shall have all welded construction.

3. Dampers shall be as manufactured by Vent Products (Model 3200) or equivalent by American Warming and Ventilating, Air Balance or Ruskin.

H. Motorized Dampers

1. Control dampers meeting the following specifications shall be furnished and installed where shown on plans and/or as described.

2. Dampers shall consist of: a 16-gauge galvanized steel channel frame with 5 in. depth; airfoil shaped, galvanized steel double skin construction blades (14-gauge equivalent thickness); blades shall be completely symmetrical relative to their axle pivot point, presenting identical resistance to airflow in either direction or pressure on either side of the damper; 1/2 in. diameter plated steel axles turning in synthetic (acetal) sleeve bearings; silicone blade seals; flexible stainless steel jamb seals; and external (out of the airstream) blade-to-blade linkage.

3. Damper manufacturer's printed application and performance data including pressure, velocity and temperature limitations shall be submitted for approval showing damper suitable for pressures to 8 in. water gage, velocities to 4000 fpm and temperatures to 250°F. Testing and ratings to be in accordance with AMCA Standard 500-D. Basis of design is Greenheck model VCD-33.

4. Damper air leakage shall not be greater than 3 cfm/sq. ft. @ 1 in. water gage.

5. Testing and ratings shall be per AMCA Standard 500-D.

I. Diffusers, Registers, and Grilles

1. Provide steel diffusers, registers and grilles for supply, return and exhaust outlets, of size, type and design shown on Drawings. Acceptable manufacturers shall be Titus, Metalaire, Nailor, or approved equal.

2. Equipment shall be tested and rated per ASHRAE 91-70.

3. Equipment shall handle air quantities at operating velocities:

   a. With maximum diffusion within space supplied or exhausted.
   b. Without objectionable air movement as determined by Architect.
   c. With sound pressure level not to exceed NC 30 or as specified on Drawings.

4. Supply, return and exhaust outlets shall have opposed blade volume dampers operable from front.

5. Supply registers shall have two sets of directional control blades.

6. Diffusers within same room or area shall be of same type and style to provide Architectural uniformity.

7. Surface mount diffusers, registers and grilles shall be furnished with gaskets and installed with faces set level and plumb, tightly against mounting surface.

8. Finish shall be as directed by Architect.

9. Coordinate diffusers, registers and grilles with ceiling and wall construction. Refer to Architectural Drawings for exact lengths and for framing and mitering arrangements that may differ from those shown on HVAC Drawings.

J. Airflow and Temperature Measurement Devices

1. References

a. UL 873 – Temperature and Airflow Indicating Equipment

2. Submittals

a. Submit product data sheets for airflow measuring devices indicating minimum placement requirements, sensor density, sensor distribution, and installed accuracy to the host control system.

1) Devices whose accuracy is the combined accuracy of the transmitter and sensor probes must demonstrate that the total accuracy meets the performance requirements of this specification throughout the measurement range.

b. Submit a schedule of airflow measuring devices indicating compliance with specified accuracy at minimum and maximum airflow rates.

c. Submit installation, operation and maintenance documentation.

3. Qualifications

a. Manufacturer: The company manufacturing the products specified in this section shall have a minimum of ten years experience producing products of this type.

4. System Responsibility

a. The contractor shall be responsible for any and all costs associated with

any and all changes resulting from the use of a supplier other than the listed acceptable manufacturer.

5. Warranty

   a. Provide a manufacturer's parts warranty for 36 months from the date of unit shipment.

6. Delivery, Storage, and Handling

   a. All handling and storage procedures shall be per manufacturer's recommendations
   b. Airflow measuring devices shall be kept clean and dry, protected from weather and construction traffic.

7. Products Included in this Section

   a. Duct and plenum mounted airflow measurement devices.
   b. Fan inlet mounted airflow measurement devices.

8. Acceptable Manufacturers

   a. EBTRON, Inc. Model GTx116-P and GTx116-F (basis of design).

      1) Alternatives requesting acceptance as "equals" less than 60 days prior to bid date or products submitted in non-conformance with the requirements of this specification will not be considered.
      2) For any product to be considered for substitution a written section-by-section detailed exceptions/compliance document shall be submitted to the Engineer before any approval will be considered.

   b. Provide airflow/temperature measurement devices (ATMD) where indicated on the plans. Fan inlet measurement devices shall not be substituted for duct or plenum measurement devices indicated on the plans.

   c. Each ATMD shall consist of one or more sensor probes and a single, remotely mounted, microprocessor-based transmitter capable of independently processing up to 16 independently wired sensor assemblies. Each sensor assembly shall contain two individually wired, hermetically sealed bead-in-glass thermistors. Thermistors shall be mounted in the sensor assembly using a marine-grade, waterproof epoxy. Thermistor leads shall be protected and not exposed to the environment. The airflow rate of each sensor assembly shall be equally weighted and averaged by the transmitter prior to output. The temperature of each sensor assembly shall be velocity weighted and

averaged by the transmitter prior to output. Each transmitter shall have a 16-character alpha-numeric display capable of displaying airflow, temperature, system status, configuration settings and diagnostics. Devices using chip-in-glass or diode-case chip thermistors are not acceptable. Devices using less than two thermistors in each sensor assembly are not acceptable. Devices using platinum wire RTDs are not acceptable. Devices having electronic circuitry mounted in or at the sensor probe are not acceptable. Pitot tubes and arrays are not acceptable. Vortex shedding devices are not acceptable.

d. All Sensor Probes

1) Each sensor assembly shall independently determine the airflow rate and temperature at each measurement point.

2) Each sensor assembly shall be calibrated at a minimum of 16 airflow rates and 3 temperatures to standards that are traceable to the National Institute of Standards and Technology (NIST).

3) Airflow accuracy shall be +/-2% of reading over the entire operating airflow range.

a) Devices whose accuracy is the combined accuracy of the transmitter and sensor probes must demonstrate that the total accuracy meets the performance requirements of this specification throughout the measurement range.

4) Temperature accuracy shall be +/-0.15° F over the entire operating temperature range of -20° F to 160° F.

5) The operating humidity range for each sensor probe shall be 0-99% RH (non-condensing).

6) Each sensor probe shall have an integral, U.L. listed, plenum rated cable and terminal plug for connection to the remotely mounted transmitter. All terminal plug interconnecting pins shall be gold plated.

7) Each sensor assembly shall not require matching to the transmitter in the field.

8) A single manufacturer shall provide both the airflow/temperature measuring probe(s) and transmitter for each measurement location.

e. Duct and Plenum Probes

1) Probes shall be constructed of extruded, gold anodized, 6063 aluminum tube. All wires within the aluminum tube shall be Kynar coated.

2) Probe assembly mounting brackets shall be constructed of 304 stainless steel. Probe assemblies shall be mounted using one of the following options:

   a) Insertion mounted through the side or top of the duct
   b) Internally mounted inside the duct or plenum
   c) Standoff mounted inside the plenum

3) The number of sensor housings provided for each location shall be as follows:

Area (sq. ft.)	Sensors
<2	4
2 to <4	6
4 to <8	8
8 to <16	12
>=16	16

4) The operating airflow range shall be 0 to 5,000 FPM unless otherwise indicated on the plans.

f. Fan Inlet Probes

1) Sensor assemblies shall be mounted on 304 stainless steel housings.

2) Mounting rods shall be field adjustable to fit the fan inlet and constructed of nickel plated steel.

3) Mounting feet shall be constructed of 304 stainless steel.

4) The operating airflow range shall be 0 to 10,000 FPM unless otherwise indicated on the plans.

g. Transmitters

1) The transmitter shall have an integral LCD display capable of simultaneously displaying airflow and temperature. The LCD display shall be capable of displaying individual airflow and temperature readings of each independent sensor assembly.

2) The transmitter shall be capable of field configuration and diagnostics using an on-board pushbutton interface and LCD display.

3) The transmitter shall have a power switch and operate on 24

VAC (isolation not required). The transmitter shall use a switching power supply fused and protected from transients and power surges. The transmitter shall use "watch-dog" circuitry to assure reset after power disruption, transients and brown-outs.

4) All interconnecting pins, headers and connections on the main circuit board, option cards and cable receptacles shall be gold plated.

5) The operating temperature range for the transmitter shall be -20° F to 120° F. The transmitter shall be installed at a location that is protected from weather and water.

6) The transmitter shall be capable of communicating with other devices using one of the following interface options:

a) Linear analog output signals for airflow and temperature: Field selectable, fuse protected and isolated, 0-10VDC/4-20mA (4-wire).

b) RS-485: Field selectable BACnet-ARCNET, BACnet-MS/TP, ModBus-RTU or Johnson Controls N2-Bus.

(1) BACnet devices shall provide analog variables for airflow and temperature containing individual sensor airflow rate and temperature data.

c) 10 Base-T Ethernet: Field selectable BACnet Ethernet, BACnet-IP, ModBus-TCP and TCP/IP.

(1) Provide dynamic link libraries and VBA functions to interface Ethernet devices to Microsoft Excel for remote monitoring of airflow and temperature using a Windows 2000 or Windows XP based PC.

7) The transmitter shall be capable of accepting an infra-red interface card for downloading airflow and temperature data or uploading transmitter configuration data using a handheld PDA (Palm or Microsoft Windows Mobile operating systems).

a) Provide PDA upload/download software. Download software shall be capable of displaying and saving individual sensor airflow rates, the average airflow rate, individual sensor temperatures and the average temperature received from the transmitter. Upload

software shall be capable of displaying and saving all setup parameters that can be configured using the on-board pushbutton interface and LCD display.

b) Provide a Microsoft Excel file capable of creating balance reports from PDA data files transferred to a Windows 98 or higher based PC.

c) Provide a Microsoft Excel file to create configuration data files that can be transferred from a Windows 98 or higher based PC to a PDA for upload to one or more transmitters.

h. The measuring device shall be UL listed as an entire assembly.

i. The measuring device shall carry the CE mark for European Union shipments.

j. The manufacturer's authorized representative shall review and approve placement and operating airflow rates for each measurement location indicated on the plans. A written report shall be submitted to the consulting mechanical engineer if any measurement locations do not meet the manufacturer's placement requirements.

9. Installation

a. Install in accordance with manufacturer's instructions at the locations indicated on the plans. A written report shall be submitted to the consulting mechanical engineer if any discrepancies are found.

10. Adjusting

a. Duct and pienum devices shall not be adjusted approval from the consulting mechanical engineer.

2.07 ACOUSTICAL DUCT LINING

A. Provide 1" thick acoustical lining by Certain-Teed, Knauf, Owens Corning or Johns Manville for following ductwork:

1. Ductwork indicated as lined on Drawings.

B. Increase duct dimensions to accommodate lining while maintaining inside clear dimensions shown on the drawings.

C. Materials and installation shall meet following standards, as applicable:

1. NFPA-90A, UL723, NFPA-255
2. SMACNA Duct Liner Applications Standard

3. SMACNA Mechanical Fasteners Standard

4. Adhesive and Sealant Council: Adhesives Standard for Duct Liner - ASC-A-7001A

   a. ASTM E-84 fire hazard classifications of 25 flame spread, 50 smoke developed, and 50 fuel contributed.

D. Lining shall be as follows:

Lining for	**Material**	**Minimum NRC**	**Maximum K-Factor at 75°F Mean**
Low Pressure Ductwork	Black, matfaced, 2 pound density, flexible glass	0.75	0.24
Medium And High Pressure Ductwork	Black, matfaced, 3 pound density, rigid board	0.75	0.23

1. For all lined ductwork at the inlets and outlets of fans, and for all lined ductwork (including plenums) within 20 feet from heat recovery units provide a perforated aluminum (24 gauge) or galvanized liner (minimum 28 gauge), with 28% minimum free area on the side of the liner exposed to the moving airstream. Metal liner shall be held in place by weld pins spaced no more than 12" O.C.

E. Duct liner shall be installed without interruptions or gaps, using 100% coverage of adhesive and mechanical fasteners. Mechanical fasteners shall be welded or secured mechanically to duct on 12" maximum centers.

F. Cut liner to ensure overlapped and compressed longitudinal joints at corners. Transverse joints in liner shall abut precisely. Seal joints against fiber entrainment with approved adhesive, as recommended by manufacturer. Use sheet metal nosing at beginning of lining (in direction of flow) to minimize erosion.

G. Friction coefficient correction factor at 1000 FPM shall be no greater than 1.1. Liner shall be Certain-Teed Ultra Liner, Knauf Duct Liner M or Manville Linacoustic. Other liners from these manufacturers with friction coefficient correction factors greater than listed above are not acceptable.

H. Mylar used for vapor barrier shall meet ASTM E-84 classification.

I. Any cut liner due to duct takeoffs and branches shall be totally sealed at edges (with sheet metal nose pieces) to prevent entrainment of loose fibers.

2.08 FLEXIBLE CONNECTIONS

A. All fan and air supply unit connections, both at inlet and discharge shall be made with

flexible material so as to prohibit the transfer of vibration from fans to ductwork connecting thereto, without air leakage. The material between the clamps shall have sufficient slack so as to prevent tearing due to fan movement.

B. The flexible connections shall be a maximum of 12” long and held in place with heavy metal bands, securely attached, to prevent any leakage at the connection points.

C. Flexible connections shall be fabricated from approved flame proved fabric conforming to 90A of the NFPA Asbestos cloth is not permitted.

2.09 ESCUTCHEONS AND DUCT COLLARS

A. Provide adjustable escutcheons on exposed piping that passes through finished floors, walls and ceilings. Escutcheons shall be chromium-plated cast brass, sized to cover sleeve opening and to accommodate pipe and insulation.

B. Provide 4” wide 20 gauge galvanized sheet metal collars at sleeves and prepared openings, sized to cover entire duct penetration including sleeve and seal, and to accommodate duct and insulation as necessary. Edges shall have milled lips ground smooth. Paint to match finish of duct or as directed by Architect.

2.10 INSULATION FOR SHEET METAL

A. Note that ductwork and casings, which are acoustically lined, as described elsewhere, need not be insulated on the exterior, provided the liner has a minimum thermal resistance of R-5. Ductwork with liner which does not have a thermal resistance of R-5 or better shall be insulated on the outside of the ductwork in accordance with current state and local codes.

B. The exception to the above is that acoustically lined ductwork above roof shall be insulated on the exterior.

C. Insulate sheet metal as follows:

1. All low pressure supply ductwork to diffusers, grilles, and registers Type D-1.

2. Medium pressure ductwork shall be insulated with insulation type D-1.

3. Sheet metal plenums behind louvers containing all or a percentage of outside air on inlet side of air handling units and ventilation fans - two inch Type D-2.

4. Outdoor ducts whether acoustically lined or not shall be insulated with Type D-2 and then weather proofed.

5. Exhaust air duct from automatic dampers to discharge louvers (including sheet metal plenums behind louvers) Type D-2.

D. Type D-1 Flexible Duct Insulation With Vapor Barrier

1. Flexible duct insulation shall be R5 glass fiber with a maximum K factor of 0.29 at 75 degrees F mean temperature, with reinforced foil-faced, flame resistant kraft vapor barrier.

2. Insulation shall be secured with duct adhesive. All joints shall be sealed by adhering a 2” sealing lap at all joints with vapor barrier adhesive or 3” strips of vapor barrier jacket applied with vapor barrier adhesive. Insulation shall then be fastened with 16 gauge copper-clad wire or fiberglass cord on 12” centers. On ducts over 24” wide, welded pins and clips shall be used on the underside.

3. Exposed round shall have a white vinyl reinforced foil vapor barrier. Application same except wires shall be omitted and blanket shall be secured by stapling 2” longitudinal lap. Staples shall be coated with vapor barrier coating.

E. Type D-2 Rigid Duct Insulation With Vapor Barrier

1. Rigid duct insulation shall be R8 glass fiber with maximum K factor of .24 at 75 degrees F mean temperature with vapor barrier facing.

2. Insulation shall be impaled over welded pins applied to duct surface on 12” to 18” centers. Use a minimum of two rows of fasteners on each side of duct. Secure insulation with suitable speed washers or clips firmly embedded into insulation.

3. All joints and voids in the insulation shall be filled with Mineral Wool Cement. All joints, speed washers and breaks in the vapor barrier shall be sealed with 3” wide strips of the vapor barrier facing adhered with vapor barrier adhesive.

4. Exposed ductwork shall have a white reinforced foil vapor barrier facing. Care shall be taken in sealing joints, speed washers, etc. with matching strips of vapor barrier to insure good appearance.

2.11 MECHANICAL IDENTIFICATION

A. GENERAL

1. General: Provide manufacturer's standard products of categories and types required for each application specified. For each identification type, provide all products from same manufacturer with same text, style, color, shape, and other identification features.

a. All labels identification tags shall comply with ASME Standards: A13.1 for color scheme, lettering size, length of color field, and viewing angles

of identification devices.

b. Provide nameplates with the unit number on all mechanical equipment.

c. Provide pipe identification labels including direction-of-flow arrows and with service indicated. All labels shall have background colors matched with specific service designation.

d. Provide valve tag numbers on HVAC piping valves.

e. Provide duct identification labels including direction-of-flow arrows and with service indicated. All labels shall have background colors matched with specific service designation.

B. EQUIPMENT LABELS

1. Plastic Labels for Equipment (Indoor Application):
   a. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch thick.
   b. Letter Color: Black
   c. Background Color: White
   d. Minimum Label Size: Length and width vary for required label content, but not less than 1 by 3 inches.
   e. Minimum Letter Size: 1/4 inch.
   f. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

2. Plastic Labels for Equipment (Outdoor Application):
   a. Material: MS-215 Max-Tek with printed graphics protected by a chemical and UV resistant MS-3000 top laminate.
   b. Letter Color: Black
   c. Background Color: White
   d. Minimum Label Size: Length and width vary for required label content, but not less than 1 by 3 inches.
   e. Minimum Letter Size: 1/4 inch.
   f. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

C. PIPE LABELS (INDOOR PIPING)

1. Provide labels for above ground piping located indoors, and not exposed to sunlight or a harsh environment.
2. Pre-printed, color-coded, with lettering indicating service, and showing flow direction.
3. Lettering shall be sub-surface printed and protected from direct contact by a layer of plastic. Markers with surface printed lettering will not be accepted.
4. Pipe Labels for pipe O.D. less than 8 inches: MS-970 Coiled, semi rigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive in contact with the pipe surface.
5. Pipe Labels for pipe O.D. 8 inches and over: MS-970 Strap-on, semi rigid plastic to cover partial circumference of pipe and to attach to pipe with nylon ties

6. Pipe Label Schedule:

PIPE INSULATION O.D.	MARKER WIDTH	LETTERING HEIGHT	MARKER TYPE
¼ INCH TO 3/8 INCH	3 INCHES	¼ INCH	COIL-ON
½ INCH TO 1 INCH	8 INCHES	½ INCH	COIL-ON
1 1/8 INCH TO 2 ¼ INCH	8 INCHES	¾ INCH	COIL-ON
2 3/8 INCH TO 3 ¼ INCH	12 INCHES	1 ¼ INCH	COIL-ON
3 3/8 INCH TO 4 ½ INCH	12 INCHES	1 ¼ INCH	COIL-ON
4 5/8 INCH TO 5 7/8 INCH	12 INCHES	1 ¼ INCH	COIL-ON
6 INCH TO 7 7/8 INCH	12 INCHES	1 ¼ INCH	COIL-ON
8 INCH TO 10 INCH	24 INCHES	2 ½ INCH	STRAP-ON

7. Pipe Label Color Schedule:

SERVICE	LETTERING COLOR	BACKGROUND COLOR
HEATING WATER PIPING	WHITE	GREEN
REFRIGERANT PIPING	BLACK	ORANGE

D. VALVE TAGS

1. Valve Tags: Stamped or engraved with 1/4 inch letters for piping abbreviation and 1/2 inch numbers.
   a. Tag Material: Brass, 0.032 inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
   b. Background Color: Natural brass.
   c. Letter Color: Black.
   d. Tag Size: 1-1/2 inches, round.
   e. Fasteners: Brass S-Hooks and Jack Chain.

2. Valve Tags: For outdoor labeling of process valves.
   a. Material: MS-215 Max-Tek with printed graphics protected by a chemical and UV resistant MS-3000 top laminate, and having stainless steel grommet protected predrilled holes with for attachment hardware.
   b. Background Color: To match pipe label color by system.
   c. Letter Color: Either white or black for best contrast to background color.
   d. Tag Size: Minimum 1-1/2 inches.
   e. Fasteners: Stainless steel S-Hooks and stainless steel Jack Chain.

E. DUCT LABELS (non-plenum space)

1. Pre-printed, color-coded, with lettering indicating associated equipment, service, and showing flow direction.
   a. Contents: Include identification of duct service using same system designation as used on Drawings and an arrow indicating flow direction.

On each label, prefix the system designation with the associated equipment number (example: AHU-1 SUPPLY AIR).

b. Material: MS900 vinyl with pressure sensitive acrylic adhesive backing.
c. Marker Size: 2-1/4 inch high, with length to suit required label content.
d. Lettering Size: Minimum 1-1/2 inches high
e. Direction-of-Flow Arrows: Separate unit for each duct label to indicate flow direction.
f. Arrow Marker Size: 2-1/4 inch by 6-1/2 inches.

2. Duct Label Color Schedule:

SERVICE	**LETTERING COLOR**	**BACKGROUND COLOR**
SUPPLY AIR	WHITE	GREEN
EXHAUST AIR	BLACK	YELLOW
RETURN AIR	WHITE	BLUE
RELIEF AIR	WHITE	BLUE
OUTSIDE AIR	WHITE	BLUE

F. DUCT LABELS (plenum space)

1. Pre-printed, color-coded, with lettering indicating associated equipment, service, and showing flow direction.

a. Contents: Include identification of duct service using same system designation as used on Drawings and an arrow indicating flow direction. On each label, prefix the system designation with the associated equipment number (example: AHU-1 SUPPLY AIR).
b. Material: MS-4000 1.6 mil aluminum with pressure sensitive adhesive backing. Meets NFPA 101 Life Safety Code for class A materials.
c. Marker Size: 2-1/4 inch high, with length to suit required label content.
d. Lettering Size: Minimum 1-1/2 inches high
e. Direction-of-Flow Arrows: Separate unit for each duct label to indicate flow direction.
f. Arrow Marker Size: 2-1/4 inch by 6-1/2 inches.

2. Duct Label Color Schedule:

SERVICE	LETTERING COLOR	BACKGROUND COLOR
SUPPLY AIR	WHITE	GREEN
EXHAUST AIR	BLACK	YELLOW
RETURN AIR	WHITE	BLUE
RELIEF AIR	WHITE	BLUE
OUTSIDE AIR	WHITE	BLUE

G. CEILING TACKS

1. Provide steel ceiling tacks with a color-coded head 3/4 inch diameter and a 1.5 inch serrated shank.
   a. Provide ceiling tacks in acoustical tile ceilings to locate equipment, valves or dampers that require regular maintenance or are part of a Life Safety System.
   b. Tacks shall be color coded as follows (coordinate with Owner.

      1) Yellow – HVAC equipment
      2) Red- Life Safety (fire dampers, sprinkler valves, etc.
      3) Green – Plumbing Valves
      4) Blue – Heating/Cooling Valves

2.12 BUILDING CONTROL SYSTEM

The Building Control System (BCS) Contractor must be an authorized representative of Siemens controls.

A. Furnish and install the following:

1. A complete Automatic Control System to be integrated to the existing Siemens Building Control System (BCS),, including all necessary hardware and all operating and applications software necessary to perform the control sequences of operation as indicated. The BCS will have the capability to control and monitor HVAC equipment.

2. All work performed under this section of the specifications will comply with all building codes.

3. The BCS Contractor shall provide and install all the hardware including controllers for the fume hood control, refer to the drawings for further information.

4. The BCS Contractor shall provide and install the laboratory air control system as specified in the drawings. Installation of the control air valves for the fume hood and general exhaust shall be furnished by BCS and installed by the mechanical contractor, all control hardware and controls is by the BCS.

5. The BCS Contractor shall provide all interlock control wiring. BCS panel power wiring for the HVAC equipment shall be by BCS Contractor.

B. Submittals

1. All shop drawings will be prepared with CAD software. Drawings will be furnished on disk as well as hard copy. Provide one copy paper and one copy electronic to Owner. Drawings shall be in Auto CAD format. Submit the following for approval, in accordance with the general provisions of this specification:

a. Riser diagram depicting locations of all controllers and workstations, with associated network wiring.

b. Individual flow drawings and wiring schematics of each mechanical system showing all connected points with reference to their associated controller. Point to point wiring schematics will be required for all controls provided or installed. Ladder diagrams are insufficient. Typicals will be allowed for identical mechanical systems where appropriate.

c. Detailed bill of materials with manufacturer's data sheets on all hardware and software products required by the specification.

d. Complete points list including system designation, point description and software point name.

e. Narrative description of sequence of operation with enough detail to fully program the system. It shall not merely be a duplication of the sequences provided in this specification.

f. Description of the reports and alarms to be furnished.

g. Printout of graphics screens to be supplied with the system.

2. Submittal documents will be revised upon completion of the project for use as record documents. Record documents will include a disk with the complete software coding.

C. BCS Start Up and Check Out – Submit completed start up and check out sheets indicating that all control points are accounted for, are calibrated and are performing within specified ranges.

D. BCS Commissioning – The BCS subcontractor shall physically demonstrate to the engineer and owners representatives that all BCS systems perform in accordance with the contract drawings and specifications.

E. All work performed under this section of the specifications will comply with all building codes. If this specification and associated drawings exceed governing code requirements, the specification will govern.

F. Approved System Manufacturers: Andover Continuum (no substitutions). Must be capable of communicating with Rockwell RS Logic 5000 with Factory Talk View SE HMI.

2.13 AIR TERMINAL UNITS

A. GENERAL

1. SUMMARY

a. Section Includes:
1) Shutoff, single-duct air terminal units.

2. ACTION SUBMITTALS

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

b. LEED Submittals:

1) Product Data for Prerequisite EQ 1: Documentation indicating that units comply with ASHRAE 62.1, Section 5 - "Systems and Equipment."

c. Shop Drawings: For air terminal units. Include plans, elevations, sections, details, and attachments to other work.

d. Delegated-Design Submittal:

1) Materials, fabrication, assembly, and spacing of hangers and supports.
2) Design Calculations: Calculations [, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation] for selecting hangers and supports[and seismic restraints].

3. INFORMATIONAL SUBMITTALS

a. Field quality-control reports.

4. CLOSEOUT SUBMITTALS

a. Operation and maintenance data.

5. QUALITY ASSURANCE

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

b. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-Up."

B. PRODUCTS

1. PERFORMANCE REQUIREMENTS

a. Structural Performance: Hangers and supports and seismic restraints shall withstand the effects of gravity and seismic loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and ASCE/SEI 7 .

2. SHUTOFF, SINGLE-DUCT AIR TERMINAL UNITS

a. Manufacturers: Subject to compliance with requirements

b. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1) Environmental Technologies, Inc..
2) Price Industries.
3) Titus.

c. Configuration: Volume-damper assembly inside unit casing with control components inside a protective metal shroud.

b. Retain one of two "Casing Lining" subparagraphs below. Retain first subparagraph for standard linings; retain second for non-fiber liners.

1) Casing Lining: Adhesive attached, 3/4-inch- (19-mm-) thick, coated, fibrous-glass duct liner complying with ASTM C 1071, and having a maximum flame-spread index of 25 and a maximum smoke-developed index of 50, for both insulation and adhesive, when tested according to ASTM E 84.

a) Cover liner with nonporous foil.
b) Cover liner with nonporous foil and perforated metal.

2) Casing Lining: Adhesive attached, 3/4-inch- (19-mm-) thick, polyurethane foam insulation complying with UL 181 erosion requirements, and having a maximum flame-spread index of 25 and a maximum smoke-developed index of 50, for both insulation and adhesive, when tested according to ASTM E 84.
3) Air Inlet: Round stub connection or S-slip and drive connections for duct attachment.
4) Air Outlet: S-slip and drive connections, size matching inlet size.

5) Access: Removable panels for access to parts requiring service, adjustment, or maintenance; with airtight gasket.
6) Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

e. Regulator Assembly: System-air-powered bellows section incorporating polypropylene bellows for volume regulation and thermostatic control. Bellows shall operate at temperatures from 0 to 140 deg F (minus 18 to plus 60 deg C), shall be impervious to moisture and fungus, shall be suitable for 10-inch wg (2500-Pa) static pressure, and shall be factory tested for leaks.

f. Volume Damper: Galvanized steel with peripheral gasket and self-lubricating bearings.

1) Maximum Damper Leakage: ARI 880 rated, 2 percent of nominal airflow at 3-inch wg (750-Pa) inlet static pressure.
2) Damper Position: Normally open.

g. Attenuator Section: 0.034-inch (0.85-mm) steel

1) Lining: Adhesive attached, 3/4-inch- (19-mm-) thick, polyurethane foam insulation complying with UL 181 erosion requirements, and having a maximum flame-spread index of 25 and a maximum smoke-developed index of 50, for both insulation and adhesive, when tested according to ASTM E 84.
2) Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

h. Hydronic Coils: Copper tube, with mechanically bonded aluminum fins spaced no closer than 0.1 inch (2.5 mm), and rated for a minimum working pressure of 200 psig (1380 kPa) and a maximum entering-water temperature of 220 deg F (104 deg C). Include manual air vent and drain valve.

i. Electronic Controls: Bidirectional damper operator and microprocessor-based thermostat with integral airflow transducer and room sensor. Control devices shall be compatible with temperature controls specified in Section 230900 "Instrumentation and Control for HVAC" and shall have the following features:
1) Damper Actuator: 24 V, powered closed, [**spring return open**] .
2) Velocity Controller: Factory calibrated and field adjustable to minimum and maximum air volumes; shall maintain constant airflow dictated by thermostat within 5 percent of set point while compensating for inlet static-pressure variations up to 4-inch wg (1000 Pa); and shall have a multipoint velocity sensor at air inlet.

3) Thermostat: Wall-mounted electronic type with temperature set-point display in Fahrenheit and Celsius.

j. Direct Digital Controls: Bidirectional damper operators and microprocessor-based controller and room sensor. Control devices shall be compatible with temperature controls specified in Section 230900 "Instrumentation and Control for HVAC" and shall have the following features:

1) Damper Actuator: 24 V, powered closed, [spring return open].
2) Terminal Unit Controller: Pressure-independent, variable-air-volume controller with electronic airflow transducer with multipoint velocity sensor at air inlet, factory calibrated to minimum and maximum air volumes, and having the following features:
   a) Occupied and unoccupied operating mode.
   b) Remote reset of airflow or temperature set points.
   c) Adjusting and monitoring with portable terminal.
   d) Communication with temperature-control system specified in Section 230900 "Instrumentation and Control for HVAC."
3) Room Sensor: Wall mounted, with temperature set-point adjustment and access for connection of portable operator terminal.

3. HANGERS AND SUPPORTS
   a. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.
   b. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.
   c. Steel Cables: [Galvanized steel complying with ASTM A 603] [Stainless steel complying with ASTM A 492].
   d. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.
   e. Air Terminal Unit Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
   f. Trapeze and Riser Supports: Steel shapes and plates for units with steel casings; aluminum for units with aluminum casings.

4. SEISMIC-RESTRAINT DEVICES

   a. General Requirements for Restraint Components: Rated strengths, features, and applications shall be as defined in reports by [an evaluation service member of the ICC Evaluation Service.

1) Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least [four] times the maximum seismic forces to which they will be subjected.

b. Channel Support System: Shop- or field-fabricated support assembly made of slotted steel channels rated in tension, compression, and torsion forces and with accessories for attachment to braced component at one end and to building structure at the other end. Include matching components and corrosion-resistant coating.

c. Restraint Cables:ASTM A 492, stainless-steel cables with end connections made of cadmium-plated steel assemblies with brackets, swivel, and bolts designed for restraining cable service; with an automatic-locking and clamping device or double-cable clips.

d. Hanger Rod Stiffener: [Steel tube or steel slotted-support-system sleeve with internally bolted connections] [Reinforcing steel angle clamped] to hanger rod.

e. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

7. SOURCE QUALITY CONTROL

a. Factory Tests: Test assembled air terminal units according to ARI 880.
1) Label each air terminal unit with plan number, nominal airflow, maximum and minimum factory-set airflows, [coil type,] and ARI certification seal.

C. EXECUTION

1. INSTALLATION
a. Install air terminal units according to NFPA 90A, "Standard for the Installation of Air Conditioning and Ventilating Systems."
b. Install air terminal units level and plumb. Maintain sufficient clearance for normal service and maintenance.
c. Install wall-mounted thermostats.

2. HANGER AND SUPPORT INSTALLATION
a. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."
b. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
1) Where practical, install concrete inserts before placing concrete.

2) Install powder-actuated concrete fasteners after concrete is placed and completely cured.
3) Use powder-actuated concrete fasteners for standard-weight aggregate concretes and for slabs more than 4 inches (100 mm) thick.
4) Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes and for slabs less than 4 inches (100 mm) thick.
5) Do not use powder-actuated concrete fasteners for seismic restraints.

c. Hangers Exposed to View: Threaded rod and angle or channel supports.
d. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3. SEISMIC-RESTRAINT-DEVICE INSTALLATION

a. Install hangers and braces designed to support the air terminal units and to restrain against seismic forces required by applicable building codes. Comply with [SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical Systems."] [ASCE/SEI 7.]
b. Select seismic-restraint devices with capacities adequate to carry present and future static and seismic loads.
c. Install cables so they do not bend across edges of adjacent equipment or building structure.
d. Install cable restraints on air terminal units that are suspended with vibration isolators.
e. Install seismic-restraint devices using methods approved by [an evaluation service member of the ICC Evaluation Service] [the Office of Statewide Health Planning and Development for the State of California] [an agency acceptable to authorities having jurisdiction].
f. Attachment to Structure: If specific attachment is not indicated, anchor bracing and restraints to structure, to flanges of beams, to upper truss chords of bar joists, or to concrete members.
g. Drilling for and Setting Anchors:

1) Identify position of reinforcing steel and other embedded items before drilling holes for anchors. Do not damage existing reinforcement or embedded items during drilling. Notify the Architect if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
2) Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3) Wedge Anchors: Protect threads from damage during anchor installation. Install heavy-duty sleeve anchors with sleeve fully

engaged in the structural element to which anchor is to be fastened.

4) Set anchors to manufacturer's recommended torque, using a torque wrench.

5) Install zinc-coated steel anchors for interior applications and stainless-steel anchors for applications exposed to weather.

4. CONNECTIONS

a. Install piping adjacent to air terminal unit to allow service and maintenance.

b. Hot-Water Piping: In addition to requirements in Section 232113 "Hydronic Piping" and Section 232116 "Hydronic Piping Specialties,"Section 15179 "Hydronic Piping Specialties," connect heating coils to supply with shutoff valve, strainer, control valve, and union or flange; and to return with balancing valve and union or flange.

c. Connect ducts to air terminal units according to [Section 233113 "Metal Ducts."] [Section 233116 "Nonmetal Ducts."]

d. Make connections to air terminal units with flexible connectors complying with requirements in Section 233300 "Air Duct Accessories."

5. IDENTIFICATION

a. Label each air terminal unit with plan number, nominal airflow, and maximum and minimum factory-set airflows. Comply with requirements in Section 230553 "Identification for HVAC Piping and Equipment" for equipment labels and warning signs and labels.

6. FIELD QUALITY CONTROL

a. Perform tests and inspections.

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

b. Tests and Inspections:

1) After installing air terminal units and after electrical circuitry has been energized, test for compliance with requirements.

2) Leak Test: After installation, fill water coils and test for leaks. Repair leaks and retest until no leaks exist.

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

4) Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

c. Air terminal unit will be considered defective if it does not pass tests and inspections.

d. Prepare test and inspection reports.

7. STARTUP SERVICE

a. Perform startup service.
1) Complete installation and startup checks according to manufacturer's written instructions.
2) Verify that inlet duct connections are as recommended by air terminal unit manufacturer to achieve proper performance.
3) Verify that controls and control enclosure are accessible.
4) Verify that control connections are complete.
5) Verify that nameplate and identification tag are visible.
6) Verify that controls respond to inputs as specified.

8. DEMONSTRATION
a. [Engage a factory-authorized service representative to train] [Train] Owner's maintenance personnel to adjust, operate, and maintain air terminal units.

2.14 LABORATORY AIRFLOW CONTROL SYSTEM

A. GENERAL

1. Description

a. A laboratory airflow control system shall be furnished and installed to control the airflow into and out of laboratory rooms. The exhaust flow rate of a laboratory fume hood shall be maintained at a constant average face velocity into the fume hood at a standard/in-use mode (100 fpm). The laboratory airflow control system shall vary the amount of make- up/supply air into the room to operate the laboratories at the lowest possible airflow rates necessary to maintain temperature control, achieve minimum ventilation rates, and maintain laboratory pressurization in relation to adjacent spaces (positive or negative). The laboratory airflow control system shall be capable of operating as a standalone system or as a system integrated with the Building Automation System (BAS).

b. The complete airflow control valves and associated control devices specified in this section are to be furnished by the Automatic Temperature Control (ATC) Contractor. The HVAC Contractor will install the airflow control valves. All wiring or installation of any other components associated with the laboratory monitoring and control are by ATC Contractor. Airflow valves and control components shall be furnished and installed to control the airflow into and out of the laboratories.

c. The plans and specifications for the laboratory airflow control system

are based on systems and equipment manufactured by Siemens Controls.

d. The laboratory airflow control systems shall be by Siemens including the fume hood controls, sash sensors, exhaust air valves (EAV-1 & 2). The building control system contractor shall integrate the laboratory air valves supply, general exhaust and fume hood exhaust air valve including the fume hood controls as part of turnkey package.

e. The fume hood is furnished by Owner, the installation is by general contractor, sheet metal control including installation of air valve shall be Mechanical contractor and control is by the BCS or ATC.

f. Siemens shall control the supply air, general exhaust, and other non-fume hood controls including temperature and humidity control using Siemens products.

2.15 SEQUENCE OF OPERATION

A. Lab 125 Sequence of Operation

1. The laboratory control system shall maintain a negative pressure (by cfm offset) within the lab relative to the corridor, independent of fume hood sash position or supply or exhaust system fluctuations, the bms shall totalize the exhaust and supply cfm values and then maintain a 100 cfm (adjustable) offset between the supply & exhaust.

2. There shall be an “in use” mode and a “stand-by” mode. When the zone presence sensor is activated (in-use mode), the fume hood operates at 100 fpm face velocity. When the zone presence sensor is de-activated (stand-by mode) the fume hood operates at 60 fpm face velocity.

3. Horizontal and vertical sash sensors shall send a resistance signal to the fume hood controller to maintain fume hood face velocity based on calculated area. The exhaust volume will vary dependent on sash position and the supply air valve will vary to maintain air volume offset between supply and exhaust to maintain required negative pressure relative to the corridor.

4. Reheat coils on the leaving side of the supply air valves shall control space temperature at all air volume set points.

5. Discharge air temperature shall be measured and inputted into the bms for indication only.

B. VAV Terminal Units (corridor

1. VAV terminal units (i.e. “boxes”) shall modulate in response to space temperature conditions.
2. Upon a rise in space temperature, the VAV box damper shall modulate open.
3. Upon a drop in space temperature, the VAV box dampers shall modulate to its minimum close position and stop.
4. Upon a further drop in space temperature the VAV fan shall be energized and the 2-way hot water valve shall modulate to maintain space heating set point.

PART 3 - EXECUTION

3.01 DEMOLITION

A. General

1. The Contractor shall completely familiarize himself with all existing building and site conditions and limitations which may have a bearing on the operations herein specified, and shall include all work required to complete the project as shown on the drawings and be required by the specifications. No extra compensation will be allowed for unforeseen conditions that can be determined from a careful examination of the site, building, drawings and specifications.

2. Items of value which are not indicated to be returned to the Owner shall become the property of the Contractor. Storage or sale of the items on the project site is prohibited.

3. Protection: Ensure the safe passage of persons in and around the building during demolition. Prevent injury to persons and damage to property. Provide adequate shoring and bracing to prevent collapse. Immediately repair damaged property to the condition before being damaged. Take effective measures to prevent windblown dust.

4. Utilities: Maintain all utilities except those requiring removal or relocation. Keep utilities in service and protect from damage. Do not interrupt utilities serving used areas without first obtaining permission from the utility company and the Owner. Provide temporary services as required.

B. Regulators Requirements

Strictly comply with applicable codes, regulations and requirements of authority having jurisdiction.

C. Handling of Materials

Remove salvage and debris from the site as it accumulates. Do not store, sell, burn, or otherwise dispose of debris on site. Remove all materials in such manner as to prevent spillage. Keep all pavements and areas adjacent to and leading from the site, clean and free of mud, dirt, and debris at all times.

D. Inspections

Prior to commencement of selective demolition work, inspect areas in which work will be performed. Photograph existing conditions to structure surfaces, equipment or to

surrounding properties which could be mis-constructed as damage resulting from selective demolition work; file with Owner's Representative prior to starting work.

E. Transfer of Responsibility and Disposition of Materials

Upon receipt of notice to proceed with the work, the tile to all materials for demolition shall be vested in the Contractor whereupon the Owner will not be responsible for the condition, loss, or damage to said property.

F. Disposal of Demolished Materials

Remove unused fixture and all piping servicing fixture including abandoned piping not associated with said fixture. Remove piping back to the next live branch will not obstruct the new work. Transport and legally dispose of materials off site.

G. Clean-up and Repair

1. Upon completion of demolition work, remove tools, equipment and demolished materials from site. Remove protections and leave interior areas broom clean.

2. Repair demolition performed in excess of that required. Return structures and surfaces to remain in condition existing prior to commencement of selective demolition work. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

3.02 INSTALLATION OF PIPING INSULATION

A. Install insulation products in accordance with manufacturer's written instructions, and in accordance with recognized industry practices to ensure that insulation service its intended purpose.

B. Install insulation on pipe systems subsequent to installation of heat tracing, painting, testing, and acceptance of tests.

C. Install insulation materials with smooth and even surfaces. Insulate each continuous run of piping with full-length units of insulation, with single cut piece to complete run. Do not use cut pieces or scraps abutting each other.

D. Clean and dry pipe surfaces prior to insulating. Butt insulation joints firmly together to ensure complete and tight fit over surfaces to be covered.

E. Maintain integrity of vapor-barrier jackets on pipe insulation, and protect to prevent puncture or other damage.

F. Cover valves, fittings and similar items in each piping system with equivalent thickness and composition of insulation as applied to adjoining pipe run. Install factory molded, precut or job fabricated units (at Installer's option) except where specific form or type is

indicated.

G. Extend piping insulation without interruption through walls, floors and similar piping penetrations, except where otherwise indicated.

H. Butt pipe insulation against pipe hanger insulation inserts. For hot pipes, apply 3 inch wide vapor barrier tape or band over the butt joints. For cold piping apply wet coat of vapor barrier lap cement on butt joints and seal joints with 3 inch wide vapor barrier tape or band.

3.03 INSTALLATION OF DUCTWORK INSULATION

A. Install insulation products in accordance with manufacturer's written instructions, and in accordance with recognized industry practices to ensure that insulation serves its intended purpose.

B. Install insulation materials with smooth and even surfaces.

C. Clean and dry ductwork prior to insulating. Butt insulation joints firmly together to ensure complete and tight fit over surfaces to be covered.

D. Maintain integrity of vapor-barrier on ductwork insulation, and protect it to prevent puncture and other damage.

E. Extend ductwork insulation without interruption through walls, floors and similar ductwork penetrations, except where otherwise indicated.

F. Lined Ductwork

1. Except as otherwise indicated, omit insulation on ductwork where internal insulation or sound absorbing linings have been installed.

G. Ductwork Exposed to Weather

1. Protect outdoor insulation from weather by installing outdoor protective finish or jacketing as recommended by manufacturer.

H. Corner Angles

1. Except for oven and hood exhaust duct insulation, install corner angles on external corners of insulation on ductwork to exposed finished spaces before covering with jacketing.

3.04 INSTALLATION OF EQUIPMENT INSULATION

A. Install equipment thermal insulation products in accordance with manufacturer's written instructions, and in compliance with recognized industry practices to ensure

that insulation serves intended purpose.

B. Install insulation materials with smooth and even surfaces and on clean and dry surfaces. Redo poorly fitted joints. Do not use mastic or joint sealer as filler for gapping joints and excessive voids resulting from poor workmanship.

C. Maintain integrity of vapor-barrier on equipment insulation and protect it to prevent puncture and other damage.

D. Do not apply insulation to equipment, breechings, or stacks while hot.

E. Apply insulation using staggered joint method for both single and double layer construction, where feasible. Apply each layer of insulation separately.

F. Coat insulated surfaces with layer of insulating cement, trowelled in workmanlike, manner, leaving smooth continuous surface. Fill in scored block, seams, chipped edges and depressions, and cover over wire netting and joints with cement of sufficient thickness to remove surface irregularities.

G. Cover insulated surfaces with all service jacketing neatly fitted and firmly secured. Lap seams at least 2 inches. Apply over vapor barrier where applicable.

H. Do not insulate boiler manholes, handholes, cleanouts, ASME stamp, and manufacturer's nameplate. Provide neatly beveled edge at interruptions of insulation.

I. Provide removable insulation sections to cover parts of equipment which must be opened periodically for maintenance; include metal vessel covers, fasteners, flanges, frames and accessories.

J. Equipment Exposed to Weather

1. Protect outdoor insulation from weather by installation of weather-barrier mastic protective finish, or jacketing, as recommended by manufacturer.

3.05 SYSTEM TESTING, ADJUSTING, AND BALANCING

A. Summary

1. Testing, adjusting and balancing (TAB) of the air conditioning systems and related ancillary equipment will be performed by an impartial technically qualified TAB firm.

2. The firm shall be capable of performing the services specified at the location of the facility described within the time specified, of preparing and submitting the detailed report of the actual field work performed, and following up the basic work as may be required.

B. Qualifications

1. The Firm shall be one which is organized to provide professional services of this specified type in the State of Massachusetts.

2. The Firm shall have operated a minimum of five (5) years under its current Firm name, and shall be in good standing with the State of MA. The firm shall submit their full incorporated name, Charter Number and Taxpayer's I.D. Number for proper verification of the firm's status.

3. The Firm shall be capable of providing a performance bond, by a bonding company licensed to do business in the State of MA, if determined by the Owner that such a bond is required. The amount of the bond which may be required shall be equal to the cost of the proposal submitted, or in the case of more than one proposal, the sum of all such proposals and any awarded work in progress.

4. All personnel used on the job site shall be either professional engineers or engineering technicians, who shall have been permanent, full time employees of the firm for a minimum of six (6) months prior to the start of work for this specific project.

5. The TAB firm shall submit biographical data on the individual proposed to directly supervise the TAB work, as well as other personnel scheduled to perform the technical work under the contract. It shall also submit a background record of at least five years of specialized experience in the field of air and hydronic system balancing, and shall possess properly calibrated instrumentation. The supervisory personnel for the TAB firm shall be registered engineers in the mechanical field and all of the employees used in the TAB firm shall be permanent, full-time employees of the firm.

C. References

1. AABC - National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems, Sixth Edition 2002.

2. ASHRAE - 2011 HVAC Applications Chapter 38: Testing, Adjusting and Balancing.

3. ANSI/ASHRAE Standard 111 – 2008 - Practices for Measurement, Testing, Adjusting and Balancing of Buildings, Heating, Ventilation, Air Conditioning and Refrigeration Systems.

D. Documents

1. The TAB firm shall, as a requirement of the TAB contract, arrange with the

Architect / Owner / Engineer to compile one set of mechanical, specifications, all pertinent change orders, and the following:

a. One complete set of Drawings less the structural sheets.
b. One set of mechanical floor plans of the conditioned spaces. These Drawings shall be ozalid type (blue or black on light background) reproductions to facilitate marking.

2. Approved submittal data on equipment installed, and related changes as required to accomplish the test procedures outlined in Paragraphs 1.06 through 1.10 of this Specification will be available through the Construction Supervisor.

E. Responsibilities of the Tab Firm

1. The TAB personnel shall check, adjust, and balance the components of the air conditioning system which will result in optimal noise, temperature, and airflow conditions in the conditioned spaces of the building while the equipment of the system is operating economically. This is intended to be accomplished after the system components are installed and operating as provided for in the contract documents. It is the responsibility of the Mechanical Contractor to place the equipment into service. Variable air volume systems shall be balanced in accordance with AABC 1989 Standard, Fifth Edition.

2. Liaison and Early Inspection

a. The TAB firm personnel on the job shall act as liaison between the Owner, Architect and Contractor. The following reviews (observations) and tests shall be performed by the TAB Agency:

1) During the design stage, before the documents are finalized, review the mechanical drawings and specifications for balanceability and provide commentary.
2) During construction, review all HVAC submittals such as control diagrams, air handling devices, etc., that pertain to commissioning work and balanceability.
3) Allow for a fixed number of trips to the project site, over and above those required for testing and balancing for inspection of installation of the mechanical piping systems, sheet metal work, temperature controls and other component parts of the heating, air conditioning and ventilating systems during the construction stage. These inspections shall be made prior to and/or at the above ceiling inspection. Commentary will be provided for each observation.
4) Test one (1) of each specified type of terminal box for performance capability and leakage. The shipment of the box to the TAB Agency's lab will be at the manufacturer's cost and the test period will be for three (3) weeks from receipt of the

box. Submittal data will not be approved until box testing passes. If the sample box is rejected for any reason the second test will be at the Contractor's cost and the time allowed will restart when the box is received at the TAB Agency.

5) Test 10% of each specified terminal boxes type for casing and damper leakage when the shipment arrives at the project site. All testing (except for the initial boxes) shall be performed on site. Boxes requiring re-testing will be charged to the Contractor at the unit price provided to the Owner.

6) Test one (1) lab configuration including fume hood with air valve, general exhaust air with air valve and supply air with air valve for performance capability through a full range of inlet pressures. The tracking capability of the exhaust air versus the supply air will be with the submitted hood sash fully open and as the sash is closed in 2" increments until fully closed. Track the three (3) valve's response time in relation to sash movement and the lab differential.

b. During the balancing process, as abnormalities and malfunctions of equipment or components are discovered by the TAB personnel, the Construction Supervisor shall be advised in writing so that the condition can be corrected by the Mechanical Contractor. The written document need not be formal, but must be understandable and legible. Data from malfunctioning equipment shall not be recorded in the final TAB report. The TAB firm shall not instruct or direct the Contractor in any of the work, but will make such reports as are necessary to the Owner.

F. Final Air Balance

1. General: When systems are complete and ready for operation, the TAB Consultant will perform a final air balance for all air systems and record the results. The outside, supply, exhaust and return air volume for each air handling unit, supply fan and exhaust fan and the supply, exhaust or return air volume for each distribution device shall be adjusted to within +5% of the value shown on the drawings. Air handling unit and fan volumes shall be adjusted by changing fan speed and adjusting volume dampers associated with the unit. Air distribution device volume shall be adjusted using the spin-in tap damper for flexible duct connected devices and the device OBD for duct connected devices. Air distribution devices shall be balanced with air patterns as specified. Duct volume dampers shall be adjusted to provide air volume to branch ducts where such dampers are shown. The general scope of balancing by the TAB Consultant will include, but is not limited to, the following:

a. Filters: Check air filters and filter media and balance only system with essentially clean filters and filter media. The Contractor shall install new filters and filter media prior to the final air balance.

b. Blower Speed: Measure RPM at each fan or blower to design requirements. Where a speed adjustment is required, the Contractor shall make any required changes.

c. Ampere Readings: Measure and record full load amperes for motors.

d. Static Pressure: Static pressure gains or losses shall be measured across each supply fan, cooling coil, heating coil, return air fan, air handling unit filter and exhaust fan. These readings shall be measured and recorded for this report at the furthest air device or terminal unit from the air handler supplying that device. Static pressure readings shall also be provided for systems which do not perform as designed.

e. Equipment Air Flow: Adjust and record exhaust, return, outside and supply air CFM (s) and temperatures, as applicable, at each fan, blower and coil.

f. Coil Temperatures: Set controls for full cooling and for full heating loads. Read and record entering and leaving dry bulb and wet bulb temperatures (cooling only) at each cooling coil, heating coil and HVAC terminal unit. At the time of reading record water flow and entering and leaving water temperatures (In variable flow systems adjust the water flow to design for all the above readings).

g. Zone Air Flow: Adjust each zone of multi-zone units, each HVAC terminal unit and air handling unit for design CFM.

h. Outlet Air Flow: Adjust each exhaust inlet and supply diffuser, register and grille to within +5% of design air CFM. Include all terminal points of air supply and all points of exhaust. Note: For Labs and Rooms that are negative exhaust air flow shall be set to design +10% and supply to design -5%. Positive areas will have opposite tolerances.

i. Pitot Tube Traverses: For use in future troubleshooting by maintenance personnel, all exhaust ducts, main supply ducts and return ducts shall have air velocity and volume measured and recorded by the traverse method. Locations of these traverse test stations shall be described on the sheet containing the data.

j. Maximum and minimum air flow on terminal boxes.

G. Final Heating Hot Water Balance

1. General: When systems are completed and ready for operation, the TAB Consultant will perform a final water balance for each chilled and hot water system. The general scope of balancing by the TAB Consultant will include, but not be limited to, the following:

a. Adjusted System Tests: Adjust balancing valves at each coil and heat exchanger for design flow, +5%. Adjust balancing valves at pumps to obtain design water flow. Record pressure rise across pumps and GPM flow from pump curve. Permanently mark the balanced position for each valve (Note: If discharge valves on the pumps are used for balancing record the head being restricted by the valves).

b. Temperature Readings: Read and record entering and leaving water temperature at each water coil, converter and heat exchanger. Adjust as necessary to secure design and conditions. Provide final readings at all thermometer well locations.

c. Pressure Readings: Water pressure shall be recorded at all gauge connections. Pressure readings at coils and pumps shall be related to coil and pump curves in terms of GPM flow through flow measuring status, if provided and installed, at each air handler. The flow of water through all water coils shall be adjusted by manipulating valves until the rated pressure drops across each coil is obtained and total water flow is verified by flow measuring status. For coils equipped with 3-way valves, the rated pressure drop shall first be adjusted through the coils. The bypass valve shall then be adjusted on each coil until an equal pressure drop between supply and return connections is the same as with the flow through the coil.

d. Ampere Readings: Reading and record full load amperes for each pump motor.

H. Sound Vibration and Alignment

1. Sound: Read and record sound levels at up to 15 locations in the building designated by the Engineer. All measurements shall be made using an Octave Band Analyzer. All tests shall be conducted when the building is quiet in the presence of the Engineer, if he so desires.

2. Vibration: Read and record vibration for all water circulating pumps, air handling units, and fans which have motors larger than 10 HP. Include equipment vibration, bearing housing vibration, foundation vibration, building structure vibration, and other tests as directed by the Engineer. Readings will be made using portable IRD (or approved equal) equipment capable of filtering out various unwanted frequencies and standard reporting forms. Maximum vibration at any point listed above, or specified, shall not exceed 1 mil on fans and 1 mil on pumps unless otherwise specified. Equipment manufacturers shall rectify all systems exceeding vibration tolerances.

I. Testing of Temperature Control Systems

1. In the process of performing the TAB work, the TAB Agency, in the presence of

the owner's representative, shall:

a. Work with the temperature control contractor to ensure the most effective total system operation within the design limitations, and to obtain mutual understanding of intended control performance.
b. Verify that all control devices are properly connected.
c. Verify that all dampers, valves and other controlled devices are operated by the intended controller.
d. Verify that all dampers and valves are in the position indicated by the controller (open, closed or modulating).
e. Verify the integrity of valves and dampers in terms of tightness of close-off and full-open positions. This includes dampers in multi-zone units, terminal boxes and fire/smoke dampers.
f. Observe that all valves are properly installed in the piping system in relation to direction of flow and location.
g. Observe the calibration of all controllers.
h. Verify the proper application of all normally opened and normally closed valves.
i. Observe the locations of all thermostats and humidistats for potential erratic operation from outside influences such as sunlight, drafts or cold walls.
j. Observe the locations of all sensors to determine whether their position will allow them to sense only the intended temperatures or pressures of the media. Control Contractor will relocate as deemed necessary by the TAB Agency.
k. Verify that the sequence of operation for any control mode is in accordance with approved shop drawings and specifications. Verify that no simultaneous heating and cooling occurs.
l. Verify that all controller setpoints meet the design intent.
m. Check all dampers for free travel.
n. Verify the operation of all interlock systems.
o. Perform variable volume system verification to assure the system and its components track with changes from full flow to minimum flow.

2. A systematic listing of the above testing and verification shall be included in the final TAB report.

J. Reports

1. The activities described in this section shall culminate in a report to be provided in quadruplicate (4) individually bound. Neatly type and arrange data. Include with the data the date tested, personnel present, weather conditions, nameplate record of test instrument and list all measurements taken after all corrections are made to the system. Record all failures and corrective action taken to remedy incorrect situation. The intent of the final report is to provide a reference of actual operating conditions for the Owner's operations personnel.

2. All measurements and recorded readings (of air, water, electricity, etc.) that

appear in the reports must have been made onsite by the permanently employed technicians or engineers of the firm.

3. At the option of the Construction Supervisor, all data sheets tabulated each day by TAB personnel shall be submitted for initial by the Construction Inspector. Those work sheets so initialed, or copies thereof, shall be presented as a supplement to the final TAB report.

4. Submit reports on forms approved by the Owner & Engineer which will include the following information as a minimum:

   a. Title Page

      1) Company Name
      2) Company Address
      3) Company telephone number
      4) Project name
      5) Project location
      6) Project Manager
      7) Project Engineer
      8) Project Contractor
      9) Project Identification Number

   b. Instrument List

      1) Instrument
      2) Manufacturer
      3) Model
      4) Serial Number
      5) Range
      6) Calibration date
      7) What test instrument was used for

   c. Fan Data (Supply and Exhaust)

      1) Location
      2) Manufacturer
      3) Model
      4) Air flow, specified and actual
      5) Total static pressure (total external), specified and actual
      6) Inlet pressure
      7) Discharge pressure
      8) Fan RPM

   d. Return Air/Outside Air Data (If fans are used, same data as for 3 above)

      1) Identification/location

2) Design return air flow
3) Actual return air flow
4) Design outside air flow
5) Return air temperature
6) Outside air temperature
7) Required mixed air temperature
8) Actual mixed air temperature

e. Electric Motors

1) Manufacturer
2) HP/BHP
3) Phase, voltage, amperage, nameplate, actual
4) RPM
5) Service factor
6) Starter size, heater elements, rating

f. V-Belt Drive

1) Identification/location
2) Required driven RPM
3) Driven sheave, diameter and RPM
4) Belt, size and quantity
5) Motor sheave, diameter and RPM
6) Center-to-center distance, maximum, minimum and actual

g. Duct Traverse

1) System zone/branch
2) Duct size
3) Area
4) Design velocity
5) Design air flow
6) Test velocity
7) Test air flow
8) Duct static pressure
9) Air temperature
10) Air correction factor

h. Air Monitoring Station Data

1) Identification/location
2) System
3) Size
4) Area
5) Design velocity
6) Design air flow

7) Test velocity
8) Test air flow

i. Air Distribution Test Sheet

1) Air terminal number
2) Room number/location
3) Terminal type
4) Terminal size
5) Area factor
6) Design velocity
7) Design air flow
8) Test (final) velocity
9) Test (final) air flow

j. Pump Data

1) Identification/number
2) Manufacturer
3) Size/model
4) Impeller
5) Service
6) Design flow rate, pressure drop, BHP
7) Actual flow rate, pressure drop, BHP
8) Discharge pressure
9) Suction pressure
10) Total operating head pressure
11) Shut off, discharge and suction pressure
12) Shut off, total head pressure
13) Pressure differential settings

k. Cooling Coil Data

1) Identification/number
2) Location
3) Service
4) Manufacturer
5) Entering air DB temperature, design and actual
6) Entering air WB temperature, design and actual
7) Leaving air DB temperature, design and actual
8) Leaving air WB temperature, design and actual
9) Water pressure flow, design and actual
10) Water pressure drop, design and actual
11) Entering water temperature, design and actual
12) Leaving water temperature, design and actual
13) Air pressure drop, design and actual

l. Heating Coil Data

1) Identification/number
2) Location
3) Service
4) Manufacturer
5) Air flow, design and actual
6) Water flow, design and actual
7) Water pressure drop, design and actual
8) Entering water or steam temperature, design and actual
9) Leaving water temperature, design and actual
10) Entering air temperature, design and actual
11) Leaving air temperature, design and actual
12) Air pressure drop, design and actual

m. Sound Level Report

1) Location (Location established by the design engineer)
2) NC curve for eight (8) bands - equipment off
3) NC curve for eight (8) bands - equipment on

n. Vibration Test on equipment having 10 HP motors or above

1) Location of Points

a) Fan bearing, drive end
b) Fan bearing, opposite end
c) Motor bearing, center (if applicable)
d) Motor bearing, drive end
e) Motor bearing, opposite end
f) Casing (bottom or top)
g) Casing (side)
h) Duct after flexible connection (discharge)
i) Duct after flexible connection (suction)

2) Test Readings

a) Horizontal, velocity and displacement
b) Vertical, velocity and displacement
c) Axial, velocity and displacement

3) Normally acceptable readings, velocity and acceleration
4) Unusual conditions at time of test
5) Vibration source (if non-complying)

o. Control verification indicating date performed and any abnormalities identified.

1) Point Location/Description
2) EMS Readout (Setpoint and Actual)
3) Actual Readout
4) Interlocks
5) Safeties
   a) VSD Normal Operation
   b) VSD Bypass Operation

6) Alarms
7) Sequences of Operation

3.06 CLEANING AND PROTECTING

A. It shall be this trade's responsibility to store his materials in a manner that will maintain an orderly clean appearance. If stored on-site in open or unprotected areas, all equipment and material shall be kept off the ground by means of pallets or racks, and covered with tarpaulins.

3.07 VIBRATION CONTROL AND SEISMIC RESTRAINT

A. General

1. All vibration isolators and seismic restraint systems must be installed in strict accordance with the manufacturers written instructions and all certified submittal data. At the completion of all construction work the vibration and seismic device supplier shall inspect all installations and provided a written report of installation compliance to the engineer of record. A copy of this written certification shall also be provided in the operations manual provided to the owner.

2. Installation of vibration isolators and seismic restraints must not cause any change of position of equipment, piping or duct work resulting in stresses or misalignment.

3. No rigid connections between equipment and the building structure shall be made that degrades the noise and vibration control system herein specified.

4. The contractor shall not install any equipment, piping, duct or conduit which makes rigid connections with the building unless isolation is not specified. "Building" includes, but is not limited to, slabs, beams, columns, studs and walls.

5. Coordinate work with other trades to avoid rigid contact with the building.

6. Any conflicts with other trades which will result in rigid contact with equipment or piping due to inadequate space or other unforeseen conditions should be

brought to the architects/engineers attention prior to installation. Corrective work necessitated by conflicts after installation shall be at the responsible contractor's expense.

7. Bring to the architects/engineers attention any discrepancies between the specifications and the field conditions or changes required due to specific equipment selection, prior to installation. Corrective work necessitated by discrepancies after installation shall be at the responsible contractor's expense.

8. Correct, at no additional cost, all installations which are deemed defective in workmanship and materials at the contractor's expense.

9. Overstressing of the building structure must not occur because of overhead support of equipment. Contractor must submit loads to the structural engineer of record for approval. Generally bracing may occur from:

   a. Flanges of structural beams.
   b. Upper truss cords in bar joist construction.
   c. Cast in place inserts or wedge type drill-in concrete anchors.

10. Specification 12 cable restraints shall be installed slightly slack to avoid short circuiting the isolated suspended equipment, piping or conduit.

11. Specification 12 cable assemblies are installed taut on non-isolated systems. Specification 13 seismic solid braces may be used in place of cables on rigidly attached systems only.

12. At locations where specification 12 or 13 restraints are located, the support rods must be braced when necessary to accept compressive loads with specification 14 braces.

13. At all locations where specification 12 or 13 restraints are attached to pipe clevis's, the clevis cross bolt must be reinforced with specification type 15 braces.

14. Drill-in concrete anchors for ceiling and wall installation shall be specification type 18, and specification type 19 female wedge type for floor mounted equipment.

15. Vibration isolation manufacturer shall furnish integral structural steel bases as required. Independent steel rails are not permitted on this project.

16. Hand built elastomeric expansion joints may be used when pipe sizes exceed 24" or specified movements exceed specification 23 capabilities.

17. Where piping passes through walls, floors or ceilings the vibration isolation manufacturer shall provide specification 27 wall seals.

18. Air handling equipment and centrifugal fans shall be protected against excessive

displacement which results from high air thrust in relation to the equipment weight. Horizontal thrust restraint shall be specification type 28.

19. Locate isolation hangers as near to the overhead support structure as possible.

B. Vibration Isolation of Piping

1. Where piping connects to rotating or vibrating mechanical equipment install specification 23 expansion joints or specification 24 stainless hoses if 23 is not suitable for the service.

2. Seismic Restraint of Piping

a. Seismically restrain all piping listed as a, b or c below. Use specification 12 cables.

1) Fuel oil piping, gas piping, medical gas piping, and compressed air piping.
2) Piping located in boiler rooms, mechanical equipment rooms, and refrigeration equipment rooms that is 1 1/4" I.D. and larger.
3) All other piping 2 1/2" diameter and larger.

b. Transverse piping restraints shall be at 40' maximum spacing for all pipe sizes, except where lesser spacing is required to limit anchorage loads.
c. Longitudinal restraints shall be at 80' maximum spacing for all pipe sizes, except where lesser spacing is required to limit anchorage loads.
d. Where thermal expansion is a consideration, guides and anchors may be used as transverse and longitudinal restraints provided they have a capacity equal to or greater than the restraint loads in addition to the loads induced by expansion or contraction.
e. For fuel oil and all gas piping transverse restraints must be at 20' maximum and longitudinal restraints at 40' maximum spacing.
f. Transverse restraint for one pipe section may also act as a longitudinal restraint for a pipe section of the same size connected perpendicular to it if the restraint is installed within 24" of the elbow or TEE or combined stresses are within allowable limits at longer distances.
g. Hold down clamps must be used to attach pipe to all trapeze members before applying restraints in a manner similar to clevis supports.
h. Branch lines may not be used to restrain main lines.

C. Seismic Restraint of Ductwork

1. Seismically retrain all duct work with specification 12 or 13 restraints as listed below:

a. Restrain rectangular ducts with cross sectional area of 6 sq. ft. or larger.
b. Restrain round ducts with diameters of 28” or larger.
c. Restrain flat oval ducts the same as rectangular ducts of the same nominal size.

2. Transverse restraints shall occur at 30' intervals or at both ends of the duct run if less than the specified interval. Transverse restraints shall be installed at each duct turn and at each end of a duct run.

3. Longitudinal restraints shall occur at 60' intervals with at least one restraint per duct run. Transverse restraints for one duct section may also act as a longitudinal restraint for a duct section connected perpendicular to it if the restraints are installed within 4' of the intersection of the ducts and if the restraints are sized for the larger duct. Duct joints shall conform to SMACNA duct construction standards.

4. The ductwork must be reinforced at the restraint locations. Reinforcement shall consist of an additional angle on top of the ductwork that is attached to the support hanger rods. Ductwork is to be attached to both upper angle and lower trapeze.

5. A group of ducts may be combined in a larger frame so that the combined weights and dimensions of the ducts are less than or equal to the maximum weight and dimensions of the duct for which bracing details are selected.

6. Walls, including gypsum board non-bearing partitions, which have ducts running through them, may replace a typical transverse brace. Provide channel framing around ducts and solid blocking between the duct and frame.

D. Seismic Restraint Exclusions

1. Piping

   a. All piping less than 2 1/2” except for gas and fire protection piping.
   b. All piping in boiler and mechanical equipment rooms less than 1 1/4" I.D.
   c. All clevis or trapeze supported piping suspended from hanger rods where the point of attachment is less than the 12" in length from the structure to the structural connection of the clevis or trapeze.
   d. All PVC and fiberglass suspended waste or vent pipe 6" in diameter and smaller.

2. Ductwork

   a. Rectangular, square or oval ducts less than 6 sq. ft. in cross sectional area.
   b. Round duct less than 28" in diameter.
   c. Duct supported by hanger rods where the point of attachment is less than 12" in length from the structure to the structural connection of the duct work.

3. Electrical

a. All conduits less than 2 1/2" diameter suspended by individual hanger rods.
b. All clevis or trapeze supported conduits suspended by hanger rods where the point of attachment is less than 12" in length from the structure to the structural connection of the clevis or trapeze.

END OF SECTION

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ELECTRICAL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. All of the Contract Documents, including General and Supplementary conditions and Divisions 1 General requirements, apply to the work of this section.

B. Examine all Drawings and all other Sections of the Specifications for requirements affecting the work of this Section.

1.02 SCOPE

A. Provide all labor, materials, tools and equipment for the installation of the complete and fully operational electrical system as shown on the drawings and as specified herein.

B. The work includes, but is not limited to the following:

1. Interior secondary distribution systems including magnetic starters, overcurrent and switching devices, panelboards, raceways, cables, wiring, junction and pull boxes, wireways, and all other components required for complete electrical distribution system.
2. Feeders, branch circuit wiring and raceways.
3. Conduit, wire, boxes, fittings, hangers and supports.
4. Switches, receptacles, dimmers, special purpose outlets and wall plates.
5. Safety disconnects switches, non-fused and fused with fuses.
6. Lighting system including lamps, lenses, ballasts, devices, controls and exit signs.
7. Motor connections and controls.
8. Power connections to all mechanical, lab equipment, and any other equipment that requires power.
9. Nameplates on all electrical equipment and components.
10. Seal penetrations between foundation floors and walls with fire retardant material.
11. Obtain all permits and associated fees.
12. Testing of all electrical systems.
13. Coordination between electrical and other trades.
14. All other systems hereinafter specified or indicated on the Contract Drawings, complete, leaving ready an electrical system in perfect operating condition.

1.03 DEFINITIONS

A. As used in this Section, “provide” means “furnish and install” and “POS” means “Provided Under Other Sections”.

B. As used in the drawings and specifications for electrical work, certain non-technical words shall be understood to have specific meanings as follows regardless of indications to the contrary in the general conditions or other documents governing the electrical work.

"Furnish" Purchase and deliver to the project site complete with every necessary appurtenance and support, all as part of this work. Purchasing shall include payment of all sales taxes and other surcharges as may be required to assure that purchased items are free of all liens, claims or encumbrances.

"Install" Unload at the delivery point at the site and perform every operation necessary to establish secure mounting and correct operation at the proper location in the project, all as part of this work.

"Provide" "Furnish" and "Install".

"New" Manufactured within the past two years and never before used.

C. Except where modified by a specific notation to the contrary, it shall be understood that the indication and/or description of any electrical item in the drawings or specifications for electrical work carries with it the instruction to furnish, install and connect the item as part of the electrical work, regardless of whether or not this instruction is explicitly stated.

D. It shall be understood that the specifications and drawings for electrical work are complimentary and are to be taken together for a complete interpretation of the electrical work except that indications on the drawings, which refer to an individual element of work, take precedence over the specifications where they conflict with same.

1.04 WORK BY OTHERS

A. The following is related work specified elsewhere:

1. HVAC Equipment including providing individual motor starters, adjustable frequency drives, control wiring, variable speed switches and devices shall be provided by HVAC contractor.

2. Temperature control wiring by HVAC contractor.

3. Access panels, where required, are furnished by the General Contractor and coordinated with this section.

1.05 CODES, PERMITS, AND STANDARDS

A. Provide all permits and licenses. Obtain and pay all certificates of inspection as required by regulatory agencies and submit for approval.

B. All materials and equipment shall be new and designed, constructed, installed and

tested in accordance with the specification and the following standards:

1. National Electrical Code (NEC)
2. Occupational Safety and Health Act (OSHA)
3. National Fire Protection Association (NFPA)
4. Underwriters Laboratory (UL)
5. American National Standards Institute (ANSI)
6. National Electrical Manufacturers Association (NEMA)
7. Americans with Disabilities Act (ADA)
8. National Electric Safety Code (NESC)
9. NEC Article 110 – Flash Protection
10. International Building Code (IBC)
11. Rhode Island Fire Safety Code
12. Rhode Island College Standards

1.06 PROTECTION AND CLEANING

A. All electrical equipment and devices in the existing building in which the electrical work is to be done under Contract, shall be protected from damages, scratches, paint, cement, etc. until the work is completed.

B. Where electrical equipment and/or devices are indicated to be abandoned and the Owner elects to salvage specific items, said items should be delivered to storage on site at a location designated by the Owner.

C. Exposed surfaces of electrical equipment & lighting fixtures shall be cleaned upon completion of the work.

D. All debris and material resulting from electrical work shall be removed from the property each and every day and shall be disposed of in a legal manner. Workspace shall be left clean as electrical work is completed.

E. Damages to covers and trims of electrical equipment shall be repaired and painted with touch-up paint supplied by the equipment manufacturer to the satisfaction of the owner's designated representative or the Architect or the equipment shall be replaced with new.

1.07 SHOP DRAWINGS

A. Definitions

1. Shop Drawings are information prepared by the Contractor to illustrate portions of the work in more detail than shown in the Contract Documents.

2. Coordination Drawings are detailed, large-scale layout Shop Drawings showing HVAC, Electrical, Plumbing and Fire Protection work superimposed in order to

identify conflicts and ensure inter-coordination of Mechanical, Electrical, Architectural, Structural and other work.

B. Submittal Cover Sheet

1. Shop Drawings shall be submitted according to specification section with a separate cover sheet completed for each product, rather than one cover sheet for multiple products, whether or not supplied by one manufacturer or vendor.

C. Submittal Procedures and Format

1. Review submittal packages for compliance with the Contract Documents and then submit to Architect for review.

2. Provide additional copies of reviewed shop drawings as required for full distribution.

3. Shop Drawings showing layouts of systems shall contain sufficient plans, elevations, sections, details and schematics to describe work clearly. They shall be ¼" = 1' –0" scale unless specified otherwise. Sheet metal shop drawings shall be 3/8" = 1' –0 and shall indicate work of other sections where interferences are possible. Provide larger scale details as necessary. Sheet metal drawings shall show elements of Architects reflected ceiling plan, exposed ductwork, walls and partitions, diffusers, registers, grilles, fire dampers, sleeves and other aspects of construction as necessary for coordination.

4. ALL FIREWALLS AND SMOKE PARTIONS MUST BE HIGHLIGHTED ON THE SHEET METAL DRAWINGS FOR APPROPRIATE COORDINATION.

5. Shop drawings showing manufacturer's product data shall contain detailed dimensional drawings, accurate and complete description of construction materials, manufacturer's published performance characteristics and capacity ratings (performance data, alone, is not acceptable), electrical requirements and wiring diagrams. Drawings shall clearly indicate location (terminal block or wire number), voltage and function for all field terminations, and other information necessary to demonstrate compliance with all requirements of Contract Documents.

D. Acceptable Manufacturers

1. Alternate Manufacturers are acceptable only if, as a minimum, they:

a. Meet all performance criteria listed in the schedules and outlined in the specification.

b. Have identical operating characteristics to those called for in the specification.

c. Fit within the available space it was designed for, including space for maintenance and component removal, with no modification to either space or the product. Clearances to walls, ceilings and other equipment shall be at least equal to those shown on the design drawings.

d. For rooftop mounted equipment and for equipment mounted in areas where structural matters are a consideration, the products must have a weight no greater than the product listed in the schedules or specifications.

e. Products must adhere to all architectural considerations including, but not limited to: being of the same color as the product scheduled or specified, fitting within architectural enclosures and details, and for diffusers, lighting and plumbing fixtures-being the same size and of the same physical appearance as schedule or specified products.

E. Deviations

1. Concerning deviations other than substitutions, proposed deviations from Contract Documents shall be requested individually in writing whether deviations result from field conditions, standard shop practice, or other cause. Submit letter with transmittal of Shop Drawings, which flags the deviation to the attention of the Architect.

2. Without letters flagging the deviation to the Architect, it is possible that the Architect may not notice such deviation or may not realize its ramifications. Therefore, if such letters are not submitted to the Architect, the contractor shall hold the Architect and his consultants harmless for any and all adverse consequences resulting from the deviations being implemented. This shall apply regardless of whether the Architect has reviewed or approved shop drawings containing the deviation, and will be strictly enforced.

3. Approval of proposed deviations, if any, will be made at the discretion of the Architect.

F. Responsibility

1. Intent of Submittal review is to check for capacity, rating, and certain construction features. Contractor shall ensure that work meets requirements of Contract Documents regarding information that pertains to fabrication processes or means, methods, techniques, sequences and procedures of construction; and for coordination of work of this and other Sections. Work shall comply with submittals marked “REVIEWED” to extent that they agree with Contract Documents. Submittal review shall not diminish responsibility under this Contract for dimensional coordination, quantities, installation, wiring, supports and access for service, nor shop drawing errors or deviations from

requirements of Contract Documents. The Architect's noting of some errors while overlooking others will not excuse the contractor from proceeding in error. Contract Documents requirements are not limited, waived nor superseded in any way by review.

2. INFORM SUBCONTRACTORS, MANUFACURERS, SUPPLIERS, ETC. OF SCOPE AND LIMITED NATURE OF REVIEW PROCESS AND ENFORCE COMPLIANCE WITH CONTRACT DOCUMENTS.

3. It shall be the responsibility of the Contractor to review all drawings and specifications thoroughly during BID process. The contractor shall notify the Engineer/Architect via RFI (request for information) if any conflicts arise. Failure to identify the discrepancies during the BID process shall disqualify the Contractor for claiming any additional compensation.

4. Shop drawings for entire distribution system will not be submitted until after the completion of the Short Circuit Study. Equipment AIC rating shall match with the results of the study.

G. Schedule: Incorporate shop drawing review period into construction schedule so that work is not delayed. Contractor shall assume full responsibility for delays caused by not incorporating the following shop drawing review time requirements into his project schedule. Working days listed reference the time in the Engineer's office. It does not include transmittal time for review each time shop drawing is submitted or resubmitted.

H. List of Proposed Equipment and Materials

1. Within four weeks after Award of Contract and before ordering materials or equipment, submit complete list of proposed materials and equipment and indicate manufacturer's names and addresses. No consideration will be given to partial lists submitted out of sequence.

I. Submit shop drawings in pdf format and electronically for the following:

1. Circuit breakers and enclosures
2. Disconnect Switches
3. Conduit, wire, feeders, cables and branch circuit wiring
4. Manual motor starters
5. Wire ways, outlet boxes, covers
6. Switches, receptacles, special purpose devices and plates
7. Lighting fixtures and lamps

1.08 SUBMITTAL DOCUMENTATION REQUIREMENTS

A. Furnish documentation associated with this bid proposal and Contract including submittals, shop drawings, O&M manuals, and test reports as follows. These

requirements are in addition to submittal requirements stated elsewhere and shall not deprive the Owner of rights under other provisions of the Contract Documents.

1. Submit documents in portable document format (PDF).
2. Submit documents in AutoCAD - Latest version for Drawings and Microsoft Word (latest version) for text format when requested.

B. Provide a Compliance Review of each section of the Specifications, Drawings and Addenda. The Compliance Review shall be a paragraph-by-paragraph review of the Specifications with the following information; “C”, “D” or “E” marked in the margin of the original Specifications and any subsequent Addenda.

1. “C”: Comply with no exceptions.
2. “D”: Comply with deviations. For each and every deviation, provide a numbered footnote with reasons for the proposed deviation and how the intent of the Specification can be satisfied.
3. “E”: Exception, do not comply. For each and every exception, provide a numbered footnote with reasons and possible alternatives.

C. Unless a deviation or exception is specifically noted in the Compliance Review, it is assumed that the Bidder is in complete compliance with the plans and Specifications. Deviations or exceptions taken in cover letters, subsidiary documents, by omission or by contradiction do not release the Bidder from being in complete compliance, unless the exception or deviation has been specifically noted in the Compliance Review. Bidders may submit the latest state-of-the-art components and their standard control components in lieu of the specified items. The A/E and Owner will review deviations from the Specifications.

1.09 CONTINUITY OF SERVICES

A. Work under this section includes new work and work on existing systems within existing building. Perform such work so as not to interfere with the Owners operation. Where work necessitates interruption of service(s), schedule outages with the Owner and Engineer and perform the work at such time(s) as they shall direct. All shutdowns shall be conducted on off hours.

1.10 RECORD DRAWINGS

A. For the duration of the contract, the Electrical Contractor shall maintain a complete set of contract drawings. All completed work and all deviations from the contract documents shall be recorded clearly and accurately. Record drawings shall be turned over to the Owner upon completion of the work.

B. Electronic files are available to facilitate the preparation of Record Drawings. These files are solely for use of the Electrical Contractor and may not be a full representation of the Scope of work. These files are available from Wozny/Barbar & Associates, Inc.

1.11 COORDINATION

A. It shall be the responsibility of the Electrical Contractor to coordinate with all other trades and parties to avoid conflicts. No additional charges will be approved due to LACK OF COORDINATION OR FIELD VERIFICATION OF THE EXISTING CONDITIONS.

B. It shall be the responsibility of the Electrical Contractor to coordinate with all final connections of equipment with all sub-consultants including but not limited to plumbing, fire protection, mechanical, kitchen, pool, communication and security equipment and all other systems.

C. Refer to Architectural door hardware schedule for location of all low voltage devices.

1.12 TEMPORARY FACILITIES

A. The Electrical Contractor shall provide, at his own expense, his own field office. Furnish all tools, equipment, scaffolding and temporary construction required for the execution of the electrical work.

1.13 MECHANICAL AND ELECTRICAL COORDINATION

A. Heating and Ventilating Subcontractor shall furnish and install various electrical items relating to the heating and ventilating equipment and control apparatus. The Electrical Subcontractor shall be required to connect power wiring to this equipment unless noted otherwise.

B. The Heating and Ventilating and Electrical Subcontractors shall coordinate their respective portions of the work, as well as the electrical characteristics of the heating and ventilating equipment.

C. All power wiring and local disconnect switches will be provided by the Electrical Subcontractor for the line voltage power. All control and interlocking wiring shall be the responsibility of the Heating and Ventilating Subcontractor.

D. 120V and above power wiring sources extended and connected to heating and ventilating control panels, transformers and switches shall be the responsibility of the Electrical Subcontractor. All low voltage thermostat, zone valve and any switch wiring shall be the responsibility of the Heating and Ventilating Subcontractor.

E. Temperature control and equipment wiring shall be installed by the Heating and Ventilating Subcontractor.

F. The Electrical Subcontractor will provide all magnetic starters except those furnished as an integral part of packaged equipment.

1.14 COORDINATION DRAWINGS

A. Before materials are purchased or work begun, the Electrical Contractor shall prepare coordination drawings showing the size and location of electrical equipment and conduit runs and other equipment related to the electrical work.

B. Coordination drawings are for the General Contractor's and the Engineer's use during construction and shall not be construed as replacing any shop, as built or record drawings required elsewhere in this Contract Document.

1.15 OPERATING INSTRUCTIONS AND MAINTENANCE MANUALS

A. Instruct to the Owner's satisfaction such persons as the Owner designates, in the proper operation and maintenance of the systems and their parts.

B. Furnish operating and maintenance manuals and forward same to the Engineer for transmittal to the Owner.

C. Operating instructions shall be specific for each system and shall include copies of posted specific instructions.

D. For maintenance purposes, provide Shop Drawings, parts lists, specifications and manufacturer's maintenance bulletins for each piece of equipment.

E. Provide name, address and telephone number of the manufacturer's representative and service company for each piece of equipment so that service or spare parts can be readily obtained.

1.16 WORKMANSHIP

A. The entire work installed in this Specification and as shown on the drawings shall be constructed and finished in every respect in a workmanlike and complete manner. It is the responsibility of the Electrical Contractor to install complete systems. All such parts as required completing the systems in accordance with the best trade practice and the satisfaction of the Owner's Engineer shall be installed.

B. Obtain detailed information from the manufacturers of apparatus as to the proper method of installing and connecting equipment. Obtain all information from the General Contractor and other Subcontractors, which may be necessary to facilitate work and the completion of the whole project.

C. Remove daily, all rubbish and debris and all refuse from workmen's lunches and at completion remove all his surplus materials, and leave in clean condition acceptable to the Owner's Engineer.

1.17 EXAMINATION OF SITE AND CONTRACT DOCUMENTS

A. Before submitting prices or beginning work, thoroughly make an examination of the site.

B. No claim for extra compensation will be recognized if difficulties are encountered which an examination of site conditions prior to executing contract would have revealed.

C. These specifications along with contract documents describe the electrical systems. The Electrical Contractor is required to provide complete and operating systems for all equipment mentioned.

D. Electrical equipment required for the successful operation of any of the particular types of Owner's equipment mentioned shall be furnished and installed.

E. Be responsible for all materials delivered to the site in connection with the work and pay all charges for cartage, scaffolds, planking, rigging and erecting. Take every precaution necessary to protect equipment and installation in addition to plugging and protecting open ends of all pipes, outlet boxes, panel boxes, and junction boxes. All equipment shall be stored in a clean dry place to preserve the quality of material being used. Equipment and/or materials damaged during construction shall be replaced at no additional cost to the Owner. Any scaffolding over 8'-0" in height will be supplied by the General Contractor.

F. All materials and equipment required by this Specification shall be new, clean and free from defects at the time of installation. The Manufacturer and Underwriter's label shall appear on all material and equipment unless otherwise approved, in writing, by Owner.

1.18 SUBSTITUTION OF MATERIALS OR EQUIPMENT

A. If the Electrical Contractor wishes to use materials or equipment other than those specifically designated herein, as being equal to those so specifically designated: BEFORE PURCHASING AND/OR FABRICATION, he shall submit the proposed substitution in accordance with the requirements of the General Conditions, and the decision of whether or not it is equal to that specified shall be determined by the owner.

B. Unless requests for substitution are made in accordance with the above instructions and the instructions of the General Conditions, supported by sufficient proof of equality, the successful Contractor will be required to furnish specifically named items designated under the base bid.

C. If the apparatus or materials substituted for those specified necessitate changes or additional connections, piping supports or construction: same shall be provided and the Electrical Contractor shall assume the cost and the entire responsibility thereto.

D. The Electrical Contractor shall coordinate with the HVAC, Plumbing and Fire Protection Contractors with regard to feeder, raceway, and circuit breaker and disconnect switch sizes. If a substitution of HVAC, Plumbing and Fire Protection equipment is proposed by

a Subcontractor, it shall become the responsibility of that Subcontractor to coordinate with the Electrical Contractor any and all changes with regard to feeder, raceway, and circuit breaker and disconnect switch sizes. The shop drawings shall clearly indicate what changes are required and any additional costs associated with this change. If coordination does not occur, the Subcontractor proposing the change shall be responsible for all costs that occur due to the substitution.

E. Whenever the Contractor secures approval for changing any items and such change involves a corresponding change or adjustment in any adjacent or related item, the responsibility for making the required change, or seeing that it is made, rests with the Contractor. The cost of these changes and/or adjustments shall be paid for by the Contractor unless it is otherwise agreed, in writing, at the time the change is approved. The acceptance of any change will not, in any way, relieve the Contractor from full compliance with the Contract Documents.

1.19 PERMITS, LAWS, ORDINANCES & CODES

A. The Electrical Contractor shall give all necessary notices, obtain all permits, and pay all taxes, fees and other costs in connection with his work; file all necessary plans, prepare all necessary documents and obtain all necessary approvals of state authorities, all local, town, city or county departments having jurisdiction; obtain all required certificates of inspection for his work.

B. The Electrical Contractor shall include in the work, without extra cost to the Owner, any labor, materials, services, apparatus, drawings in addition to the drawings prepared by the Project Engineer and Documents, in order to comply with all applicable laws, ordinances, rules and regulations whether or not shown on the drawings and/or specified.

1.20 DAMAGE TO OTHER WORK

A. Each Contractor shall be held responsible for and shall pay for all damage to other work caused by his work or workmen.

B. Repairing of such damage shall be done by the General Contractor or Contractors who installed the work and so directed by the Owner's Engineer.

1.21 GUARANTEE

A. Attention is directed to provisions of the General Conditions and Special Conditions regarding guarantees and warranties for work under this Contract.

B. Electrical Contractor's guarantees shall be the same as the General Contractors.

C. All material, items of equipment and workmanship furnished under this section shall carry for this standard warranty against all defects in material and workmanship. Any fault due to defective or improper material, equipment, workmanship or design which may develop shall be made good, forthwith, by and at the expense of the Electrical

Contractor, including all other damage done to areas, materials and other systems resulting from this failure.

D. Electrical Contractor shall guarantee that all elements of the systems are of sufficient capacity to meet the specified performance requirements as set forth herein or as indicated.

E. Upon receipt of notice from the Owner of failure of any part of the systems or equipment during the guarantee period, the affected part or parts shall be replaced by the Electrical Contractor at no additional cost to the Owner.

F. Furnish, before the final payment is made, a written guarantee covering the above requirements.

1.22 INSTALLATION REQUIREMENTS

A. The arrangement of all electrical work shown on the drawings is diagrammatic only and indicates the minimum requirements of the work. Conditions at the building including actual measurements shall determine the details of the installation. All work shall be laid out and installed so as to require the least amount of cutting and patching.

B. Check the Architectural plans and specifications before ordering any material and equipment. Any discrepancies shall be brought to the attention of the Architect for his determination prior to proceeding with the work.

1.23 TYPICAL DETAILS

A. Typical details where shown on the drawings shall apply to each and every item of the project where such items are applicable. They are not repeated in full on the drawings, which in many cases are diagrammatic only, but with the intention that such details shall be incorporated in full. Any alternate method proposed for use by the Contractor shall have the prior approval of the Architect.

1.24 TYPICAL PART PLANS

A. Typical part plan where shown on the drawings shall apply to each and every item of the project where such items are applicable. They are not repeated in full on the drawings, which in many cases are diagrammatic only, but with the intention that such details shall be incorporated in full. Any alternate method proposed for use by the Contractor shall have the prior approval of the Architect.

B. Where typical part plans are shown on the drawings, it is the Contractor's responsibility to install all wiring devices in accordance with State and National Codes. Where Architectural deviations occur, additional devices will be required and shall be the responsibility of the Contractor to confirm wall layouts with the latest Architectural floor plans.

1.25 SLEEVES, INSERTS

A. Furnish and install all sleeves, inserts, anchor bolts and similar items to be set into masonry or concrete, as required for mechanical and electrical work. Internal diameter of sleeve shall be 2" larger than the outside diameter of the pipe or insulation covered line passing through it.

1.26 CORING, DRILLING

A. Core, cut and/or drill all small holes 4.5" diameter or less in walls and floors required for the installation of sleeves and supports for the electrical work.

1.27 ACCESSIBILITY

A. Install all work such that parts, receptacles, equipment, devices etc. requiring periodic inspection, operation, maintenance and repair are readily accessible.

B. All GFCI receptacles shall be mounted in readily accessible location as required by NEC 210.8

C. Furnish all access panels appropriate to particular conditions, to be installed by trades having responsibility for the construction of actual walls, floors or ceilings at required locations.

1.28 TOOLS AND EQUIPMENT

A. Provide all tools and equipment required for the fabrication and installation of the mechanical and electrical equipment at the site.

1.29 PORTABLE AND DETACHABLE PARTS

A. Contractors shall retain in their possession all portable and/or detachable parts and portions of materials, devices, equipment etc. necessary for the proper operation and maintenance of the mechanical and electrical systems until final completion of the work, at which time they shall be handed over to the Owners.

1.30 RECORD DRAWINGS, PROJECT CLOSEOUT

A. As work progresses and for the duration of Contract, maintain a complete and separate set of prints of Contract Drawings at job site at all times. Record work completed and all changes from original Contract Drawings clearly and accurately including work installed as a modification or addition to the original design. Work shall be updated on a weekly basis and shall be made available for review by Architect. Failure to perform this work shall be reason for withholding requisition payments. In addition, take photographs of all concealed equipment in gypsum board ceilings, shafts, and other concealed, inaccessible work. At completion of work, make copies of photographs with written explanation on back. These shall become part of Record Documents.

B. At completion of work prepare a complete set of record drawings on diskette in the latest AutoCAD® Release 12 or higher format showing all systems as actually installed, including all fire alarm and electrical circuitry. The design tracings will be made available for the electrical contractor's copying, at his expense, into mylar reproducibles to serve as backgrounds for the drawings. The quantity of design tracings which are made available shall in no way be interpreted as setting a limit to the number of drawings necessary to show the required information. The Electrical Contractor's professional draftsperson shall transfer changes to mylars; submit mylars and three sets of prints to Architect for comments as to compliance with this section.

C. THE ARCHITECT WILL NOT CERTIFY THE ACCURACY OF THE RECORD DRAWINGS - THIS IS THE SOLE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.

D. This trade shall submit the record set for approval by the fire and building departments in a form acceptable to the departments, when required by the jurisdiction.

E. Drawings shall show record condition of details, sections, riser diagrams, control changes and corrections to schedules. Schedules shall show actual manufacturer and make and model numbers of final equipment installation.

F. Refer to SECTION 01770 – CLOSEOUT PROCEDURES and 01782 – RECORD DOCUMENTS AND OWNER TRAINING sections

1.31 QUALITY ASSURANCE

A. The requirements of the State Building Code and local regulations establish the minimum acceptable quality of workmanship and materials, and all work shall conform thereto unless more stringent requirements are indicated or specified herein.

B. All work shall comply with the latest editions of the codes as referenced herein.

C. Follow manufacturer's directions for articles furnished, in addition to directions shown on drawings or specified herein.

D. Protect all work, materials, and equipment from damage during process of work. Replace all damaged or defective work, materials and equipment without additional cost to Owner.

E. All equipment and materials for permanent installation shall be the products of recognized manufacturers and shall be new.

F. Equipment and materials shall:

1. Where normally subject to Underwriters Laboratory Inc. listing or labeling services, be so listed or labeled.
2. Be without blemish or defect.
3. Not be used for temporary light and power purposes.
4. Be in accordance with the latest applicable NEMA standards.

5. By products which will meet with the acceptance of all authorities having jurisdiction over the work. Where such acceptance is contingent upon having the products examined, tested and certified by Underwriters or other recognized testing laboratory, the product shall be so examined, tested and certified.

G. Except for conduit, conduit fittings, outlet boxes, wire and cable, all items of equipment or material of one generic type shall be the product of one manufacturer throughout.

H. For items which are to be installed but not purchased as part of the electrical work, the electrical work shall include:

1. The coordination of their delivery.

2. Their unloading from delivery trucks driven into any point on the property line at grade level.

3. Their safe handling and field storage up to the time of permanent placement in the project.

4. The correction of any damage, defacement or corrosion to which they may have been subjected. Replacement if necessary shall be coordinated with Contractor who originally purchased the item.

5. Their field make-up and internal wiring as may be necessary for their proper operation.

6. Their mounting in place including the purchase and installation of all dunnage, supporting members, and fastenings necessary to adapt them to architectural and structural conditions.

7. Their connection to building wiring including the purchase and installation of all termination junction boxes necessary to adapt and connect them to this wiring. Included also shall be the purchase and installation of any substitute lugs or other wiring terminations as may be necessary to adapt their terminals to the building wiring as called for and to the connection methods set forth in these specifications.

I. Items which are to be installed but not purchased as part of the electric work shall be carefully examined upon delivery to the project. Claims that any of these items have been received in such condition that their installation will require procedures beyond the reasonable scope of the electric work will be considered only if presented in writing within one week of the date of delivery to the project of the items in question. The electric work includes all procedures, regardless of how extensive, necessary to put into satisfactory operation, all items for which no claims have been submitted as outlined above.

1.32 DELIVERY, STORAGE, AND HANDLING

A. All materials for the work of this section shall be delivered, stored and handled so as to preclude damage of any nature. Manufactured materials shall be delivered and stored in their original containers, plainly marked with the products' and manufacturer's name. Materials in broken containers or in packages showing watermarks or other evidence of damage shall not be used and shall be removed from the site.

PART 2 - PRODUCTS

2.01 GENERAL

A. All materials and equipment necessary to make the installation complete in every detail shall be furnished and installed under this contract whether or not specifically specified herein. All materials and equipment shall be new. The Electrical Contractor shall include all wiring for mechanical, plumbing and fire protection systems, wiring protection systems and wiring for all equipment specified.

B. It is the intent of the Specifications that one manufacturer be selected, not a combination, for any particular system. For example, all wire of one manufacturer, all switches of one manufacturer, etc., except specific material classifications in which delivery time becomes a problem the Owner's Engineer may; give specific exemption from the requirements.

C. Where materials, equipment, apparatus or other products are specified by manufacturer, brand name, type or catalog number, such designation is to establish standards of performance, quality, type and style.

2.02 PULL BOXES, WIREWAYS, AND CHANNELS

A. Pull boxes shall be code gauge galvanized steel with screw covers to match. Pull boxes and wire ways shall be as shown on Drawings and/or as required by NEC and/or job conditions, with steel barriers separating systems.

B. Wire ways shall be galvanized steel, manufactured standard sections and fittings, with combination hinged and screw covers.

C. Steel channel supports shall be minimum 1-5/8 inch mold strip with minimum .105 inch wall thickness, Unistrut P1000, Kindorf, Husky Products, or equal.

2.03 RACEWAYS

A. Electric metallic tubing (EMT) shall be electro galvanized or sheradized steel. Tubing shall be as manufactured by Pyle National, Allied Tube and Conduit Corp., Wheatland Tube Company or equal.

B. All EMT shall be a minimum of 3/4" including branch circuits for lighting, power, data and telephone systems.

C. Intermediate metal conduit (IMC) shall be used where subject to damage.

D. Flexible metal conduit shall be galvanized steel with separate copper grounding conductor. Liquid-tight flexible metal conduit shall be similar, but with extruded moisture and oil proof outer jacket of polyvinyl chloride plastic. Flexible metal conduit less than 6-feet long may be used to connect all lighting fixtures. Motors and other equipment may be connected in length; not exceeding 18 inches. Liquidtight flexible

metal conduit shall be used for all mechanical equipment or other rotating equipment subjected to moisture.

E. Couplings and connectors for electrical metallic tubing shall be galvanized steel set screw type.

F. Steel support rods or support bolts for conduits shall be 1/8" diameter for each inch or fraction thereof of diameter of conduit size, but no rod or bolt shall be less than 1/4" in diameter.

G. Conduit ends shall be cut square and reamed to remove burrs and sharp edges. Offsets and bends for changes in elevation of exposed conduit runs shall be made at walls or beams and not in open spaces between walls or beams. Conduits shall be routed so as not to interfere with the operation or maintenance of any equipment. The entire job shall be done in a neat and workmanlike manner, as approved by the Engineer. Steel supports or racks shall be galvanized steel channel and fittings, Unistrut, Kindorf, Husky Products Company, or equal.

H. Conduits shall be routed in the field so as to be coordinated with the building structure. Exposed conduit shall be run in straight lines parallel to walls, beams and columns and with right angle bends and threaded conduit fittings.

I. For 20 ampere branch circuit wiring furnish and install the number of individual conduits required to limit the number of conductors in each conduit to a number which will not require derating to a value below 100 percent of the current rating of the circuit over current protective device.

2.04 WIRE AND CABLE

A. All wire and cable shall be copper, minimum of #12 AWG solid.

B. Provide single conductor wire and cable with 600V insulation. Wire size #8 AWG and larger shall be stranded. Wire of size smaller than #8 AWG shall be solid. Conductors shall be soft drawn copper with conductivity of not less than 98% of ANSI Standard for annealed copper.

C. Wire and cable shall be Type THWN-THHN building wire, 600V, rated for 75 degrees C. in wet locations and 90 degrees C. in dry locations.

D. Flexible metal clad cable Type MC with green equipment ground may be used in areas above hung ceilings and in wall partitions where allowed by code. MC Cable shall be manufactured by AFC or equal.

E. Fire Alarm wiring shall be dual-rated fire alarm control cable rated @ 105 degrees C. for power limited fire protective signaling cable (Type FPL) and 90 degrees C. for non-power limited circuit cable (Type MC) installations. Cable shall be manufactured by AFC or equal.

F. Wire and cable shall be manufactured by Phelps Dodge Copper Products Corp., General Cable Co., Triangle Conduit and Cable Co., AFC/ A Monogram Co. or equal.

2.05 WIRING DEVICES

A. Available manufacturers: subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work included, but not limited, to the following:

1. Wiring Devices
   a. Pass and Seymour/Legrand
   b. Bryant Electric
   c. Cooper Industries
   d. Hubbell
   e. Leviton

B. Wiring devices and components shall be designed, manufactured, tested and installed to comply with FPA 70 (National Electrical Code), UL Standards: UL498 receptacles; UL20 switches; UL508 industrial control equipment; UL 943 ground fault circuit interrupters (2003 revision); and, UL 1449 surge suppressor; NEMA standards, state and local codes and requirements of authorities having jurisdiction. Federal specifications apply to certain receptacles (WC596) and switches (WS896). Furnish and install Federal Specification grade wiring devices, complete with all accessories as indicated on the drawings and as specified hereunder.

C. Color

1. As determined by Architect, except as otherwise indicated or required by code.

D. Duplex receptacles shall be Construction Grade Federal Specification rated for 125 volts, 20 amperes unless otherwise indicated on contract drawings and conform to WC596 standards. Receptacles shall have wire bundling clamps on all terminals including ground; terminal screws shall be #10. A full wrap-around steel bridge strap shall be provided with locking finger tabs to secure the face.

1. Pass & Seymour: CRB5362
2. Hubbell: CR5352
3. Leviton 5362S

E. Duplex receptacles with ground fault circuit interrupter characteristics shall be rated for 125 volts, 20 amperes with 20 ampere feed through amperes unless otherwise indicated on contract drawings, and shall conform to the revised 2003 UL 943 standard. All receptacles shall have “SafeLock” protection that will disconnect power to the receptacle if critical components are damaged and ground fault protection is lost. All receptacles shall have “trip indicator” light to identify a tripped condition. All receptacles in bathrooms/toilets, within 6’ 0” of sink locations, exterior outlets, utility vault, in wet areas, etc. shall be ground fault type whether indicated on the drawings or

not. Provide weatherproof While-in-Use covers for exterior outlets.

1. Pass & Seymour: 2094
2. Cooper: XGF20
3. Leviton: 8898

F. Toggle switches shall be full sized, heavy duty AC type rated for 120/277 volts, 20 amperes and comply with Federal Specification WS 896. Mounting strap shall be one-piece nickel plated steel with integral ground. Terminals shall external screw-pressure plate back and side wired to accept # 14 - #10 AWG wire. Contacts shall be silver alloy.

	Single Pole	Double Pole	3-Way	4-Way	Locking
1. Pass & Seymour:	PS20ACI	PS20AC2	PS20AC3	PS20AC4	PS20AC-L
2. Hubbell:	HBL1221	HBL1222	HBL1223	HBL1224	HBL1221-L
3. Leviton:	1221-2	1222-2	1223-2	1224-2	1221-2L

G. Provide foam seals around all wiring device boxes in the building envelope.

2.06 WIRING DEVICE PLATES

A. All normal power wiring device plates shall be high impact nylon.

1. Pass & Seymour: TP Series (3/16 ” wider/longer than standard size; captive screws for single gang)

2. Hubbell: P Series

3. Leviton: 80700 Series

2.07 OUTLET BOXES AND ACCESSORIES

A. Provide galvanized sheet steel outlet boxes for all outlets unless otherwise noted.

B. Fixture outlet boxes shall have 3/8" solid male fixture studs and auxiliary fixture stems shall be supported from 3/8" male fixture studs.

C. All outlet boxes for concealed work shall be galvanized, stamped steel; those for fixtures, furnished with a fixture stud.

D. Outlet boxes shall be of size and type to accommodate (1) structural conditions; (2) size and number of raceways, conductors or cables entering and (3) devices or fixtures for which required.

E. Install blank plates on all outlet boxes, in which no apparatus is installed, which do not integrally provide a cover for the box.

F. Special care shall be taken to set all boxes correctly square and true with the building finish.

G. Outlet boxes and accessories shall be as manufactured by Steel City, Appleton, Raco or equal.

2.08 PANELBOARDS

A. Provide dead front lighting and power panel boards, with proper voltage and ampere rating as indicated. Panel boards shall be surface or flush mounted as specified in the panel schedules.

B. Provide bolt-on, molded case, circuit breakers with thermal - magnetic trips. Multiple pole breakers shall be single handle, common trip. Provide handle locks for emergency lighting circuits, fire alarm, security and other similar breakers. Main breakers shall be vertically mounted, separate from breakers.

C. Provide copper bus bars and full size insulated neutral bus. Panel buswork shall be rated to carry, as minimum, ampere rating of over current device that serves panel. Panels with see-thru bussing shall not be used. Provide anti-turn, solderless lugs suitable for copper wire.

D. Provide insulated, isolated ground bus for all isolated ground panelboards that serve computer equipment, furniture partitions and or as indicated on floor plans.

E. Provide fully rated circuit breakers equal to short circuit interrupting current available.

F. All circuit breakers in branch panels shall be coordinated for short circuit withstand and localizing a short circuit per NEC 240-12 without fuses.

G. Panel boards shall be manufactured by Square D. Approved alternates are General Electric, Cutler Hammer or Siemens.

2.09 NAMEPLATES

A. Nameplates consisting of black plastic with white center, lettering to be 1/4" high, engraved through to white layer and properly fastened with brass screws shall be provided for the following equipment:

1. All panel boards and distribution equipment.

2. Terminal cabinets.

3. Junction boxes larger than 4-11/16".

2.10 DISCONNECT SWITCHES

A. All safety switches shall be NEMA Type HD and Underwriters' Laboratories listed.

B. All switches shall have switch blades which are fully visible in of OFF position with the door open. All current carrying parts shall be plated through electrolytic processed to resist corrosion and promote cool operation.

C. Switches shall be quick-make and quick-break such that, during normal operation of the switch, the operation of the contacts shall be not capable of being restrained by the operating handle after the closing or opening action of the contacts has started. The handle and mechanism shall be an integral part of the box, not the cover, with positive padlocking provisions in the OFF position.

D. Switches shall be furnished in NEMA 1 general purpose enclosures unless NEMA 3R (raintight) or NEMA 4 as required by environment. Enclosures shall be of code gauge (UL 98) sheet steel (NEMA 1) or code gauge phosphate treatment and gray baked enamel finish.

E. Switches shall be horsepower rated for 600 volts AC and all switches shall be fused type with dual element fuses.

F. Safety switches shall be Square D Class 3130 or approved equal as manufactured by General Electric or Cutler Hammer.

2.11 FUSES

A. Fuses shall be non-renewable type, UL Class J up to 600 amp, and Class L over 600 amp. Fuses shall be current limiting type with a minimum interrupting rating of 200,000 rms amp.

B. Fuses shall not be used in any switchboards or panel boards unless adequate A.C. rated circuit breakers are not available.

C. Fuses shall be manufactured by Bussman, Gould Shawmut, Little Fuse or equal.

2.12 GROUNDING REQUIREMENTS

A. Ground all systems and equipment in accordance with best industry practice, the requirements of NFPA 70.

2.13 PHASING AND COLOR CODING

A. The insulation or covering of each wire or cable shall be color coded so as to provide for circuit identification as specified below:

120/208 V Circuits	277/480V	Phase Circuits
Black	Brown	A
Red	Orange	B

Blue	Yellow	C
White	Grey	Neutral
Green	Green w/yellow tracer	Equipment Ground

B. Color coding shall be achieved by one of the following methods:

1. The insulation or covering shall be coded during manufacture by use of one of the following methods:

   a. Colored compounds.
   b. Colored coatings.

2. In sizes and insulation types where factory applied colors are not available, wires and cables shall be color coded by the application of colored plastic tapes in overlapping turns at all terminal points, and in all boxes in which splices are made.

C. The same colored cable shall be connected to the same phase throughout the project.

D. In general, building load centers and panelboards shall be phased "A", "B", "C", left to right. The neutral, although it may be in different locations for different equipment, shall be identified.

2.14 MOLDED CASE CIRCUIT BREAKERS

A. Molded case type circuit breakers shall consist of manually operated quick-make quick-break mechanically trip free operating mechanisms for simultaneous operation of all poles, with contacts, arc interrupters and trip elements for each pole, all enclosed in molded phenolic plastic cases.

1. Their tripping units shall be of the "thermal magnetic" type having bimetallic elements for time delay overload protection and magnetic elements for short circuit protection.

2. They shall be manually operable by means of toggle type operating handles having "tripped" position midway between the "on-off" position.

3. They shall each be contained in an individual case enclosing only the number of poles required for the particular breaker.

4. All panels and individually mounted circuit breakers shall have short circuit ratings exceeding the available short circuit or the values indicated in the Power System Studies in this section by a factor of 1.2 with a minimum as follows:

   a. 240V class panels/breakers

1) 10 kAIC where shown fed by a 150 kVA or less transformer
2) 22 kAIC where shown fed by a 300 kVA or less transformer

b. 480V Class Panels/Breakers shall be 65 kAIC.

5. They shall be of the "bolted-in" type.

6. Where necessary, to accommodate other requirements, their frame sizes shall be increased to conform to such requirements, frame sizes being indicated only as a reference to the minimum acceptable interrupting ratings noted above.

7. Where single pole in trip sizes 20 amps or less, they shall be rated for switching duty.

8. They shall be equipped with 5 milliamp sensitivity ground fault interrupting features where so indicated.

B. They shall be manufactured by Square D, Cutler Hammer, or General Electric.

2.15 LIGHTING FIXTURES

A. Furnish all labor, materials and equipment required for a complete installation of lighting equipment specified.

B. This Contractor shall assume all responsibility for the safe handling of all lighting fixtures, which are furnished under this Section and other accessories and lamps, until the final inspection has been made by the Owner's Engineer.

C. Special fittings and materials that may be required to support fixtures shall be supplied as well as supports or grounds required securing surface or pendant mounted fixtures on suspended ceilings unless otherwise noted. Where ductwork, pipes, type of building construction materials and structural framing members provide obstructions or difficult support means, hanger rods shall be used in association with horizontal sections of steel support channels in a manner approved by the Owner's Engineer. Steel support channels shall be Unistrut, Kindorf, Husky Products Co., or equal. The exact mounting height of all stem supported lighting fixtures shall be determined on the job, by the Owner's Engineer.

D. Fixtures, part or parts thereof (including lamps) determined to be defective upon completion of the electrical installation shall be replaced by the Electrical Contractor free of charge.

E. In addition to fixture supports, surface mounted lighting fixtures shall be secured to the surface to which they mount at a minimum to two points on each 4 foot length of fixture housing, as approved, to prevent rotation or movement of the fixture out of its square and level position of alignment.

F. This Contractor shall include all fixtures, wiring, hanging, uncrating, connecting up and making ready for operation. This Contractor shall include the cost of furnishing and installing all lamps for all fixtures under this Contract.

G. All light fixtures installed in suspended ceilings shall be supported from the building structure by chains at either end of fixture.

H. All fixtures installed in insulated ceilings shall be IC rated. Coordinate with the Architects reflected ceiling plans.

I. All fixtures installed in rated ceilings shall be one or two hour rated. Coordinate with the Architects reflected ceiling plans for ceiling rating.

J. All lighting fixtures shall be individually supported from the structural slab or structural building member. Fixtures will not be permitted to be supported from suspended ceiling or roof deck. Fixtures shall be supported in accordance with seismic requirements outlined in the International Building Code.

2.16 OCCUPANCY SENSORS

A. Work Included

1. Contractor's work to include all labor, materials, tools, appliances, control hardware, sensor, wire, junction boxes and equipment necessary for and incidental to the delivery, installation and furnishing of a completely operational occupancy sensor lighting control system, as described herein.

2. Contractor/Supplier shall examine all general specification provisions and drawings for related electrical work required as work under Division 16.

3. Contractor shall coordinate all work described in this section with all other applicable plans and specifications, including but not limited to wiring, conduit, fixtures, HVAC systems and building management systems.

B. Equipment Qualification

1. Products supplied shall be from a single manufacturer that has been continuously involved in the manufacturing of occupancy sensors for a minimum of five (5) years. Mixing of manufacturers shall not be allowed.

2. All components shall be U.L. listed, offer a five (5) year warranty and meet all state and local applicable code requirements.

3. Products shall be manufactured by an ISO 9002 certified manufacturing facility and shall have a defect rate of less than 1/3 of 1%.

4. Wall switch products must be capable of withstanding the effects of inrush current. Submittals shall clearly indicate the method used.

C. System Description

1. The objective of this section is to ensure the proper installation of the occupancy sensor based lighting control system so that lighting is turned off automatically after reasonable time delay when a room or area is vacated by the last person to occupy said room or area.

2. The occupancy sensor based lighting control shall accommodate all conditions of space utilization and all irregular work hours and habits.

3. Contractor shall warrant all equipment furnished in accordance to this specification to be undamaged, free of defects in materials and workmanship, and in conformance with the specifications. The supplier's obligation shall include repair or replacement, and testing without charge to the owner, all or any parts of equipment which are found to be damaged, defective or non-conforming and returned to the supplier. The warranty shall commence upon the owner's acceptance of the project. Warranty on labor shall be for a minimum period of one (1) year.

D. Submittals

1. Manufacturer shall substantiate conformance to this specification by supplying the necessary documents, performance data and wiring diagrams. Any deviations to this specification must be clearly stated by letter and submitted.

2. Submit a lighting plan clearly marked by manufacturer showing proper product, location and orientation of each sensor.

3. Submit any interconnection diagrams per major subsystem showing proper wiring.

4. Submit standard catalog literature, which includes performance specifications indicating compliance to the specification

5. Catalog sheets must clearly state any load restrictions when used with electronic ballasts.

E. System Operation

1. It shall be the contractor's responsibility to make all proper adjustments to assure owner's satisfaction with the occupancy system. Unless specified otherwise, the contractor shall set all time delays to no less than 15 (fifteen) minutes. Or;

a. Factory Commissioning

1) It shall be the manufacturer's responsibility to verify all proper adjustments and train owner's personnel to ensure owner's

satisfaction with the occupancy system. This service is provided at an additional cost.

F. Acceptable Manufacturers

1. Watt Stopper, Sensor Switch or Pre-Approved Equal: For pre-approval, provide all the information listed under section 1.04A and 1.04D a minimum of ten (10) working days prior to initial bid date.

2. The listing of any manufacturer as "acceptable" does not imply automatic approval. It is the sole responsibility of the electrical contractor to ensure that any price quotations received and submittals made are for sensors, which meet or exceed the specifications included herein.

G. Products

1. All products shall be Watt Stopper product numbers:

a. Ceiling Sensors:

W-500A, W-1000A, W-2000A, W-2000H, WPIR, DT-200, DT-205, DT-300, DT-305, DT-355, CX-100, CX-105, CI-200, CI-205, WT600, WT-05, WT1100, WT-1105, WT2200, WT-2205, WT-2250, HB-100, HB-150

b. Wall Sensors:

WI-200, WI-300, WS-200, WA-200, WA-300, WD-170, WD-180, WD-270, WD-280, WN-100

c. Power and Slave Packs:

B120E-P, B277E-P, A120E-P, A277E-P, A120C-P, A277C-P, C120E-P, C277E-P, S120/277-P, AT-120, AT-277, BZ-100

d. Low Temperature: CB-100 Outdoor Sensors: EW, EN series.

e. InteliSwitch: TS-400, TS-400-24, AS-100, AS-110

f. Daylighting Controls: LCO, LCD, LCE, LS-100, LS-301.

2. Wall switch sensors shall utilize Passive Infrared sensing technology only to detect motion.

3. Wall switch sensors shall be capable of detection of occupancy at desktop level up to 300 square feet, and gross motion up to 1000 square feet.

4. Wall switch sensors shall accommodate loads from 0 to 800 watts at 120 volts; 0 to 1200 watts at 277 volts and shall have 180˚ coverage capability.

5. Wall switch products shall utilize Zero Crossing Circuitry, which increases relay life, protects from the effects of inrush current, and increases sensor's longevity.

6. Wall switch sensors shall have no leakage current to load, in manual or in Auto/Off mode for safety purposes and shall have voltage drop protection.

7. Where specified, wall switch sensors shall provide a field selectable option to convert sensor operation from automatic-ON to manual-ON.

8. Where specified, vandal resistant wall switch sensors shall utilize a hard lens with a minimum 1.0mm thickness. Products utilizing a soft lens will not be considered.

9. Passive infrared sensors shall utilize Pulse Count Processing and Digital Signature Analysis to respond only to those signals caused by human motion.

10. Passive infrared sensors shall utilize mixed signal ASIC which provides high immunity to false triggering from RFI (hand-held radios) and EMI (electrical noise on the line), superior performance, and greater reliability.

11. Passive infrared sensors shall have a multiple segmented Lodif Fresnel lens, in a multiple-tier configuration, with grooves-in to eliminate dust and residue build-up.

12. Where specified, passive infrared and dual technology sensors shall offer daylighting foot-candle adjustment control and be able to accommodate dual level lighting.

13. Dual technology sensors shall be corner or recessed mounted to avoid detection outside the controlled area when doors are left open. Sensors shall have "auto on" or "manual on" feature.

14. Dual technology sensors shall consist of passive infrared and ultrasonic technologies for occupancy detection. Products that react to noise or ambient sound shall not be considered.

15. Ultrasonic sensors shall utilize Advanced Signal Processing to adjust the detection threshold dynamically to compensate for constantly changing levels of activity and airflow throughout controlled space.

16. Ultrasonic operating frequency shall be crystal controlled to within plus or minus 0.005% tolerance to assure reliable performance and eliminate sensor cross-talk. Sensors using multiple frequencies are not acceptable.

17. All sensors shall be capable of operating normally with electronic ballasts, PL lamp systems and rated motor loads.

18. Coverage of sensors shall remain constant after sensitivity control has been set.

No automatic reduction shall occur in coverage due to the cycling of air conditioner or heating fans.

19. All sensors shall have readily accessible, user adjustable settings for time delay and sensitivity. Settings shall be located on the sensor (not the control unit) and shall be recessed to limit tampering.

20. In the event of failure, a bypass manual override shall be provided on each sensor. When bypass is utilized, lighting shall remain on constantly or control shall divert to a wall switch until sensor is replaced. This control shall be recessed to prevent tampering.

21. All sensors shall provide an LED as a visual means of indication at all times to verify that motion is being detected during both testing and normal operation.

22. Where specified, sensor shall have an internal additional isolated relay with Normally Open, Normally Closed and Common outputs for use with HVAC control, Data Logging and other control options. Sensors utilizing separate components or specially modified units to achieve this function are not acceptable.

23. All sensors shall have UL rated, 94V-0 plastic enclosures.

H. Circuit Control Hardware - CU

1. Control Units - For ease of mounting, installation and future service, control unit(s) shall be able to externally mount through a 1/2" knock-out on a standard electrical enclosure and be an integrated, self-contained unit consisting internally of an isolated load switching control relay and a transformer to provide low-voltage power. Control unit shall provide power to a minimum of two (2) sensors.

2. Relay Contacts shall have ratings of:

   a. 13A - 120 VAC Tungsten
   b. 20A - 120 VAC Ballast
   c. 20A - 277 VAC Ballast

3. Control wiring between sensors and controls units shall be Class II, 18-24 AWG, stranded U.L. Classified, PVC insulated or TEFLON jacketed cable suitable for use in plenums, where applicable.

4. Minimum acceptable wire gauge from the circuit control hardware relays shall be #14 AWG.

I. Installation

1. It shall be the contractor's responsibility to locate and aim sensory in the correct location required for complete and proper volumetric coverage within the range

of coverage(s) of controlled areas per the manufacturer's recommendations. Rooms shall have ninety (90) to one hundred (100) percent coverage to completely cover the controlled area to accommodate all occupancy habits of single or multiple occupants at any location within the room(s). The locations and quantities of sensors shown on the drawings are diagrammatic and indicate only the rooms, which are to be provided with sensors. The contractor shall provide additional sensors if required to properly and completely cover the respective room. Power/switch packs may or may not be indicated on the drawings. It shall be the contractor's responsibility to provide and install all power/switch packs required to make the system fully operational. Locations of power/switch packs may be determined in the field by the contractor unless specified otherwise, but must be readily accessible for future servicing. Usually, a minimum of one (1) power/switch pack is required per circuit and/or area of control. However, in some cases additional power/switch packs may be required. Contact manufacturer for final determination of power/switch packs required for this project.

2. It is the contractor's responsibility to arrange a pre-installation meeting with the manufacturer's factory authorized representative, at the owner's facility, to verify placement of sensors and installation criteria.

3. Proper judgment must be exercised in executing the installation so as to ensure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference of structural components. The contractor shall also provide, at the owner's facility, the training necessary to familiarize the owner's personnel with the operation, use, adjustment, and problem-solving diagnosis of the occupancy sensing devices and systems.

J. Factory Commissioning

1. Upon completion of the installation, the system shall be completely commissioned by the manufacturer's factory authorized technician who will verify all adjustments and sensor placement to ensure a trouble-free occupancy-based lighting control system. This service is provided at an additional cost.

2. The electrical contractor shall provide both the manufacturer and the electrical engineer with 15 working days written notice of the scheduled commissioning date. Upon completion of the system fine-tuning the factory authorized technician shall provide the proper training to the owner's personnel in the adjustment and maintenance of the sensors. The contractor shall provide all lifts and/or ladders and one technician to assist in the commissioning. Prior to commissioning, the contractor shall verify that all sensors and associated power supplies/relays are installed and all wiring properly terminated.

3. The system must be completely operational and all time delays adjusted per the specification

4. The manufacturer's factory authorized technician shall, upon completion of the commissioning, provide a written report to the electrical contractor and the electrical engineer indicating completion of the work.

5. This report shall also indicate any corrective actions required on the part of the electrical contractor to the system.

PART 3 - EXECUTION

3.01 SPECIAL COORDINATION INSTRUCTIONS

A. Coordination with the work of other trades is referred to within various parts of this Section of the Specifications. The following special instructions shall also be carefully noted:

1. Locations and mounting height of all wall outlets and lighting fixtures shall be as specified on the electrical, architectural drawings, and as required by the latest edition of national and local codes.

2. All feeder, branch circuit or auxiliary system wiring passing through pull boxes and/or being made up in panel boards shall be properly grouped, bound and tied together in a neat and orderly manner in keeping with the highest standards of the trade, with plastic cable ties.

3. All duplex convenience and power receptacles shall be mounted vertically with the grounding post to the bottom as the outlet is viewed from the front.

4. All miscellaneous hardware and support accessories, including support rods, nuts, bolts, screws and other such items shall be of a galvanized or cadmium plated finish, or of other approved rust-inhibiting coatings. Care should be taken that fixtures shall not be installed on both sides of existing or new building expansion joints.

5. The Electrical Contractor shall provide all materials, equipment and workmanship to provide for adequate protection of all electrical equipment during the course of construction of the project.

6. The Electrical Contractor shall furnish and install approved details for all insulation at terminal connection points for all electrical conducting materials, such as transformer terminals, terminal studs, and at any other special locations as directed by the Engineer and confirmed by the Owner.

7. The Electrical Contractor shall provide GFI rated and weatherproof rated equipment in damp or wet locations. All GFCI receptacles shall be mounted in readily accessible location as required by NEC 210.8

8. Coordination with local utility companies with the local utility companies and the local Fire Department is required. Electrical Contractor shall obtain all necessary permits and file all required applications and meet all utility company requirements.

9. Any outlet box shall not be mounted back to back on any wall of any rotating. Maintain the code clearances when boxes are mounted back to back.

3.02 COOPERATION AND WORK PROGRESS

A. The electrical work shall be carried on under the usual construction conditions, in conjunction with all other work at the site. The Electrical Contractor shall cooperate with the Engineer and all contractors and equipment suppliers working on the site coordinate the work and proceed in a manner so as not to delay the progress of the project.

B. The Electrical Contractor shall be responsible to coordinate the exact mounting arrangement and location of equipment indicated on the drawings to allow for proper space requirements for equipment access, operation and maintenance.

C. It shall be the responsibility of the Electrical Contractor to coordinate the delivery of electrical equipment to the project prior to the time of installation or equipment.

3.03 INSTALLATION OF WIRING & CONDUIT

A. In general, all conduits shall be run concealed unless otherwise indicated to be run exposed.

B. Exposed conduits shall be run parallel to or at right angles to the walls of the building and all bends shall be made with standard conduit ells or conduits bent to, not less than, the same radius. Horizontal runs of exposed conduits shall be close to ceiling beams, passing over water or other piping where possible and shall be supported by pipe straps or by other approved means, not more than 5' apart. Installation of exposed conduits in finished areas of the building shall be checked with the Engineers, Architect, and Owner for layout before installation to conform to the pattern of the structural members, and when completed, is to present the most obtrusive appearance possible. No exposed conduits will be permitted on walls or partitions in public areas.

C. In no place shall a conduit be run within 3" of hot water pipes or appliances, except where crossing is unavoidable, and in that case, the conduit shall be kept at least 1" from covering or pipe crossed.

D. Conduits shall be supported on approved galvanized wall brackets, ceiling trapeze, strap hangers or pipe straps, secured by means of toggle bolts on hollow masonry units or expansion bolts in concrete or brick.

E. In general, no splices or joints will be permitted in either feeder or branches except at outlets or accessible junction boxes. No splices shall be made in security or fire alarm systems.

F. All splices in wire #8 AWG and smaller shall be standard pigtail, made mechanically tight and insulated with proper thickness of insulating tape. Wire splicing nuts as manufactured by; Minnesota Mining Company (Scotch Lock) or Ideal wire nuts shall be used, subject to the local wire inspector.

G. Wire #6 and larger shall be connected to panels and apparatus by means of approved

lugs or connectors. Connectors shall be solderless type, sufficiently large to enclose all strands of the conductor and securely fastened.

3.04 GROUNDING

A. For each feeder or run of lighting and appliance branch circuitry include equipment and raceway grounding conductors run within the raceways. The indicated quantities of conductors do not include the ground wires.

B. Conductors utilized for grounding and bonding shall have type of insulation, comparable to the phase conductors, color coded green.

3.05 TEMPERATURE CONTROL WIRING

A. The temperature control system shall be installed by the Heating and Air Conditioning Contractor.

B. All electric wiring and wiring connections required for the installation of the temperature control system shall be provided by the Temperature Control Contractor.

C. Electrical Contractor shall provide 120-volt control power to all temperature control panels. Provide a 120V, 20A circuit from local 120V panel to a ceiling mounted junction box located in each mechanical space.

3.06 SLEEVES, INSERTS, AND SUPPORTS

A. Furnish and install all inserts, conduit hangers, anchors and steel supports necessary for the support and installation of all electrical equipment.

B. Where openings are required in walls and floors for the passing of raceways the Electrical Contractor shall furnish the General Contractor with the necessary information regarding dimensions and locations so that he may install suitable concrete stops to provide these openings. Such openings shall be by the General Contractor in such a manner so as to interfere with the fireproof integrity of the building.

C. The Electrical Contractor will be held responsible for the location of the maintaining in proper position, sleeves, inserts and anchor bolts supplied and/or set in place by him. In the event that failure to do so required cutting and patching of finished work, such work shall be done at the Electrical Contractor's expense by the General Contractor.

3.07 FINAL INSPECTION AND TEST

A. Prior to test, feeders and branches shall be continuous from service contact point to each outlet include: all panels, feeders and devices. Test system free from short circuits and grounds with insulation resistances not less than outlines in the National Electrical Code. Provide testing equipment necessary and conduct test in presence of the Owner's representative.

B. Furnish all labor, material, instruments, supplies and services and bear all costs for the accomplishment of tests herein specified. Correct all defects appearing under test, repeat the tests until no defects are disclosed. Leave the equipment clean and ready for use.

C. The Electrical Contractor shall perform any test other than herein specified which may be specified by legal authorities or by agencies to whose requirements this work is to conform.

D. All equipment and material furnished by the Electrical Contractor shall operate under all conditions of load without objectionable noises or vibrations, which in the opinion of the Owner's Engineer, is objectionable. Where sound or vibration conditions arise which are considered objectionable by the Owner's Engineer, the Electrical Contractor shall eliminate it in a manner approved by the Owner's Engineer.

E. Final inspection and test report shall be provided for the following:

1. Testing of the emergency lighting system.
2. Testing of the impedance of the grounding system.
3. Testing of each outlet.
4. Testing of branch and feeder conductors for continuity.
5. Testing of panel boards to verify proper current balance and voltage.
6. Testing of motors, verifying proper current balance and voltage.
7. Testing, targeting and focusing of all adjustable lighting fixtures.

3.08 BRANCH CIRCUITRY

A. For all lighting and appliance branch circuitry, raceway sizes shall conform to industry standard maximum permissible occupancy requirements except where these are exceeded by other requirements specified elsewhere.

B. Circuits shall be balanced on phases at their supply as evenly as possible.

C. Feeder connections shall be in the phase rotation which establishes proper operation for all equipment supplied.

D. Reduced size conductors indicated for any feeders shall be taken as their grounding conductors.

E. Feeders consisting of multiple cables and raceways shall be arranged such that each raceway of the feeder contains one cable for each leg and one neutral cable, if any.

F. For circuitry indicated as being protected at 20 Amps or less, abide by the following:

1. All 20 amp, 120/208 volt, 3 phase, 4 wire combined branch circuit homeruns shall be provided with an individual full neutral conductor.

2. All 20 amp branch circuit shall be provided with separate control.

3. Minimum conductor size shall be No. 12 AWG copper.

4. Conductors operating at 120 volts extending in excess of 100 feet, or at 277 volts extending in excess of 200 feet, or the last outlet or fixture tap shall be No. 10 AWG copper throughout.

5. Lighting fixtures and receptacles shall not be connected to the same circuit.

6. Circuits shall be balanced on phases at their supply point as evenly as possible.

7. Circuits for prewired modular furniture are based on an 8-wire system, 3 hots, 3 neutrals, 1 insulated ground and 1 isolated ground.

G. Type MC Cable Installation

1. Where cable is permitted under the products section, the installation of same shall be done in accordance with code and the following:

a. Cable shall be supported in accordance with code. Tie wire is not an acceptable means of support. Cable supports such as Caddy WMX-6, MX-3, and clamps such as Caddy 449 shall be used. Where cables are supported by the structure and only need securing in place, then ty-raps will be acceptable. Ty-raps are not acceptable as a means of support. All fittings, hangers, and clamps for support and termination of cables shall be of types specifically designed for use with cable, i.e., romex connectors not acceptable.

b. Armor of cable shall be removed with rotary cutter device equal to roto-split by Seatek co., not with hacksaw.

c. Use split "insuliner" sleeves at terminations.

3.09 REQUIREMENTS GOVERNING ELECTRICAL WORK IN DAMP OR WET LOCATIONS

A. Outlets and outlet size boxes shall be of galvanized cast ferrous metal only.

B. The finish of threaded steel conduit shall be galvanized only.

C. Wires for pulling into raceways for lighting and appliance branch circuitry shall be limited to "THWN".

D. Wires for pulling into raceways for feeders shall be limited to "THWN".

E. Plates for toggle switches and receptacles shall have gasketed snap shut covers suitable for wet locations while in use.

F. Final connections of flexible conduit shall be neoprene sheathed.

G. Apply one layer of half looped plastic electric insulating tape over wire nuts used for joining the conductors of wires.

H. Enclosures, junction boxes, pull boxes, cabinets, cabinet trims, wiring troughs and the like, shall be fabricated of galvanized sheet metal, shall conform to the following:

1. They shall be constructed with continuously welded joints and seams.

2. Their edges and weld spots shall be factory treated with cold galvanizing compound.

3. Their connection to circuitry shall be by means of watertight hub connectors with sealing rings.

I. Enclosures for individually mounted switching and overcurrent devices shall be NEMA Class IV weatherproof construction.

J. The covers, doors and plates and trims used in conjunction with all enclosures, pull boxes, outlet boxes, junction boxes, cabinets and the like shall be equipped with gaskets.

K. Panels shall be equipped with doors without exception.

L. The following shall be interpreted as damp or wet locations within building confines:

1. Spaces where any designations indicating weatherproof (WP) or vapor-proof appear on the drawings.

2. Below waterproofing in slabs applied directly on grade.

3. Spaces defined as wet or damp locations by article 100 of the National Electric Code.

3.10 REQUIREMENTS GOVERNING ELECTRIC WORK IN AIR HANDLING SPACES

A. Within air handling ductwork or plenums (other than spaces within suspended ceilings used for air handling purposes): Area B and the media shall comply with requirements for return air plenums.

1. Abide by the requirements specified for electric work in damp locations within building confines.

2. Where circuitry passes through duct walls, include, in accordance with instructions issued in the field, airtight sealing provisions which allow for a relative movement between the circuitry and the duct walls.

3. Exclude the installation of type NM or NMC cable.

B. In spaces within suspended ceilings used for air handling purposes, abide by the requirements specified for normal electric work conditions except:

1. Lighting fixtures recessed into the ceilings shall be certified as being suitable for

this purpose.

3.11 IDENTIFICATION AND TAGGING

A. Identify individually:

1. Each panelboard.
2. Each switch and circuit breaker.
3. Each feeder, wire or cable of all systems.
4. Each outlet.

B. Each wire or cable in a feeder shall be identified at its terminal points of connection and in each pullbox, junction box and panel gutter through which it passes.

C. The nomenclature used to identify panelboards or load center shall designate the numbers assigned to them.

D. The nomenclature used to identify switches or circuit breakers shall:

1. Where they disconnect mains or services designate this fact.

2. Where they control feeders, designate the feeder number and the name of the load supplied.

3. Where they control lighting and appliance branch circuitry, designate the name of the space and the load supplied.

E. The nomenclature used to identify feeder wires and cables shall designate the feeder number.

F. Identification for panelboards or load centers shall be by means of engraved lamacoid nameplates showing 1/4" high white lettering on a black background fastened to the outside face of the front.

G. Identification for switches or circuit breakers shall be by means of the following:

1. Where individually enclosed -- engraved lamacoid nameplates showing 1/8" high white lettering on a black background fastened on the outside front face of the enclosure.

2. Where in panelboards or load centers without doors -- same as for individually enclosed.

3. Where in panelboards or load centers with doors -- typewritten directories mounted behind transparent plastic covers, in metal frames fastened on the inside face of the doors.

H. Identification for wires and cables shall be by means of wrap around "brady" type labels.

I. Device plates for local toggle switches, toggle switch type motor starters, pilot lights and the like, whose function is not readily apparent shall be engraved with 1/8" high letters suitably describing the equipment controlled or indicated.

J. These identification letters shall be stamped into the metal of the bus bars of each phase of the main busses of each switchboard and each panelboard. The letters shall be visible from at least one "normal posture" location without having to demount any current carrying or supporting elements.

K. Identify each outlet box, junction box, and cabinet used in conjunction with empty raceway for wires of a future system by means of indelible markings on the inside denoting the system.

L. Prior to installing identifying tags and nameplates, submit their nomenclature for approval. Conform to all revisions issued by the Architect.

3.12 LIMITING NOISE PRODUCED BY ELECTRICAL INSTALLATION

A. Perform the following work, in accordance with field instructions issued by the Architect to assure that minimal noise is produced by electrical installations due to equipment furnished as part of the electrical work.

B. Check and tighten the fastenings of sheet metal plates, covers, doors and trims used in the enclosures of electrical equipment.

C. Remove and replace any individual device containing one or more magnetic flux path metallic cores (e.g., discharge lamp ballast, transformer, reactor, dimmer, solenoid) which is found to have a noise output exceeding that of other identical devices installed at the project.

3.13 SUPPORTS AND FASTENINGS

A. Support work in accordance with best industry standards and Mass. Electric Code.

B. Include supporting frames or racks for equipment, intended for vertical surface mounting, which is required in a free standing position.

C. Supporting frames or racks shall be of standard angle, standard channel or specialty support system steel members. They shall be rigidly bolted or welded together and adequately braced to form a substantial structure. Racks shall be of ample size to assure a workmanlike arrangement of all equipment mounted on them.

D. No work intended for exposed installation shall be mounted directly on any building surface. In such locations, flat bar members or spacers shall be used to create a minimum of 1/4" air space between the building surfaces and the work. Provide 3/4" thick exterior grade plywood painted with two coats of fire-retardant gray paint for mounting of panelboards.

E. Nothing (including outlet, pull and junction boxes and fittings) shall depend on electric conduits, raceways or cables for support.

F. Nothing shall rest on, or depend for support on, suspended ceiling media.

G. Support less than 2" trade size, vertically run, conduits at intervals no greater than 8 ft. Support such conduits, 2-1/2" trade size or larger, at intervals no greater than the story height, or 15 ft., whichever is smaller.

H. Where they are not embedded in concrete, support less than 1" trade size, horizontally run, conduits at intervals no greater than 7 ft. Support such conduits, 1" trade size or larger, at intervals no greater than 10 ft.

I. Support all lighting fixtures directly from structural slab, deck or framing member.

J. Where fixtures and ceilings are such as to require fixture support from ceiling openings frames, include in the electric work the members necessary to tie back the ceiling opening frames to ceiling suspension members or slabs so as to provide actual support for the fixtures noted above.

K. As a minimum procedure, in suspended ceilings support small runs of circuitry (e.g., conduit not in excess of 1 inch trade size) from ceiling suspension members as defined above. Support larger runs of circuitry directly from structural slabs, decks or framing members.

L. Fasten electric work to building structure in accordance with the best industry practice.

M. Floor mounted equipment shall not be held in place solely by its own dead weight. Include floor anchor fastenings in all cases.

N. For items which are shown as being ceiling mounted at locations where fastenings to the building construction element above is not possible, provide suitable auxiliary channel or angle iron bridging tying to building structural elements.

O. As a minimum procedure, where weight applied to the attachment points is 100 lbs. or less, fasten to concrete and solid masonry with bolts and expansion shields.

P. As a minimum procedure, where weight applied to building attachment points exceeds 100 lbs., but is 300 lbs. or less, conform to the following:

1. At field poured concrete slabs, utilize inserts with 20' minimum length slip-through steel rods, set transverse to reinforcing steel

3.14 SPLICING AND TERMINATING WIRES AND CABLES

A. Maintain all splices and joints in removable cover boxes or cabinets where they may be easily inspected.

B. Locate each completed conductor splice or joint in the outlet box, junction box, or pull box containing it, so that it is accessible from the removal cover side of the box.

C. Join solid conductors No. 8 AWG and smaller by securely twisting them together and soldering, or by using insulated coiled steel spring "wire nut" type connectors. Exclude "wire nuts" employing non-expandable springs. Terminate conductors No. 8 AWG and smaller by means of a neat and fast holding application of the conductors directly to the binding screws or terminals of the equipment or devices to be connected.

D. Join, tap and terminate stranded conductors No. 6 AWG and larger by means of solder sleeves, taps; and lugs with applied solder or by means of bolted saddle type or pressure indent type connectors, taps and lugs. Exclude connectors and lugs of the types which apply set screws directly to conductors. Where equipment or devices are equipped with set screw type terminals which are impossible to change, replace the factory supplied set screws with a type having a ball bearing tip. Apply pressure indent type connectors, taps and lugs utilizing tools manufactured specifically for the purpose and having features preventing their release until the full pressure has been exerted on the lug or connector.

E. Except where wire nuts are used, build up insulation over conductor joints to a value, equal both in thickness and dielectric strength, to that of the factory applied conductor insulation. Insulation of conductor taps and joints shall be by means of half-lapped layers of rubber tape, with an outer layer of friction tape; by means of half-lapped layers of approved plastic electric insulating tape; or by means of split insulating casings manufactured specifically to insulate the particular connector and conductor, and fastened with stainless steel or non-metallic snaps or clips.

F. Exclude splicing procedures for neutral conductors in lighting and appliance branch circuitry which utilize device terminals as the splicing points.

G. Exclude joints or terminations utilizing solder in any conductors used for grounding or bonding purposes.

H. Exclude all but solder or pressure indent type joints in conductors used for signaling or communications purposes.

I. Lugs for conductors used to make phase leg connections on the line side of the main service overcurrent and switching device shall be of the limiter type.

3.15 PULLING WIRES INTO CONDUITS AND RACEWAYS

A. Delay pulling wires or cables in until the project has progressed to a point when general construction procedures are not liable to injure wires and cables, and when moisture is excluded from raceways.

B. Utilize nylon snakes or metallic fish tapes with ball type heads to set up for pulling. In raceways 2" trade size and larger, utilize a pulling assembly ahead of wires consisting of a suitable brush followed by an 3-1/2" diameter ball mandrel.

C. Leave sufficient slack on all runs of wire and cable to permit the secure connection of devices and equipment.

D. Include circular wedge-type cable supports for wires and cables at the top of any vertical raceway longer than 20 feet. Also include additional supports spaced at intervals which are no greater than 10'. Supports shall be located in accessible pull boxes. Supports shall be of a nondeteriorating insulating material manufactured specifically for the purpose.

E. Pulling lubricants shall be used. They shall be products manufactured specifically for the purpose.

F. Slack on wires and cables located in cabinets and pull boxes shall be formed and set in place in groupings corresponding to their occupancy of raceways. They shall also be arranged, with insulators and supports provided where necessary, such that cable shims or other such temporary expedients do not have to be left permanently in place to prevent the wires and cables from shifting when covers or trims are removed.

3.16 REQUIREMENTS FOR THE INSTALLATION OF JUNCTION BOXES, OUTLET BOXES AND PULL BOXES

A. Flush wall mounted outlet boxes shall not be set back to back but shall be offset at least 24" horizontally regardless of any indication on the drawings.

B. Locate all boxes so that their removable covers are accessible without necessitating the removal of parts of permanent building structure, including piping, ductwork, and other permanent mechanical elements.

C. In conjunction with concealed circuitry, abide by one of the following instructions (as may be applicable to the conditions) in order to assure the aforementioned accessibility. (Not required for circuitry concealed by removable suspended ceiling tiles.)

1. For a small (outlet size) box on circuitry concealed in a partition or wall, locate box or fitting so that its removable cover side (or the face of any applied raised cover) penetrates through to within 1/8" a of the exposed surface of the building materials concealing the circuitry and apply a blank or device plate to suit the functional requirements.

2. For a large box on circuitry concealed in a partition, suspended ceiling, or wall, locate box totally hidden but with its removable cover directly behind an architectural access door or panel (included for the purpose, separate from the electric work) in the building construction which conceals the circuitry.

3. For a small (outlet size) box on circuitry concealed above and intended as an outlet for a surface mounted lighting fixture or other such electrical item, locate box so that its removable cover side penetrates through to the exposed surface of the building materials concealing the circuitry. Arrange the mounting of the lighting fixture or other item so that it completely covers the opening in the

building construction caused by the box.

4. For a small (outlet size) box on circuitry concealed in a suspended ceiling, and intended as an outlet for a non-demountable type of recessed lighting fixtures or other such electrical items, locate box totally hidden but with its removable cover not more than one foot away from the building construction opening occupied by the demountable items.

D. Apply junction and pull boxes in accordance with the following:

1. Include pull boxes in long straight runs of raceway to assure that cables are not damaged when they are pulled in.

2. Include junction and pull boxes to assure a neat and workmanlike installation of raceways.

3. Include junction and pull boxes to fulfill requirements pertaining to the limitations to the number of bends permitted in raceway between cable access points, the accessibility of cable joints and splices, and the application of cable supports.

4. Include all required junction and pull boxes regardless of indications on the drawings (which, due to symbolic methods of notation, may omit to show some of them).

E. Apply outlet boxes in accordance with the following:

1. Unless noted below or otherwise specifically indicated, include a separate outlet box for each individual wiring device, lighting fixture and signal or communication system outlet component. Outlet boxes supplied attached to lighting fixtures shall not be used as replacements for the boxes specified herein.

2. A continuous row of fixtures of the end-to-end channel type, designed for "through wiring," and wired in accordance with the specification hereinafter pertaining to circuitry through a series of lighting fixtures, may be supplied through a single outlet box.

3. A series of separate fixtures, designed for "through wiring," spaced not more than 4' apart, and inter- connected with conduit or raceway and circuitry which is in accordance with the specifications hereinafter pertaining to circuitry through a series of lighting fixtures, may be supplied through a single outlet box.

4. Connection to recessed ceiling fixtures supplied with pigtails may be arranged so that more than one, but not more than four, such fixtures are connected into a single outlet box. When adopting this procedure:

a. Utilize an outlet box no smaller than 5" square by 2-1/2" deep.

b. Allow no fixture to be supplied from an outlet box in another room.

5. Multiple local switches indicated at a single location shall be gang mounted in a single outlet box.

6. Include all required outlet boxes regardless of indications on the drawings (which due to symbolic methods of notation, may omit to show some of them).

F. Install junction boxes, pull boxes and outlet boxes in accordance with the following:

1. Exclude surface mounted outlet boxes in conjunction with concealed circuitry.

2. Exclude unused circuitry openings in junction and pull boxes. In larger boxes each such opening shall be closed with a galvanized sheet steel plate fastened with a continuous weld all around. In small outlet type boxes, utilize plugs as specified for such boxes.

3. Close up all unused circuitry openings in outlet boxes. Unused openings in cast boxes shall be closed with approved cast metal threaded plugs. Unused openings in sheet metal boxes shall be closed with sheet metal knock-out plugs.

4. Outlet boxes for switches shall be located at the strike side of doors. Indicated door swings are subject to field change. Outlet boxes shall be located on the basis of final door swing arrangements.

5. Boxes and plaster covers for duplex receptacles shall be arranged for vertical mounting of the receptacle.

6. Equip outlet boxes used for devices which are connected to wires of systems supplied by more than one set of voltage characteristics with barriers to separate the different systems.

G. Barriers in junction and pull boxes of outlet size shall be of the same metal as the box.

H. Barriers in junction and pull boxes which are larger than outlet size shall be of the polyester resin fiberglass of adequate thickness for mechanical strength, but in no case less than 1/4" thick. Each barrier shall be mounted, without fastenings, between angle iron guides so that they may be readily removed.

3.17 LOCATING AND ROUTING OF CIRCUITRY

A. In general, all circuitry shall be run concealed except that it shall be run exposed where the following conditions occur:

1. Horizontally at the ceiling of permanently unfinished spaces which are not assigned to mechanical or electrical equipment.

2. Horizontally and vertically in mechanical equipment spaces.

3. Horizontally and vertically in electric equipment rooms.

B. Concealed circuitry shall be so located that building construction materials can be applied over its thickest elements without being subject to spalling or cracking.

C. All circuitry and raceways shall not be run within slabs. If for field conditions requires raceways to be embedded in field poured structural building construction concrete fill or slab shall conform to the following:

1. All proposed embedded raceways shall be indicated on plan and elevation and submitted to the Architect and Structural Engineer for review and written approval prior to installation. Any costs associated with the review and approval shall be borned by the Electrical Subcontractor.

2. They shall be run "single layer" with their outside surface no closer than 1" to any surface of the structural concrete.

3. They shall not be located in any configuration which places the outside surface of one closer than 3" to the outside surface of another, except at tees, crosses or other single level wide angle junction points.

4. Where crossovers or close grouping are unavoidable, circuitry shall be carefully field coordinated so as not to cause structural weakness.

5. Where turned up or down into a wall or partition they shall, before entering same, be routed parallel for a long enough distance to assure that no relocation of the wall or partition will be necessary to conceal the required bend.

6. They shall be routed in such a manner as to coordinate with the structural requirements of the building.

7. They shall be routed in accordance with field instructions issued by the Architect where such instructions differ from specifications set forth herein.

D. Circuitry run exposed shall be routed parallel to building walls and column lines.

E. Exposed circuitry located overhead shall be run in a completely accessible manner on the underside of all piping and ductwork.

F. Circuitry run in suspended ceilings shall be routed parallel to building walls, column lines, etc.

G. Circuitry shall be routed so as to prevent electric conductors from being subject to high ambient temperature. Minimum clearances from heated lines or surfaces shall be maintained as follows:

1.	Crossing where uninsulated	3"
2.	Crossing where insulated	1"
3.	Running parallel where uninsulated	36"

4. Running parallel where insulated 6"

H. Circuitry shall not be run in elevator shafts, hoistways, and the like. Where outlets for trail cables, pit lights, run be level lights, and the like, are involved, only the "final connection" outlet boxes themselves shall be located within or open into, the confines of the shaft.

I. Circuitry for miscellaneous systems indicated without notation as to location and routing shall be run as per the requirements and notations governing the adjacent light and power circuitry.

END OF SECTION