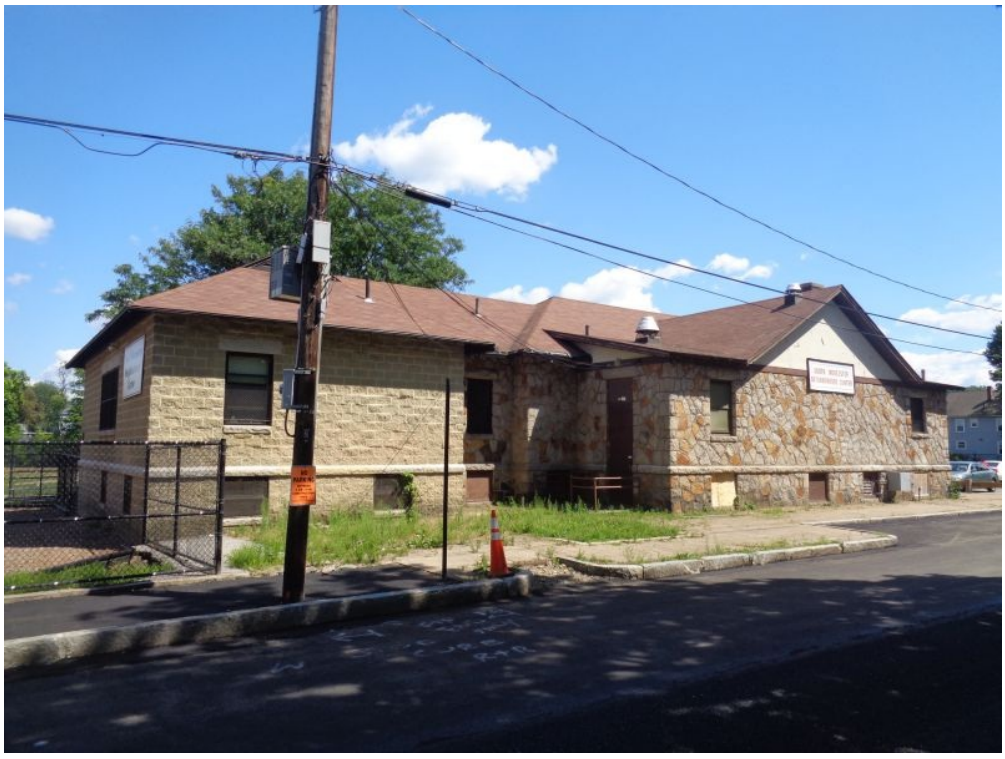
Interior Accessibility Renovations

South Worcester Neighborhood Improvement Center
Worcester, MA

October 2022



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SECTION 00.01.00

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SECTION 01.11.00

SUMMARY OF WORK

I PART 1 - GENERAL

1.01 GENERAL PROVISIONS

A. This section supplements the Conditions of the Contract, Prime Requirements, Drawings, and all other parts of the Contract Documents.

B. This Contractor must be familiar with all other Divisions and Sections of the Specifications which affect the work of this Section.

1.02 REQUIREMENTS INCLUDED

A. Work under this Contract.
B. Examination of Site and Documents.
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1.03 WORK UNDER THIS CONTRACT

A. The work to be done under this contract consists of executing and completing all work required for the Interior Accessibility Renovations to the South Worcester Neighborhood Improvement Center at 47 Camp Street, for the City of Worcester DPW and Parks Department.

B. For this project, the Prime Contractor shall be a contractor certified by DCAMM in the category of General Contractor, as a Prime Contractor.

C. The scope of work, without limiting the generality thereof, includes all labor, materials, equipment and services required to perform the work described fully in the Drawings and Specifications and includes, but is not limited to the following major work:

1. Demolition of existing storage room, bathroom and lift room for two new accessible bathrooms.
2. New floor construction in lift room.
3. Replacement of existing doors, frames and hardware.
4. Enclosing existing stage with a new construction wall.

5. Painting existing and new walls *in work areas*.
6. Replacement of stair railings in egress stairwell.
7. Replacement of existing kitchen ceiling and new drop ceiling in bathrooms and office areas.

D. The following major elements will be performed by the Owner, under separate contracts, for which the Prime Contractor has a coordinating responsibility:

1. Use of the adjacent playing field, by the public. The lower floor of the building contains the public restrooms which support the park, and construction operations may require coordination with staff to permit the continued use of the restrooms.

E. The following major elements will be furnished by the Owner, for installation by the Contractor or sub-contractors:

1. Metal transom.
2. Toilet paper, paper towel, and soap dispensers.

F. Reference to Drawings: The work to be done under this Contract is shown on the Drawings listed at the end of this Section.

G. Prevailing Wage: The Massachusetts Standard Labor Wage rates, as outlined in the exhibits, will be used in the construction of this project

1.04 EXAMINATION OF SITE AND DOCUMENTS

A. A pre-bid meeting will be held at the job site on the date and at the time indicated in the Invitation to Bid.

B. The bidders are expected to examine and to be thoroughly familiar with all contract documents and with the conditions under which the work is to be carried out. The Owner and Designers will not be responsible for errors, omissions, and/or charges for extra work arising from the Prime Contractor's or Subcontractor's failure to familiarize themselves with the contract documents. The Prime Contractor and Subcontractors acknowledge that they are familiar with the conditions and requirements of the contract documents where they require, in any part of the work a given result to be produced, and that the contract documents are adequate and will produce the required results.

1.05 CONTRACT METHOD

A. Work under this contract shall be lump sum price, for the scopes of work as described in these specifications and shown on the Drawings.

1.06 WORK SEQUENCE

A. The Work will be conducted in the following sequence of demolition/construction:

1. Actual sequence of the work will be left to the discretion of the Contractor, who will prepare a construction schedule showing the sequence and duration of work, for review and approval by the Owner.

1.07 SUPERVISION OF WORK

A. The Prime Contractor shall be held directly responsible for the correct installation of all work performed under this Contract. The Prime Contractor must make good repair, without expense to the Owner, of any part of the new work, or existing work to remain, which may become inoperative on account of leaving the work

unprotected or unsupervised during construction of the system or which may break or give out in any manner by reason of poor workmanship, defective materials or any lack of space to allow for expansion and contraction of the work during the Prime Contractor's warranty period, from the date of final acceptance of the work by the Owner.

B. The Prime Contractor shall furnish a competent Massachusetts licensed superintendent satisfactory to the Owner and to the Designer. The licensed superintendent shall supervise all work under this contract and who shall remain on duty at the site throughout the Contract period while work is in progress.

1. Submit the name and resume of the superintendent for approval to the Architect. Include experience with projects of equal size and complexity.

1.08 PRIME CONTRACTOR'S USE OF PREMISES

A. Use of the Site: Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is indicated.

1. Owner Occupancy: Allow for Owner occupancy in all offices, food storage and sorting areas and use by the public in the main sorting room.

2. Driveways and Entrances: Keep driveways and entrances serving the premises clear and available to the Owner, the Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

B. Schedule and perform work to afford minimum of interruption to normal and continuous operation of utility systems. Submit for approval, a proposed schedule for performing work; including construction of new utilities, re-routing of existing utilities and final connection of new work to existing work. Schedule shall indicate shutdown time required for each operation.

C. The Prime Contractor shall schedule as per Section 01.50.00 - Temporary Facilities and Controls, the shutting down or interrupting any utilities, services or facilities which may affect the operation of the building outside the area of work or other buildings, services or facilities.

D. The Prime Contractor can gain access to the premises during the hours specified below. In addition the Prime Contractor and his personnel will limit themselves only within the working premises during working hours. If work needs to be scheduled during times other than those listed below, Prime Contractor shall inform the Owner one week prior to work.

1. Deliveries: 7:00 AM to 6:00 PM.
2. Work on site: 8:00 AM to 4:00 PM
3. Weekends: with Owner's approval
4. Holidays: with Owner's approval

E. The Prime Contractor shall verify that Subcontractors have visited the site and included all costs associated with the location of the project, and any restriction or limitations the location of the project may pose.

F. All contractors shall at all times conduct their operations in a courteous, professional manner while on the project or in the vicinity of the project. Harassment, offensive language or behavior will not be permitted on the site.

G. The Owner can neither accept nor assume responsibility for the security of the Contractor's material or equipment which is lost, stolen or vandalized. The Contractor is advised to exert caution in placement and

storage of his equipment and material.

H. Parking: Contractors will be allowed to park on site, where directed by the Owner. Contractor vehicles shall not block the use of the building by the Owner.

I. Radios, tape players, "boom boxes", or other audio entertainment equipment, including personal entertainment devices, shall not be allowed on the project site.

J. The Contractor shall not permit smoking within the building. Locate smoking areas away from entries, outdoor intakes, and operable windows, including adjacent buildings.

K. The Contractor shall not allow the use of intoxicating beverages or non-prescription controlled substance drugs upon or about the work site.

L. The Contractor shall provide and maintain in good serviceable condition at all times, warning signs and non-combustible barriers, forms and fire resistive tarps or plastic, each of which shall be approved by the Owner, shall be suitable for the purpose, and shall be installed adjacent to each work area, for complete enclosure and/or isolation of all excavations, wells, pits, manholes, shafts, overhead areas, etc., which are associated with the work under the contract. Barriers shall be a secure fence, guardrail, cover, or similar assembly designed and erected to provide protection for concrete, protection from the weather, and to prevent accidental access. Barrier tape and/or sawhorses shall not be used as a means of such access protection.

1.09 COORDINATION

A. The Prime Contractor shall be responsible for the proper fitting of all the work and for the coordination of the operations of all Subcontractors or material and persons engaged upon the work. The Prime Contractor shall do, or cause his agents to do, all cutting, fitting, adjusting, and repair necessary in order to make the several parts of the work come together properly.

1. Examine Contract Documents in advance of start of construction and identify in writing questions, irregularities or interference to the designer in writing. Failure to identify and address such issues in advance becomes the sole responsibility of the Prime Contractor. A conflict that would cause the reduction of the normal ceiling height of any occupied space is considered to be an interference.

B. Execute the work in an orderly and careful manner with due regard to the occupants of the facility, the public, the employees, and the normal function of the facility.

C. The work sequence shall follow planning and schedule established by the Prime Contractor as approved by the Designer and the Owner. The work upon the site of the project shall commence promptly and be executed with full simultaneous progress. Work operations which require the interruption of utilities, service, and access shall be scheduled so as to involve minimum disruption and inconvenience, and to be expedited so as to insure minimum duration of any periods of disruption or inconvenience.

D. The Prime Contractor shall review the tolerances established in the specifications for each type of work and as established by Subcontractor organizations. The Prime Contractor shall coordinate the various Subcontractors and resolve any conflicts that may exist between Subcontractor tolerances without additional cost to the Owner. The Prime Contractor shall provide any chipping, leveling, shoring or surveys to ensure that the various materials align as detailed by the Designer and as necessary for smooth transitions not noticeable in the finished work.

1.10 PROJECT MEETINGS

A. Project meetings shall be held on a weekly basis and as required subject to the discretion of the Owner.

B. Attendees: In addition to the Project Manager and Designer, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

C. In order to expedite construction progress on this project, the Prime Contractor shall order all materials immediately after the approval of shop drawings and shall obtain a fixed date of delivery to the project site for all materials ordered which shall not impede or otherwise interfere with construction progress. The Prime Contractor shall present a list and written proof of all materials and equipment ordered (through purchase orders). Such list shall be presented at the meetings and shall be continuously updated.

D. Scheduling shall be discussed with all concerned parties, and methods shall be presented by the Prime Contractor, which shall reflect construction completion not being deferred or foreshortened. Identify critical long-lead items and other special scheduling requirements. The project schedule is to include time for submission of shop drawing submittals, time for review, and allowance for resubmittal and review.

1.11 PERMITS, INSPECTION, AND TESTING REQUIRED BY GOVERNING AUTHORITIES

A. If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having any jurisdiction require any portion of the Work to be inspected, tested, or approved, the Prime Contractor shall give the Designer, the Owner or his/her designated representative, and such Authority timely notice (5 business days minimum) of its readiness so the Designer may observe such inspecting, testing, or approval.

B. Prior to the start of construction, the Prime Contractor shall complete application to the applicable Building Code enforcement authority for a Building Permit. Such Permit shall be displayed in a conspicuous location at the project site. The building permit fee shall be paid by the Contractor.

C. Unless otherwise specified under the Sections of the Specifications, the Prime Contractor shall pay such proper and legal fees to public officers and others as may be necessary for the due and faithful performance of the work and which may arise incidental to the fulfilling of this Contract. As such, all fees, charges, and assessments in connection with the above shall be paid by the Prime Contractor.

D. Prime Contractor and specialized Subcontractors as applicable shall identify all permits (other than Prime building permit) required from Authorities having jurisdiction over the Project for the construction and occupancy of the work. The Prime Contractor shall prepare the necessary applications and submit required plans and documents to obtain such permits in a timely manner, and shall furnish the required information to the Building Official and obtain the required permits as early as practicable after award of the Contract.

E. Prior to the start of construction, the Prime Contractor shall complete applicable applications, permits, and notifications to the MADEP, such as the Demolition/Construction form BWP AQ-06, and pay the required fees. These forms must be submitted at least 10 working days in advance of any regulated activity on the site. Demolition permits must be submitted for any work involving demolition, new construction and renovation.

1.12 CUTTING, CORING, AND PATCHING, UNLESS OTHERWISE INDICATED

A. The Prime Contractor shall perform and/or coordinate all cutting, coring, fitting and patching of the work as specified in Section 01.73.29 – Cutting and Patching.

B. The Prime Contractor shall coordinate that the work of the Subcontractor is not endangered by any cutting, coring, excavating, or otherwise altering of the work and shall not allow the cutting or altering the work of

any Subcontractor except with the written consent of the Designer.

C. Performance:

1. Execute cutting and patching by methods which will prevent damage to other work, and will provide proper surfaces to receive installation of repairs.

   (a) In general, where mechanical cutting is required, cut work with sawing and grinding tools, not with hammering and chopping tools. Core drill openings through concrete work.

   (b) Prior to cutting and structural steel or concrete work, contact Designer and Project Structural Engineer in writing. Do not cut any structural steel and concrete work until approval has been granted by the Designer and the Project Structural Engineer.

2. Employ original installer or fabricator to perform cutting and patching for:

   (a) Weather-exposed or moisture-resistant elements.
   (b) Sight-exposed finished surfaces.

3. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances, and finishes.

4. Restore work which has been cut or removed; install new products matching existing to provide completed Work in accordance with requirements of Contract Documents.

5. Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

6. Patch with seams which are durable and as invisible as possible. Flash and seal all penetration of exterior work. Comply with specified tolerances for the work.

7. Restore exposed finishes of patched areas; and, where necessary extend finish restoration onto retained work adjoining, in a manner which will eliminate evidence of patching.

   (a) Where patch occurs in a smooth painted surface, extend final paint coat over the entire unbroken surface containing the patch.

8. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes:

   (a) For continuous surfaces, refinish to nearest intersection.
   (b) For an assembly, refinish entire unit.

D. Existing Utilities Services:

1. Interruptions to critical existing utility services will not be allowed except as scheduled per Section 01.50.00 - Temporary Facilities and Controls.

2. The Prime Contractor shall locate and record on Drawings all existing utilities along the course of the work by such means as the Designer and the Owner may approve, and shall preserve such marked locations until the work has progressed to the point where the encountered utility is fully exposed and protected as required. It shall be the Prime Contractor's responsibility to notify the proper authorities and/or utility company before interfering therewith.

3. Existing utilities that are indicated on the Drawings or whose locations are made known to the Prime

Contractor prior to excavations, though accuracy and information as to grades and elevations may be lacking, shall be protected from damage during the excavation and backfilling operations and, if damaged by the Prime Contractor, it shall be repaired by the Prime Contractor at his/her own expense.

4. All exposed conduits, wires, and/or cables shall be provided with sufficient protection and support to prevent failure, fraying, or damage due to backfilling or other construction operations.

1.13 DEBRIS REMOVAL

A. The Prime Contractor shall coordinate the removal of all demolition and construction waste including waste by all Subcontractors from the job site on a daily basis.

B. Debris shall be legally disposed of in a D.E.P. approved disposal site.

C. Contractors are advised that the project site is within an Asian Longhorn Beetle district. All vegetative waste and debris shall be disposed of at an approved Asian Longhorn Beetle site.

D. The Prime Contractor shall bear responsibility for maintaining the building and site clean and free of debris, leaving all work in clean and proper condition satisfactory to the Owner and the Designer. The Prime Contractor shall ensure that each of the Subcontractors clean up during and immediately upon completion of their work. Clean up includes the following tasks:

1. Remove all rubbish, waste, tools, equipment, appurtenances caused by and used in the execution of work.

E. Prevent the accumulation of debris at the construction site, storage areas, parking areas, and along access roads and haul routes.

F. Provide containers for deposit of debris and schedule periodic collection and disposal of debris.

G. Prohibit overloading of trucks to prevent spillage on access and haul routes.

H. The Prime Contractor shall be responsible for proper disposal of all construction debris leaving the site.

1.14 FIELD MEASUREMENTS

A. Although care has been taken to ensure their accuracy, the dimensions shown for existing items and structures are not guaranteed. It is the responsibility of the Prime Contractor to verify these dimensions in the field before fabricating any construction component. No claims for extra payment due to incorrect dimensions will be considered by the Owner.

1.15 SAFETY REGULATIONS

A. This project is subject to compliance with Public Law 91 596 "Occupational Safety and Health Act" latest edition (OSHA 29 CFR 1926), with respect to all rules and regulations pertaining to construction, including Volume 36, numbers 75 and 105, of the Federal Register, as amended, and as published by the U.S. Department of Labor.

B. Hazardous Waste Generation: Any work generating Hazardous or so-called Universal Wastes will comply with all requirements of 310 CMR 30.000. The proper storage, use and disposal of any hazardous chemicals or substances brought on site by the Contractor are the responsibility of Contractor. The Owner will not be responsible for any hazardous materials left on site, the cost to remove these materials will be the Contractor’s responsibility. All hazardous wastes generated as a result of demolition and remodeling shall be

contained, collected, segregated, labeled per all applicable federal EPA, Massachusetts DEP, and Federal DOT regulations or other applicable local, state or federal hazardous waste regulations, pending the appropriate disposition.

1.16 OSHA SAFETY AND HEALTH COURSE DOCUMENTATION

A. OSHA Safety and Health Course Documentation Records: Chapter 306 of the Massachusetts Acts of 2004 requires that everyone employed at the jobsite must complete a minimum 10-hour long course in construction safety and health approved by the U.S. Occupational Safety and Health Administration (OSHA) prior to working at the jobsite. Compliance is required of Prime Contractors' and Subcontractors' on-site employees at all levels whether stationed in the trailer or working in the field. Unless the Massachusetts Attorney General's office indicates otherwise, this requirement does not apply to home-office employees visiting the site or to suppliers' employees who are making deliveries.

B. OSHA 10 cards for anyone working on site are to be submitted prior to the first requisition.

C. Documentation records shall be initially compiled by the Prime Contractor and Subcontractors, and the Prime Contractor shall create and maintain a copy of the documentation on site at all times.

1.17 DAMAGE RESPONSIBILITY

A. The Prime Contractor shall repair, at no cost to the Owner, any damage to building elements, site appurtenances, landscaping, utilities, etc. caused during demolition operation and work of this Contract.

1.18 OWNER FURNISHED PRODUCTS

A. Products indicated "N.I.C." (Not in Contract), or "E. O." (Equipment by Owner), or "O.F.O.I." (Owner Furnished Owner Installed), or other similar acronyms as defined in the contract documents will be furnished and installed by the Owner. Coordination and provision of service lines for such products shall be included under these Construction Contract Documents, if indicated. Final connections from service lines to equipment will be by the Owner, unless otherwise indicated

1.19 ASBESTOS AND HAZARDOUS MATERIALS DISCOVERY

A. If unanticipated asbestos-containing materials or other Hazardous Materials not included in Contract are discovered at any time during the course of work, the Prime Contractor shall cease work in the affected areas only and continue work in other areas, at the same time notify the Designer of such discovery. Do not proceed with work in such affected areas until written instructions are received. If removal is required, payment will be made in accordance with the contract unit prices bid for each respective material. In the absence of unit prices, costs shall be negotiated or otherwise established prior to commencement of removal, in accordance with provisions of the Contract.

B. The Owner or Designer will work with the Contractor to initiate removal or encapsulation of the asbestos. An extension of the completion date may be granted equal to the time lost. Proper notification must be made to the MADEP through the ANF-001 form, and the Owner.

1.20 LIST OF DRAWINGS

T1 - COVER SHEET
A1.0 - DEMOLITION FIRST FLOOR PLAN
A1.1 - DEMOLITION BASEMENT FLOOR PLAN
A2.0 - NEW FIRST FLOOR PLAN
A2.1 - NEW BASEMENT FLOOR PLAN

A3.0 - WORK AREA PLANS AND DETAILS
A3.1 - NEW OFFICE AND KITCHEN RCP
A4.0 - ELEVATIONS AND DETAILS
A5.0 - DETAILS
S1.1 - PLANS AND SECTIONS
DP-1 - BASEMENT PLUMBING DEMOLITION PLAN
DP-2 - FIRST FLOOR PLUMBING DEMOLITION PLAN
P-1 - PROPOSED BASEMENT PLUMBING FLOOR PLAN
P-2 - PROPOSED FIRST FLOOR PLUMBING PLAN
DH-1 - FIRST FLOOR HEATING & VENTILATION DEMOLITION PLAN
H-1 - BASEMENT HVAC PLAN
H-2 - PROPOSED FIRST FLOOR HEATING & VENTILATION PLAN
E0 - LEGEND AND NOTES
ED1 - DEMOLITION PLAN
ED2 - DEMOLITION PLAN - BASEMENT
ED3 - DEMOLITION PLAN - FIRST FLOOR
E1 - LIGHTING PLAN
E2 - POWER PLAN
E3 - HVAC POWER PLAN
EH1 - ELECTRICAL HVAC POWER REPLACEMENT PLAN
ER1 - ELECTRICAL REPLACEMENT PLAN - BASEMENT
ER2 - ELECTRICAL REPLACEMENT PLAN - FIRST FLOOR

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

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SECTION 01.31.00

PROJECT MANAGEMENT AND COORDINATION

I. PART I - GENERAL

1.01 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.02 SUMMARY

A. Without limitations, coordination will include Critical Path Method Scheduling (CPM), coordination of submittals, coordination of all elements of the Work, and coordination of contract closeout.

B. Description:

1. Coordinate scheduling, submittals, and work of the various trades and elements of the Work to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items to be installed later.

2. Coordinate sequence of the Work to accommodate Partial (Beneficial) Occupancy.

C. Meetings:

1. In addition to progress meetings, hold coordination meetings and pre-installation conferences with personnel and Sub-Contractors to assure coordination of the Work. The coordination meetings are to be separate from the commissioning or commissioning meetings.

D. Coordination of Submittals:

1. Schedule and coordinate submittals.

2. Coordinate work of various trades having interdependent responsibilities for installing, connecting to, and placing in service such equipment.

3. Coordinate requests for substitutions to assure compatibility of space, of operating elements, and effect on work of other trades.

4. Contractor’s mark-up will be excluded from change orders caused by lack of coordination during design.

E. Commissioning:

1. Not applicable.

1.03 FIELD COORDINATION

A. Project scopes of limited complexity or limited utility installation will not require coordination drawings. The Prime Contractor remains responsible for field coordinating the work of all trades, to see that it comes together without conflict or loss of functionality.

1. Where field coordination is performed, the Prime Contractor shall advise the Designers of any conflict or field condition which results in the system being installed other than as designed.

2. In such instances, contractors are expected to propose alternative routes based on field conditions

revealed through the performance of the demolition. Rerouting shall not be performed, however, until first approved by the Designers. No additional compensation will be due for field coordination efforts.

3. Where rerouting of utilities differently than designed creates a conflict with another trade, which was not foreseen or properly coordinated between the contractors, the conflicting utility shall be revised at no expense to the Owner, to eliminate the conflict.

1.04 MEP COORDINATION DRAWINGS

A. Where the project scope includes multi-trade above ceiling or below grade utilities, prepare and submit coordination drawings for site utilities and building(s), for Designer and the Owner's Project Manager's review as specified herein.

B. The General Contractor shall be fully responsible for coordinating all trades, coordinating construction sequences and schedules, and coordinating the actual installed location and interface of all work. Before materials are fabricated or the Work begun, the General Contractor shall supervise and direct the creation of one (1) complete set of Coordination Drawings showing the complete coordination and integration of all Work of this Project including, but not limited to, structural, architectural, mechanical, plumbing, fire protection, and electrical disciplines. Coordination Drawings are intended to assist the General Contractor during construction and shall not be used for "shop drawings", "record drawings", or any other required submittal.

1. Base Sheets: The General Contractor shall prepare and provide one accurately scaled set of building coordination drawing "base sheets" on reproducible transparencies or electronic format showing all architectural and structural work. Base sheets shall be at 1/4-inch scale, except congested areas and sections through vertical shafts shall be at 3/8-inch scale.

2. HVAC: The General Contractor shall circulate the coordination drawing base sheets to the HVAC Sub-Contractor and require the HVAC Sub-Contractor to accurately and neatly show the actual size and location of all HVAC equipment and work. Ductwork shall be drawn to scale with full dimensions indicated graphically. Single line diagrams are not acceptable. The HVAC Sub-Contractor shall note any apparent conflicts, suggest alternate solutions, and return the coordination drawings to the General Contractor.

3. Plumbing: The General Contractor shall circulate the coordination drawings to the Plumbing Sub-Contractor and require the Plumbing Sub-Contractor to accurately and neatly show the actual size and location of all plumbing equipment and work. The Plumbing Sub-Contractor shall note any apparent conflicts, suggest alternate solutions, and return the coordination drawings to the General Contractor. Sloped plumbing lines have right of way.

4. Electrical: The General Contractor shall circulate the coordination drawings to the Electrical Sub-Contractor and require the Electrical Sub-Contractor to accurately and neatly show the actual size and location of all electrical equipment and work. The Electrical Sub-Contractor shall note any apparent conflicts, suggest alternate solutions, and return the coordination drawings to the General Contractor.

5. Other Trade and Non Sub-Contractors: The General Contractor shall circulate the coordination drawings to other Trade and Non Sub-Contractors and trades whose work might conflict with other work and require these Trade and Non Sub-Contractors to accurately and neatly show the actual size and location of all their equipment and work. These Trade and Non Sub-Contractors shall note any apparent conflicts, suggest alternate solutions, and return the coordination drawings to the General Contractor.

6. After each trade completes its drawings, a meeting will be held to resolve conflicts between the trades.

   (a) Coordination drawings shall be prepared at not less than 1/4-inch scale, and electronic AutoCAD files of same.

   (b) Submit drawings to the General Contractor for Designer's review prior to starting any installations.

(c) Items of impossibility or request for variance shall be called to the General Contractor's attention for the Designer's resolution.

7. General Contractor Review and Submission: The General Contractor shall carefully review, modify and approve coordination drawings in cooperation with the Trade and Non Sub-Contractors to assure that conflicts, if any, are resolved before work in the field is begun and to ensure that the location of work exposed to view is as indicated or as approved by the Designer and the Owner.

   (a) Prior to submittal of the coordination drawings, the Trade and Non Sub-Contractors shall affix their signatures to the drawings.

   (b) Clearly indicate conflicts requiring modification to the general appearance or the function of the project for Designer and Owner's reviews, and approvals.

   (c) The General Contractor shall stamp, sign and submit the coordination drawing originals to the Designer for review and approval, with one (1) paper copy and one (1) additional electronic copy on compact disk to the Owner, following the specified procedures and policies outlined in Section 01.33.00 – SUBMITTAL REQUIREMENTS. In no case shall acceptance of coordination drawings be interpreted as a release of General Contractor of responsibility to fulfill all of the requirements of the Contract Documents.

II. PRODUCTS (Not Used)

III. EXECUTION (Not Used)

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SECTION 01.32.00

CONSTRUCTION PROGRESS DOCUMENTATION

I. PART I - GENERAL

1.01 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.02 REQUIREMENTS INCLUDED

A. Procedures and requirements for submission and review of progress schedules and reports.

1.03 RELATED SECTIONS

A. Section 01.10.00 – SUMMARY

1. Project meetings.

B. Section 01.31.00 - PROJECT MANAGEMENT AND COORDINATION

1. Progress and coordination meetings.

C. Section 01.33.00 - SUBMITTAL REQUIREMENTS

1. Project reports.
2. Schedule of values.
3. Shop drawings, product data, and samples.

1.04 CONSTRUCTION SCHEDULE

A. Prime Contractor shall prepare and submit for Designer and Owner's information, a Critical Path Method (CPM) Progress Schedule for the work of the project. Said schedule will be coordinated with the Designer's Work Plan to include sequencing of the project work and shall be submitted within 2 weeks of pre-construction meeting.

B. In addition, the Prime Contractor shall prepare and submit at each project meeting, a two- week look-ahead schedule. The schedule shall identify:

1. Major elements of the work which were complete since the last project meeting, organized by room or by trade.

2. Major elements of the work to be performed in the next two weeks, to be able to track short-term conformance to the overall project schedule.

3. A projection of any upcoming required service interruption notices

1.05 CRITICAL PATH METHOD SCHEDULING

A. The Prime Contractor remains responsible for identifying the critical path of all project activities and milestones, and will not be entitled to any additional compensation or any additional days related to Change Order work unless it can be demonstrated that latent conditions impact the critical path.

B. The critical path schedule shall be updated and resubmitted with each Application for Payment, and shall be considered a prerequisite for payment.

C. Additional Requirements

1. Provide a list of all items requiring submittal, their lead time, and the date by which submittal approval is required in order for the materials to on site at the required time.

II. PRODUCTS (Not Used)

III. EXECUTION (Not Used)

END OF SECTION

SECTION 01.33.00

SUBMITTALS

I. PART 1 - GENERAL

1.01 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.02 RELATED DOCUMENTS

A. This Section supplements the General Conditions.

B. Consult the individual sections of the specifications for the specific submittals required under those sections and for further details and descriptions of the requirements

1.03 GENERAL PROCEDURES FOR SUBMITTALS

A. Timeliness - The Contractor shall transmit each submittal to the Architect sufficiently in advance of performing related Work or other applicable activities so that the installation is not delayed by processing times, including disapproval and resubmittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery, and similar sequenced activities. No extension of time will be authorized because of the Contractor's failure to transmit submittals to the Architect in advance of the Work.

1. Allow 10 business days for the Architect’s review of submittals.

B. Sequence - The Contractor shall transmit each submittal in a sequence which will not result in the Architect's approval having to be later modified or rescinded by reason of subsequent submittals which should have been processed earlier or concurrently for coordination.

C. Contractor's Review and Approval - Only submittals received from and bearing the stamp of approval of the Contractor will be considered for review by the Architect. Submittals shall be accompanied by a transmittal notice stating name of Project, date of submittal, "To", "From" (Contractor, Subcontractor, Installer, Manufacturer, Supplier), Specification Section, or Drawing No. to which the submittal refers, purpose (first submittal, resubmittal), description, remarks, distribution record, and signature of transmitter.

D. Architect's Action - The Architect will review the Contractor's submittals and return them with one of the following actions recorded thereon by appropriate markings:

1. Final Unrestricted Release: Where marked "No Exceptions Taken" the Work covered by the submittal may proceed provided it complies with the requirements of the Contract Documents.

2. Final-But-Restricted Release: When marked "Note Markings" or “Comments Attached” the Work may proceed provided it complies with the Architect's notations or corrections on the submittal and complies with the requirements of the Contract Documents. Acceptance of the Work will depend on these compliances.

3. Returned for Resubmittal: When marked "Resubmit" or "Rejected" the Work covered by the submittal (such as purchasing, fabrication, delivery, or other activity) should not proceed. The submittal should be revised or a new submittal resubmitted without delay, in accordance with the Architect's notations stating the reasons for returning the submittal.

E. Processing - All costs for printing, preparing, packaging, submitting, resubmitting, and mailing, or delivering submittals required by this contract shall be included in the Contract Sum.

1.04 OR EQUALS

A. Definition - Whenever a specification section names one or more brands for a given item, and the Contractor wishes to submit, for consideration, another brand, the submission shall be considered an "or-equal" or a "material substitution". For the purposes of this Contract, the terms "or-equal" and "material substitution" shall be considered synonymous.

B. In no case may an item be furnished on the Work other than the item named or described, unless the Architect, with the Owner's written concurrence, shall consider the item equal to the Item so named or described.

C. The equality of items offered as "equal" to items named or described shall be proved to the satisfaction of the Architect at the expense of the Contractor submitting the substitution.

1.05 SUBMISSION OF PRODUCT DATA

A. The Contractor shall submit an electronic copy of Product Data, in Adobe Acrobat (pdf) format to the Architect. All such data shall be specific and identification of material or equipment submitted shall be clearly marked or highlighted. Data of general nature will not be accepted.

B. Product Data shall be accompanied by a transmittal notice. The Contractor's stamp of approval shall appear on the printed information itself, in a location which will not impair legibility.

C. Product Data returned by the Architect as "Rejected" shall be resubmitted until the Architects approval is obtained.

D. When the Product Data are acceptable, the Architect will stamp them “No Exceptions Taken”, and return 1 copy to the Contractor. The Contractor shall provide and distribute additional copies as may be required to complete the Work.

E. The Contractor shall maintain one full set of approved, original, Product Data at the site.

1.06 SUBMISSION OF SHOP DRAWINGS

A. Shop Drawings shall be complete, giving all information necessary or requested in the individual section of the specifications. They shall also show adjoining Work and details of connection thereto.

B. Shop Drawings shall be for whole systems. Partial submissions will not be accepted.

C. The Architect reserves the right to review and approve shop drawings only after approval of related product data and samples.

D. Shop drawings shall be properly identified and contain the name of the project, name of the firm submitting the shop drawings, shop drawing number, date of shop drawings and revisions, Contractor's stamp of approval, and sufficient spaces near the title block for the Architect's stamp.

E. The Contractor shall submit to the Architect three (3) black line prints of each shop drawing or one electronic copy in Adobe Acrobat (pdf) format, at the Architect’s discretion. Prints may be mailed, delivered in roll form or emailed. Each submittal shall be accompanied by a transmittal notice bearing the Contractor's approval stamp.

F. When the Architect returns a marked submittal with the stamp "Resubmit" or "Confirm", the Contractor shall correct the original drawing or prepare a new drawing and resubmit three prints or an electronic version thereof to the Architect for approval. This procedure shall be repeated until the Architect's approval is obtained.

G. When the Architect returns submittal with the stamp "No Exceptions Taken", the Contractor shall provide and distribute the prints for all Contractor and Subcontractors use.

H. The Contractor shall maintain one full set of approved shop drawings at the site.

1.07 SUBMISSION OF SAMPLES

A. Unless otherwise specified in the individual section, the Contractor shall submit two specimens of each sample.

B. A transmittal notice with the Contractors stamp of approval shall be included with all sample submittals.

C. Samples shall be of adequate size to permit proper evaluation of materials. Where variations in color or in other characteristics are to be expected, samples shall show the maximum range of variation. Materials exceeding the variation of approved samples will not be approved on the Work.

D. Samples that can be conveniently mailed shall be sent directly to the Architect, accompanied by a transmittal notice. All transmittals shall be stamped with the Contractor's approval stamp of the material submitted.

E. All other samples shall be delivered at the field office of the Project Representative with sample identification tag attached and properly filled in.

F. If a sample is rejected by the Architect, a new sample shall be resubmitted in the specified manner. This procedure shall be repeated until the Architect approves the sample.

G. Samples will not be returned unless return is requested at the time of submission. The right is reserved to require submission of samples whether or not particular mention is made in the specifications, at no additional cost to the Owner.

END OF SECTION

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SECTION 01.50.00

TEMPORARY FACILITIES AND CONTROLS

I. PART I - GENERAL

1.01 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.02 REQUIREMENTS INCLUDED

A. Temporary Facilities and Controls including the following:

1. Temporary Water.
2. Weather Protection.
3. Heating During Construction.
4. Temporary Power.
5. Hoisting Equipment and Machinery.
6. Staging.
7. Maintenance of Access.
8. Dust Control.
9. Noise Control.
10. Indoor Air Quality (IAQ) Management.
11. Enclosures.
12. Cleaning During Construction.
13. Field Offices.
14. Telephone Service.
15. Sanitary Facilities.
16. Construction Barriers.
17. Parking.
18. Debris Control and Removal.
19. Safety Protection.
20. Vehicle and Equipment Protection.
21. Shoring.
22. Construction Fence.
23. Project Identification Sign.
24. Delivery of Materials.
25. Shut Down Notice.
26. Construction Cores.
27. Covered Walkways
28. Excavations and Field Survey Requirements

1.03 TEMPORARY WATER

A. Contractors may use water available at the site, provided for and paid for by the Owner, provided it is not used wastefully. Connections to hose bibbs or sill cocks shall be made where directed by the Owner in the field.

B. Any temporary hoses and pipe lines and connections from the permanent service lines either outside or within the building, necessary for the use of the General Contractor and his Subcontractors shall be installed, protected, and maintained at the expense of the Plumbing Subcontractor.

C. Temporary hoses and temporary pipe lines used for transporting water shall not be run unattended or unprotected across parking areas, parking area entrance, walkways, plazas, or steps. Temporary hoses and temporary pipelines shall not be permitted to be installed along, through or across corridor and occupied rooms or spaces.

D. The General Contractor shall provide an adequate supply of drinking water from approved sources of acceptable quality, satisfactorily cooled, for his employees and those of his Subcontractors.

E. Use of the water may be discontinued by the Owner if, in their opinion, it is wastefully used.

1.04 WEATHER PROTECTION

A. Although the project scope is entirely interior, state law requires that the General Contractor shall provide temporary enclosures and heat to permit construction work to be carried on during the months of November through March in compliance with M.G.L. Chapter 149, Section 44D(G), if required due to work performed. Under no circumstances shall the General Contractor suspend any work during the months of November through March because of their reluctance to provide and pay for temporary weather protection. These Specifications are not to be construed as requiring enclosures or heat for operations that are not economically feasible to protect in the judgment of the Designer. Included in the preceding category, without limitation, are such items as site work, excavation, steel erection, erection of certain "exterior" wall panels, roofing, and similar operations.

B. "WEATHER PROTECTION" shall mean the temporary protection of that work adversely affected by moisture, wind, and cold, by covering, enclosing and/or heating. This protection shall provide adequate working areas during the months of November through March as determined by the Designer and consistent with the approved construction schedule to permit the continuous progress of all work necessary to maintain an orderly and efficient sequence of construction operations. The General Contractor shall furnish and install all "weather protection" material and be responsible for all costs, including heating required to maintain a minimum temperature of 50 degrees F. at the working surface, except in unheated buildings. This provision does not supersede any specific requirements for methods of construction, curing of materials or the applicable general conditions set forth in the Contract Articles with added regard to performance obligations of the General Contractor.

1. Within 30 calendar days after his award of contract, the General Contractor shall submit in writing to the Designer for approval, three copies of his proposed methods for "Weather Protection."

2. Installation of weather protection and heating devices shall comply with all safety regulations including provisions for adequate ventilation and fire protection devices. Heating devices which may cause damage to finish surfaces shall not be used.

1.05 HEATING DURING CONSTRUCTION

A. The General Contractor, with the approval of the Owner, may use the permanent heating system as specified for the project.

B. The General Contractor shall maintain heat therein of not less than 50 degrees F., nor more than 75 degrees F., which shall be continuously maintained in the enclosed area to the extent necessary to properly progress and protect the work until the project is accepted.

1. Should heating system shutdown require temporary heating to maintain the specified temperatures, the General Contractor shall submit in writing to the Designer for approval, three copies of his method and time schedule for heating during construction.

2. Costs for temporary heat shall be solely the General Contractor’s.

C. The installation and operation of heating devices shall comply with all safety regulations including provisions for adequate ventilation and fire protection. Heating devices which may cause damage to finish surfaces shall not be used.

D. Contractors shall have qualified personnel available 7 days a week, 24 hours a day to respond to emergencies or service or check heating equipment when required, to protect the Work and the building.

1.06 TEMPORARY POWER

A. Contractors may utilize electrical power where available in or around the Work Area, and the Owner shall pay the cost of electricity used.

1. The use of cordless tools is strongly encouraged.

2. Contractors shall provide their own electrical cords, and cords shall not be run through or across egress components.

B. Modification of electrical panels is not permitted, except where higher voltages are required for specialty tools. Any panel modifications may only be performed by a licensed electrician, and with the Owner's approval.

C. Generators for temporary power will be permitted.

1.07 HOISTING EQUIPMENT AND MACHINERY

A. All hoisting equipment and machinery required for the proper and expeditious prosecution and progress of the work shall be furnished, installed, operated and maintained in safe condition by the individual Subcontractors and is so stated in each appropriately related Section of the Specifications. All costs for hoisting operating services shall be borne by the Subcontractors unless specifically excepted in the Contract Documents.

1. A licensed equipment manufacturer's representative shall be present at all times, to witness the erection and dismantling of all hoisting equipment and machinery, whenever such equipment is being erected or dismantled. No such work will be performed without the presence of such representative.

2. Hoisting equipment and machinery erection and dismantling shall be performed only by trained, certified, and experienced riggers qualified to perform such work.

3. Copies of such licenses and/or certifications, clearly indicating qualifications, shall be provided to the designer prior to commencement of such erecting and dismantling work.

B. Review Drawings for hoisting requirements and openness of traffic access routes to installed destinations of specified equipment and furnishings.

1.08 STAGING

A. All staging, planking and scaffolding, exterior and interior, required for the proper execution of the work and over eight feet in height, shall be furnished, installed, and maintained by the Prime Contractor.

1. Erection and dismantling of staging shall be performed only by trained, certified, and experienced staging personnel qualified to perform such work.

2. Copies of such certifications, clearly indicating qualifications, shall be provided to the Owner prior to commencement of such erecting and dismantling work.

3. All staging up to eight feet in height shall be provided by the individual Subcontractors as applicable to their work.

4. Use of staging extends to the Owner's contractors as may be listed in Section 01.11.00 - Summary of Work, where applicable.

1.09 MAINTENANCE OF ACCESS

A. The Prime Contractor shall provide and maintain for the duration of his contract, a means of access to, around and within the site, as indicated on the Contract Drawings, for vehicular traffic and authorized personnel. This means of access shall be construed to sustain the weight of equipment customarily engaged for use in construction projects of this type and magnitude. The Prime Contractor shall, without additional compensation from the Owner, furnish labor and materials as may be required from time to time to maintain this means of access in an

acceptable condition as determined by the Designer. Pedestrian access shall provide adequate protection against falling debris, slippage, adequate lighting, warning and directional signs, and protection against construction activities.

1.10 DUST CONTROL

A. The Prime Contractor shall have all Subcontractors provide adequate means for the purpose of preventing dust caused by construction operations from creating a hazard, nuisance, and from entering adjacent occupied areas throughout the period of the construction contract.

B. This provision does not supersede any specific requirements for methods of construction or applicable general conditions set forth in the Contract Articles with added regard to performance obligations of the Prime Contractor.

1.11 NOISE CONTROL

A. Work must be scheduled and performed in such a manner as to not interfere with the operations of the Owner. Construction work that is deemed by the Owner to be excessively noisy may be required to be done during non-normal working hours and at no additional expense.

B. Comply with requirements of authorities having jurisdiction. Develop and maintain a noise-abatement program and enforce strict discipline over all personnel to keep noise to a minimum.

C. Execute construction work by methods and by use of equipment which will reduce excess noise.

1. Equip air compressors with silencers, and power equipment with mufflers.
2. Manage vehicular traffic and scheduling to reduce noise.
3. No heavy equipment may be started or idled before 7A.M.

1.12 INDOOR AIR QUALITY (IAQ) MANAGEMENT

A. Minimize exposure of building occupants, indoor surfaces, and ventilation air distribution systems to environmental tobacco smoke. At a minimum, take the following measures:

1. Prohibit smoking in the building.
2. Locate exterior designated smoking areas away from entries, outdoor air intakes, and operable windows.

B. During Construction:

1. During construction meet or exceed the recommended Control Measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, Chapter 3, November 2007.

2. Protect stored on-site and installed absorptive materials from moisture damage.

3. If the Owner authorizes the use of permanent heating, cooling, and ventilating systems during construction, install filter media having a Minimum Efficiency Reporting Value (MERV) of 8 according to ASHRAE 52.2 at each return-air inlet for the air-handling system used during construction. Replace air filters immediately prior to occupancy. Replacement air filters shall have a MERV 13 according to ASHRAE 52.2.

C. Before Occupancy:

1. Conduct a baseline indoor air quality testing procedure consistent with the United States Environmental Protection Agency's "Compendium of Methods for the Determination of Air Pollutants in Indoor Air."

1.13 ENCLOSURES

A. Provide temporary, insulated, weather tight closures of openings in exterior surfaces for providing acceptable working conditions and protection for materials, allowing for heating during construction, and preventing entry of unauthorized persons. Provide doors with self-closing hardware and locks.

B. All utilities including electric ducts, conduits, telephone lines, sprinklers, and other utilities shall be protected against damage from construction activity. The General Contractor shall be responsible for all damage to the utilities from construction and shall repair all such damage at no additional cost to Owner.

C. Provide temporary partitions and/or ceiling as required to separate work areas from occupied areas, to prevent penetration of dust and moisture into occupied areas, to prevent damage to existing areas and equipment. Construction shall be framing and sheet materials with closed joints and sealed edges at intersections with existing surfaces; (STC rating 35 in accordance with ASTM E900. Flame Spread Rating of 25 in accordance with ASTM E84.)

1.14 CLEANING DURING CONSTRUCTION

A. Unless otherwise specified under the various Sections of the Specifications, the General Contractor shall perform clean-up operations during construction as herein specified.

B. Control accumulation of waste materials and rubbish; periodically dispose of off-site in a legal manner. The General Contractor shall bear all costs, including fees resulting from such disposal.

C. Clean interior areas prior to start of finish work and maintain areas free of dust and other contaminants during finish operations.

D. Clean all dirt and debris tracked into other buildings by construction personnel, to the satisfaction of the Owner.

E. Maintain project in accordance with all local and Federal Regulatory Requirements.

F. Store volatile wastes in covered metal containers, and remove from premises.

G. Prevent accumulation of wastes which create hazardous conditions.

H. Provide adequate ventilation during use of volatile or noxious substances.

I. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.

1. Do not burn or bury rubbish and waste materials on 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.
4. Identify potential sources of cleaning water runoff and propose abatement procedures.

J. Use only those materials which will not create hazards to health or property and which will not damage surfaces.

K. Use only those cleaning materials and methods recommended by manufacturer of surface materials to be cleaned.

L. Execute cleaning to ensure that the buildings, the sites, and adjacent properties are maintained free from accumulations of waste materials and rubbish and windblown debris, resulting from construction operations.

M. Provide on-site containers for collection of waste materials, debris, and rubbish.

N. Remove waste materials, debris and rubbish form the site periodically and dispose of at legal disposal dump site (DEP approved). Recycle where possible.

O. Handle material in a controlled manner with as few handlings as possible. Do not drop or throw materials from heights.

P. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not damage surrounding surfaces.

1.15 FIELD OFFICES

A. Contractors may not utilize space within the project area for a field office. The Owner will not provide usable space, outside of the project area, as field offices for the contractors.

B. If desired, the Prime Contractor may provide a suitable field office on site for its own use and at his own expense. The office trailer shall be relocated if required by the Owner, and shall be secured to the site as required by the Building Code.

1.16 TELEPHONE SERVICE

A. Wired telephone service to the office trailer or project site is not required, although contractors may elect to have such service at their own expense.

B. All Designers, Superintendents and Project Managers shall maintain cellular telephones and be reachable Monday - Friday between 8AM and 5PM, and after hours for emergency calls. Phone numbers shall be listed on a Project Directory, to be submitted at the pre-construction meeting.

1.17 SANITARY FACILITIES

A. Use of toilet facilities within the building is prohibited.

B. The General Contractor shall provide (2) wheelchair accessible portable toilets on site, for the use of construction staff and building staff/patrons, from the time of site mobilization through Substantial Completion.

C. Chemical toilets and their maintenance shall meet requirements of state and local health regulations and ordinances and shall be subject to the approval the Owner and Designer. The contractor is responsible for the security of the portable toilets and shall promptly remove and replace any portable toilets which are damaged by the public.

D. If the Owner allows the use of public toilet rooms on site, the General Contractor shall take responsibility for maintenance and cleaning of such areas and shall leave them in first class condition equal to the accepted conditions of toilet facilities not used for construction personnel.

1.18 CONSTRUCTION BARRIERS

A. Proper construction barriers shall be provided around the contract work areas as defined by the Contract Drawings or as directed by the Owner.

B. Construction barriers shall consist of traffic cones, ribbons, tapes, secure fencing, trench covers, wood barriers, warning signs, directional signs, and other traffic materials to keep traffic and people from area of construction and maintain ongoing operations.

C. Barriers shall be erected at such approved locations as are necessary, sufficiently cross-braced and supported adequately from floors and ceilings as required.

1.19 PARKING

A. Contractors shall park where directed by the Owner, and move vehicles when requested by the Owner.

1. Access to loading docks, driveways, staff, faculty, visitor or tenant parking shall not be blocked by construction vehicles.

2. Parking in handicapped accessible spaces will not be permitted.

B. Idling of vehicles on site will not be permitted.

C. If the Owner authorizes parking on lawns, the Prime Contractor shall be responsible for repairing any damage to lawns or curbs from parked vehicles.

1.20 DEBRIS CONTROL AND REMOVAL

A. Debris shall not be permitted to accumulate or migrate and the work shall at all times be kept satisfactorily clean. Facility trash receptors shall not be used for the disposal of debris. Dumpster shall be provided by the General Contractor for removal of debris for all Subcontractors.

B. Remove debris from the work site on a daily basis and dispose of same at any (private or public) DEP approved dump that the General Contractor may choose providing that the General Contractor shall make all arrangements and obtain all approvals and permits necessary from the owner or officials in charge of such dumps. During disposal process, copies of daily receipts from dumpsite shall be submitted on a regular basis.

1.21 SAFETY PROTECTION

A. At no time shall the work be left unattended without proper safety protection and shall not be left unprotected to the weather and accessible to the public. It is the responsibility of the General Contractor to maintain proper safety protection for the public while work is in progress or unattended.

1.22 VEHICLE AND EQUIPMENT PROTECTION

A. All construction activities shall be performed in such a manner so as not to dust, stain or damage any building elements, equipment, vehicles, etc. within general vicinity of the construction work area. Any damage to these items shall be cleaned and repaired at the expense of the General Contractor.

1. All construction vehicles and equipment on site shall be effectively disabled and secured when not in use.

1.23 SHORING

A. The Subcontractors shall provide all temporary shoring and bracing as required for the proposed work. Comply with all applicable codes and standards.

1.24 CONSTRUCTION FENCE

A. A construction fence is not required on this project.

1.25 PROJECT IDENTIFICATION

A. No project sign is required by the Owner.

B. If the Contractor wishes to provide a project sign, at his own expense, the Owner reserves the right to approve the content and appearance of the sign.

C. Any signs will be located on site where directed by the Owner, and shall be relocated or removed if the Owner so directs.

1.26 DELIVERY OF MATERIALS

A. All Materials shall be delivered to the Contractor's or Sub-Contractor's warehouse or may be delivered to the site if the Contractor's representative is present to receive them.

B. No materials will be received by the Owner's personnel.

1.27 SHUT DOWN NOTICE

A. The Contractor shall notify the Owner, at least fourteen (14) calendar days in advance, of the need for any utility shut down to install or modify any utilities or building systems. The shutdown request shall indicate:

1. The utility to be shutdown.
2. The duration of the shutdown.
3. The spaces anticipated to be affected by the shutdown.

B. Investigation of the existing systems to determine the areas served, the location of isolation valves or sub-panels, etc., is to be anticipated and included in the bid scope.

C. Shutdowns involving sprinkler systems or fire alarm systems, for which the Authority Having Jurisdiction (AHJ) requires a fire watch, the contractor performing the shutdown shall provide and pay for the fire watch at no additional cost to the Owner.

D. Utility shutdowns affecting other buildings will be limited to occur after normal working hours. No additional compensation will be paid for overtime.

1.28 EXCAVATIONS AND FIELD SURVEY REQUIREMENTS

A. Not applicable.

II. PART II - PRODUCTS (Not Used)

III. PART III - EXECUTION (Not Used)

END OF SECTION
01.50.00

SECTION 01.73.29

CUTTING AND PATCHING

I. PART-1 GENERAL

1.01 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 1 - GENERAL REQUIREMENTS, which are hereby made a part of this section of the specifications.

1.02 SCOPE OF WORK

A. The General Contractor shall coordinate the work to ensure that all embedded or concealed items are placed prior to the closing of construction. Where opening up construction is required to install any aspect of the work, the General Contractor shall be solely responsible for the cutting and patching of such materials.

1.03 SUMMARY

A. This Section specifies administrative and procedural requirements for cutting and patching.

B. Refer to other Sections for specific requirements and limitations applicable to cutting and patching.

1.04 QUALITY ASSURANCE

A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio.

B. Obtain approval of the cutting and patching proposal from the Designer before cutting and patching structural elements.

C. Operational and Safety Limitations: Do not cut and patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety.

D. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Designer's opinion, reduce the building's esthetic qualities, or result in visual evidence of cutting and patching. Remove and replace Work cut and patched in a visually unsatisfactory manner.

1.05 RELATED SECTIONS

A. Section 4.13 - General Conditions of the Contract, Article 3.

II. PART 2 - PRODUCTS

2.01 MATERIALS

A. Use materials that are identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of existing materials.

B. Concrete, where used to patch slabs, shall be:

1. Normal weight concrete proportioned in accordance with ACI 211.1 and ACI 30 for 4,000 psi

compressive strength @ 28 days. For spot repairs or pour quantities under 1 cubic yard, field mixed concrete meeting the following will be allowed:

(a) Quikrete or approved equal meeting ASTM C387 with 4,000psi compressive strength at 28 days, field mixed from bags.

(b) At openings over 6" wide, provide ASTM A 615/A 615M, Grade 60, deformed reinforcing bars doweled into to the existing slab 48" on center, both sides, staggered.

(c) At horizontal openings less than 6" wide, chip out the top of the opening to enlarge it, creating a tapered or conical hole to patch, such that the patch material cannot drop trough the hole.

C. Mortar, where used for repointing existing masonry units, shall be a pre-blended bag mix mortar, Type N or strength to match existing construction. Where partial repointing is required, color shall match the existing to remain.

D. Grout, where used to close annular space around floor or wall penetrations, shall be:

1. non-shrink type, prepackage and preproportioned, requiring only the addition of potable water before use, meeting or exceeding the following standards:

(a) General Properties: ASTM C 1107-02
(b) Compressive strength: ASTM C 109
(c) Bond Strength: ASTM C 882

E. Lumber: where cutting of lumber is required for the installation of utilities or recessed items such at toilet room accessories, or for the incidental replacement of damaged or unsuitable framing materials, new materials used to patch, sister, header or box out openings shall be kiln dried, stud grade S-P-F dimensional lumber with a dressed size of 1½" x the depth of the members receiving the work.

1. Use pressure treated lumber when in contact with ground, masonry, concrete or for roof blocking, with CCA preservative and a minimum AWPA rating of UC2. Treat all cut ends by touching up in field with preservative. Use only galvanized fasteners and separate from materials which will react with preservative by using a separation sheet of peel-and-stick bituminous flashing tape.

F. Wood Paneling or Acoustic Treatments: cutting and patching is not permitted where wood materials have a transparent finish and a veneer with a grain match to adjacent panels. Such woodwork will be carefully removed, stored and protected, and reinstalled after concealed work is completed.

G. Gypsum Board: patch gypsum board with ASTM C-1396 board materials of a thickness to match existing.

1. Patches in rated assemblies shall be made with Type X materials.
2. Patches in wet areas shall be made with MR (moisture resistant) materials.
3. Joints and fasteners shall receive 3 coats of setting or drying type joint compound (contractor's option), sanded and feathered in successive wider applications to deliver a Level 4 finish to the patched area.

H. Plaster: Where cutting and patching involves plaster, comply with the following:

1. Comply with ASTM C 842
2. Comply with manufacturer's instructions and install thickness and coats as indicated.
3. Unless otherwise indicated, provide 3-coat work.
4. Base Coat: Ready-mixed, sand aggregate gypsum plaster base.
5. Finish Coat: Ready-mixed gypsum finish plaster.
6. Finish gypsum plaster to match existing adjacent surfaces. Sand lightly to remove trowel marks and arises.

III. PART 3 - EXECUTION

3.01 PROTECTION

A. Protect existing trees, plants, roads, walls etc. to remain. Special protection of any lawns and planting around buildings is the responsibility of the Contractor. Contractor will replace any planting killed or damaged by construction operations.

3.02 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.

1. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

2. Take all precautions necessary to avoid cutting existing pipe, conduit or duct work serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

C. Furnish dropcloths, erect dust partitions and take other measures as required to control dust generated by cutting activities and prevent its spread to adjacent areas

3.03 PERFORMANCE

A. The General Contractor shall be responsible for all cutting and patching, including all cutting and patching required by sub contractors.

1. Before cutting existing surfaces, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.

2. Before proceeding, meet at the site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

B. Firestopping, where required, shall be performed by the trade penetrating the wall, floor or ceiling. At all other areas requiring firestopping, work shall be performed by the General Contractor.

C. General: Employ skilled workmen to perform cutting and patching. Where required to maintain an existing product or system warranty, such as a roof warranty, employ a manufacturer's approved and warranted Contractor to perform the cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.

1. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.

D. Cutting: Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible review proposed procedures with the original installer; comply with the original installer's recommendations.

1. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into

concealed surfaces.

3. Cut through concrete and masonry using a cutting machine such as a Carborundum saw or diamond core drill.

E. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.

1. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

2. Where removal of walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary to achieve uniform color and appearance.

3. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch, after the patched area has received primer and second coat. Touch-up painting may stop at a corner, pilaster or other visual break in the repaired surface.

4. Patch, repair or re-hang existing ceilings as necessary to provide an even plane surface of uniform appearance.

5. Patch holes left after removing utilities with materials matching their surroundings.

F. Site Repair:

1. Restore all lawns, plantings, trees to their original condition.

2. Repair all walkways and driveways that were damaged due to construction.

3.04 CLEANING

A. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely paint, mortar, oils, putty and items of similar nature.

B. Clean any portions of the building which were affected by dirt or dust generated by cutting, sanding or other construction activities.

END OF SECTION

SECTION 01.74.19

CONSTRUCTION WASTE MANAGEMENT

I. PART 1 - GENERAL

1.01 GENERAL

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.02 DESCRIPTION OF WORK

A. **Work included:** Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. This Section includes requirements for the Contractor's implementation of waste management controls and systems for the duration of the Work.

B. **Alternates:** Not Applicable.

C. **Items to Be Installed Only:** Not Applicable.

D. **Items to Be Furnished Only:** Not Applicable.

E. **Related Work Specified Elsewhere:** The following items are not included in the Section, and will be performed under the designated Section:

1. Section 02.40.00 – Selective Demolition for the demolition of various trades.

1.03 INTENT

A. This Project shall generate the least amount of waste practical and that processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors shall be employed.

B. With regard to these goals the Contractor shall develop, for the Designer's review, a Waste Management Plan (WMP) for this Project.

1. Final Waste Management Plan shall not be required to be submitted for LEED certification.

C. Each Subcontractor shall be responsible for segregating their own waste into different dumpsters as directed by the Contractor.

D. Source Separation, Definition: Source separated construction waste materials that are sorted into separate bins on the project site (aka on-site).

1. This waste strategy often isolates waste materials targeted for reuse, donation, or recycling programs.

2. Typically, sorted materials on-site include metals, wood, ceiling tiles, furniture, and concrete.

3. The Contractor shall be responsible for ensuring that debris will be disposed of at appropriately designated licensed solid waste disposal facilities, as defined by local authorities having jurisdiction or Massachusetts General Laws (MGL) Chapter 111, Section 150A.

1.04 SUBMITTALS

A. Construction and Demolition Waste Management Plan (WMP): Submit within 21 calendar days after receipt of Notice to Proceed, in a format acceptable to the Designer. Demolition shall not begin until WMP has been approved.

1. Establish waste diversion goals for the project by identifying at least seven materials (both structural and nonstructural) targeted for diversion. Approximate a percentage of the overall project waste that each material represents.

2. Construction and Demolition Handling Facilities:

(a) Indicate the name(s) of the facilities where construction and demolition waste will be delivered and the applicable tipping fees.

(b) Furnish Contractor's statement of verification that facilities proposed for use are licensed for types of waste to be delivered and have sufficient capacity to receive waste from this project.

3. Material Handling Procedures, at Construction and Demolition Handling Facilities:

(a) Specify which materials shall be source separated or commingled and describe the diversion strategies planned for the project. Describe where the materials will be taken and how the recycling facilities will process the materials.

4. Alternatives to Landfilling: A list of each material proposed to be salvaged or recycled during the course of the Project. Include the following and any additional items proposed:

(a) Cardboard and paper products.
(b) Clean dimensional wood. If means of diversion is Wood Derived Fuel (WDF) refer to submittal requirements below.
(c) Beverage containers and employee food containers.
(d) Concrete.
(e) Slurry wall materials.
(f) Bricks and masonry.
(g) Asphalt.
(h) Metals from framing, banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
(i) Mechanical and electrical equipment.
(j) Building components which can be removed relatively intact from existing construction.
(k) Packaging materials, including cardboard, boxes, plastic sheet and film, polystyrene packaging, wood crates, and plastic pails.
(l) Glass.
(m) Scraps from new gypsum wall board (drywall).
(n) Carpet and pad.
(o) Acoustical ceiling panels.
(p) Plastics, including plastic pails, polyethylene sheet, and bubble wrap.
(q) Rigid foam.

5. Materials Handling Procedures, at Project Site: A description of the means by which any waste materials identified above will be protected from contamination, and a description of the means to be employed in recycling the above materials consistent with requirements for acceptance by designated facilities.

(a) Indicate which material streams shall be source separated and which shall be commingled.

6. Transportation: A description of the means of transportation of the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site) and destination of materials.

B. Waste Management Final Report: Prior to Substantial Completion, submit a written Waste Management Final Report summarizing the types and quantities of materials recycled and disposed of under the Waste Management Plan. Include the name and location of disposal facilities.

C. Other Submittals:

1. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

II. PART 2 - PRODUCTS [Not Used]

III. PART 3 - EXECUTION

3.01 PLAN IMPLEMENTATION

A. General: Implement Waste Management Plan as approved by the Designer. Provide containers, storage, signage, transportation, and other items as required to implement WMP for the entire duration of the Contract.

1. Deliver waste directly to construction and demolition handling facilities. Do not deliver to transfer stations.

B. Commingled Waste: Commingling waste at the job site may be allowed, provided that the following conditions are met:

1. Commingled waste shall be included in the Waste Management Plan (WMP).

2. Additional commingled waste must be pre-approved by the Designer via WMP addenda, prior to tipping on the job site.

3.02 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Manager: The Contractor shall designate an on-site person responsible for instructing workers and overseeing and documenting results of the Waste Management Plan for the Project.

B. Distribution: The Contractor shall distribute copies of the Waste Management Plan to the Job Site Foreman, each Subcontractor, the Owner, and the Designer.

C. Instruction: The Contractor shall 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.

D. Separation Facilities: The Contractor shall lay out and label a specific area to facilitate separation of materials for recycling, salvage, reuse, and return.

END OF SECTION

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SECTION 01.77.00

CLOSEOUT PROCEDURES

I. PART 1 - GENERAL

1.01 SCOPE

A. This section lists the procedures required for the proper completion of this project including processing the Release of Retainage and making the Final Payment to the Contractor.

B. Consult the Individual sections of the specifications for requirements affecting Project Close Out.

1.02 RELATED DOCUMENTS

A. This section supplements the General Conditions.

B. Consult the individual sections of the specifications for specific items required under those sections.

1.03 SUBSTANTIAL COMPLETION

A. Prior to requesting Substantial Completion the Contractor shall make a thorough inspection of the Work. During this inspection the Contractor shall prepare a comprehensive list of all items remaining to be completed or corrected. This list shall include all remaining Contractor and Subcontractor items to be provided under the Contract Documents.

B. Upon completion of the items noted on the Contractor's list the Contractor shall notify the Architect that the Work is Substantially Complete. The Architect shall then conduct a similar thorough inspection. If the Architect agrees that the Work is Substantially Complete, the Architect will promptly make a thorough inspection and prepare a punch list, setting forth in accurate detail any items on the Contractor's list and additional items that are not acceptable or incomplete. The Contractor shall coordinate all Subcontractors to achieve prompt completion of the punch list.

C. The Contractor shall not be relieved of the responsibility to provide Contract items left off of the Architect's punch list.

D. If the Architect determines that the Work is not Substantially Complete, the Architect shall inform the Contractor of those items that must be completed before the Architect will prepare a punch list. Upon completion of those items, the Contractor shall again request the Architect to prepare a punch list.

E. When the punch list has been prepared, the Architect will arrange a meeting with the Contractor and Subcontractors to identify and explain all punch list items and answer questions on work which must be done before final acceptance.

F. The Architect may revise the punch list, from time to time, to ensure that all items of Work are properly completed.

G. The Architect shall prepare the Certificate of Substantial Completion in accordance with the General Conditions.

H. The Contractors shall correct the items noted on the punchlist(s). The General Contractor shall check the work of his forces, and of all sub-contractors to verify that the work has been corrected, and notify the architect that the project is ready for reinspection. The Architect and Engineers may, at their discretion, check the work to confirm the punchlist has been completed, and advise the Owner.

1. If the Contractor calls for reinspection, and the Project is not actually ready or punchlist items have not been corrected and subsequent reinspections are required, the Architect reserves the right to bill the Owner for the reinspections, and such monies will be deducted from the balance due to the

Contractor.

1.04 RECORD DRAWINGS

A. As-built Drawings shall consist of all the Contract Drawings. As-built Drawings shall be kept up-to-date. Information from on-going Work shall be recorded on As-built Drawings within 48 hours of Work being performed.

B. The General Contractor and each Subcontractor shall be required to maintain one set of As-built Drawings, as the work relates to their Sections of the Specifications, at the site.

C. The As-built Drawings shall be stored and maintained in the General Contractor's field office or a secure location apart from other documents used for construction. The As-built Drawings shall be maintained in a clean, dry, and legible condition and shall not be used for construction purposes.

D. As-built Drawings, as submitted by the General Contractor shall be verified in the field by the Designer or his Consultants. Verification by the Designer shall occur during the construction process and prior to the related work being completed and covered up.

E. The As-built Drawings shall be available at all time for inspection by the Project Manager or Designer. All deficiencies noted shall be promptly corrected.

F. The following information shall be indicated on the As-Built Drawings:

1. Record all changes, including change orders, in the location, size, number and type both horizontally and vertically of all elements of the project which deviate from those indicated on all the Contract Drawings.

2. The tolerance for the actual location of utilities and appurtenances within the building to be marked on the As-built Drawings shall be plus or minus two (2) inches.

3. The location of all internal utilities and appurtenances, concealed by finish materials, including but not limited to valves, coils, dampers, vents, cleanouts, strainers, pipes, junction boxes, turning vanes, variable and constant volume boxes, ducts, traps and maintenance devices. The location of these internal utilities, appurtenances, and devices shall be shown by offsets to the column grid lines on the Drawings, or marked accurately on the as-built reflected ceiling plans.

4. Each of the utilities and appurtenances shall be referenced by showing a tag number, area served and function on the As-built Drawings.

G. At the end of each month and before payment for materials installed, the General Contractor, each Subcontractor, the Architect and Project Manager shall review the As-built Drawings for purpose of payment.

1. If the changes in location of all installed elements are not shown on the As-Built Drawings and verified in the field, then the material shall not be considered as installed and payment will be withheld.

H. Prior to the installation of all finish materials, a review of the As-built Drawings shall be made to confirm that all changes have been recorded. All costs to investigate such conditions shall be borne by the applicable party as determined by the Designer.

I. At the completion of the contract, each Subcontractor shall submit to the General Contractor a complete set of his respective As-built Drawings indicating all changes. After checking the above drawings, the General Contractor shall certify in writing on the title sheet of the drawings that they are complete and correct and shall submit the As-built Drawings to the Designer.

J. The original hand-noted as-Built Drawings shall be scanned in color to Adobe Acrobat (*.pdf) format and

submitted on CD or DVD to the Designer, to be added to the complete plans as constructed.

1.05 RECORD SURVEYS

A. Not applicable.

1.06 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Consult the individual sections of the specifications for the specific requirements for those sections and for further details and descriptions of the requirements.

B. Prior to final payment and completion the Contractor shall provide all Operating Manuals and Maintenance Instructions as required by the Contract Documents.

C. Operating Instructions and Manuals:

1. Subcontractors, installers, and suppliers shall furnish to the Contractor two sets of operating and maintenance instructions of all mechanical, electrical, and manually operated equipment furnished and installed by them. Mechanical and electrical subcontractors shall furnish instructions as specified in their respective sections.

2. The Contractor shall collect all of the above instructions, bind them into two complete sets, and submit them to the Architect who will deliver them to the Owner.

3. The Contractor shall prepare a CD of all O&M items and deliver to the Owner.

4. Submission of operating and maintenance instructions shall be a condition precedent to final payment

D. Instruction of Owner's Personnel

1. Where specified in the individual sections of the specifications, the Contractor and Subcontractor shall instruct the Owner's personnel at the site, in the use and maintenance of equipment installed under the Contract.

2. Submission to the Architect of a certificate of compliance to this requirement, signed by the Contractor and the Owner's Representative, shall be a condition precedent to final payment.

1.07 PARTIAL RELEASE OF RETAINAGE

A. If within 65 days after Substantial Completion, any of the items on the Architect's punch list are not complete or if the Contractor has not provided the appropriate marked up As Built Drawings, Operating Manuals, Warranties, Guarantees, or Spare Parts the Architect shall assign a monetary value for each incomplete item as well as any other items as provided by M.G.L. c.30 §39K, and the Architect shall prepare a Certificate for Partial Release of Retainage

B. If the Architect is required to prepare a Certificate for Partial Release of Retainage the Contractor shall complete all remaining Work in accordance with the provisions of the General Conditions.

C. The Contractor's signature on this Certificate shall be notarized.

D. The Contractor may make a request for additional releases of retainage when portions of the Work listed on the Architect's punch list have been satisfactorily completed. Each request shall be accompanied by a new application for payment and a new signed and notarized Certificate for Partial Release of Retainage.

E. The Architect's inspections, required to complete the additional payment applications described above, are subject to provisions of the General Conditions.

F. If the Owner has required Performance and Payment Bonds, then prior to the partial release of retainage, the

General Contractor shall submit to the Owner Consent of Surety to Partial Release of Retainage using AIA Document G707A or an equivalent document.

1.08 FINAL RELEASE OF RETAINAGE

A. Prior to the final release of retainage, the General Contractor shall submit to the Owner:

1. Consent of Surety, using AIA Document G707 or similar document, if performance and payment bonds were required for the project.

2. Contractor's Affidavit of Release of Liens, using AIA Document G706A or equivalent. This document shall be accompanied by certified statements from all sub-contractors working on the project, that they have received all monies due, and have paid all suppliers and sub-sub contractors accordingly.

(a) Should any payments be outstanding and contingent upon receipt of the retainage in order to be paid, the General Contractor shall submit AIA Document 706, itemizing those items which have not been paid.

END OF SECTION

SECTION 020800

ASBESTOS ABATEMENT

PART I - GENERAL

1.01 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 1 – GENERAL REQUIREMENTS, which are hereby made a part of this section of the specifications.

1.02 DEFINITIONS

A. The following definitions shall be applicable to this Section:

"Site": Refers to the South Worcester Neighborhood Improvement Center located in Worcester, Massachusetts as described by the Contract Documents and Drawings.

"Owner": Refers to the City of Worcester and their designated, authorized personnel.

"Architect": Refers to Nault Architects Inc., 71 Hope Avenue, Worcester, Massachusetts and their designated, authorized personnel.

"Consultant": Refers to Atlas Technical Consultants, LLC (ATLAS), 73 William Franks Drive, West Springfield, Massachusetts and their designated, authorized personnel.

"General Contractor": Refers to the Contractor who has been awarded the overall contract for renovation work outlined by the Contract Documents.

"Asbestos Abatement Contractor": Refers to the Contractor who is performing asbestos abatement work as outlined by this Section.

1.03 GENERAL REQUIREMENTS/QUALIFICATIONS

A. All Asbestos Abatement work referenced herein shall be performed by a Massachusetts licensed Asbestos Abatement Contractor in accordance with Massachusetts Department of Labor Standards (DLS) 454 CMR 28.0 Regulations.

B. Qualifications of Asbestos Abatement Contractor

1. Asbestos Abatement Contractor performing the abatement work of this section ("Asbestos Abatement Contractor") shall be an Asbestos Abatement Contractor licensed to perform asbestos operations in the State of Massachusetts. Asbestos Abatement Contractor shall submit license number and proof of licensure.

2. The Asbestos Abatement Contractor shall also provide the project name, contact person and phone number of three (3) projects which were successfully completed of similar size and scope within the last two (2) years. Each project shall have been

completed in good standing and the work performed by the Asbestos Abatement Contractor for each project resulted in no work violations/citations, contract delays, contract extensions/disputes or litigation. Failure to provide this information and/or meet the approval of these qualifications by the Owner may result in rejection of the Asbestos Abatement Contractor.

3. The Owner, Architect or Consultant shall also reserve the right to research and utilized other information received from any other projects completed by the Asbestos Abatement Contractor not provided under 1.03 B (2) above, regardless of the date completed, location or circumstances resulting from the outcome of their work. The Owner shall reserve their right to reject the Asbestos Abatement Contractor based upon this review, for any reason, if found to be in the best interest of the Owner.

NOTE: The Asbestos Abatement Contractor shall not be authorized to begin work until all credentials outlined above are reviewed and approved by the Architect.

1.04 DESCRIPTION OF WORK

A. Work: This section details all areas where asbestos abatement work is to be performed and lists areas requiring special protection during the abatement work. The Asbestos Abatement Contractor shall furnish all labor, materials, services, training, insurance, and equipment as needed to complete removal of asbestos-containing and asbestos-contaminated materials located as indicated below. The Asbestos Abatement Contractor shall follow all Federal, State and local ordinances, regulations and rules pertaining to asbestos, including its abatement, storage, transportation and disposal.

B. The Asbestos Abatement Contractor shall be responsible for verifying all quantity estimates in preparation of their bids, including the location and conditions of all asbestos-containing materials to be abated as specified herein and as per the Drawings. No additional compensation and/or contract time shall be granted to the Asbestos Abatement Contractor for failure to perform this requirement.

C. The following Scope of Work and Requirements shall be applicable for asbestos abatement work at the site. If a specific note for an abatement procedure or requirement is not mentioned herein, the Asbestos Abatement Contractor shall perform the removal of such material in accordance with local, state and federal regulations. The Asbestos Abatement Contractor shall also coordinate all work with the General Contractor.

1. All Asbestos Abatement work shall take place in accordance with the provisions outlined herein as well as current local, state and federal regulations. No additional compensation shall be granted to the Asbestos Abatement Contractor for compliance with applicable laws when performing the abatement work at the site. This shall include any regulatory requirements that mandate additional or more restrictive containment and abatement procedures than what has been presented herein. It shall be the Asbestos Abatement Contractor's responsibility to comply with such regulations as well as any other additional requirements outlined by this Section.

2. The Asbestos Abatement Contractor shall coordinate with the General Contractor as to the locations of areas to be abated in accordance with the Scope of Work outlined herein and the Drawings.

3. The Asbestos Abatement Contractor shall be responsible for all demolition work required in order to access all asbestos materials for abatement. All demolition debris shall be disposed of as asbestos waste, unless otherwise determined by the Consultant.

4. All removal procedures shall take place under full containment and a three-stage decontamination unit under negative pressure (unless otherwise approved by the Consultant).

5. With regards to the variance from requirements on polyethylene sheeting on "impervious wall" surfaces, the Asbestos Abatement Contractor shall be required to adhere to all requirements outlined by DLS regulations governing work area set-up for asbestos abatement. This process shall be applicable for all work areas deemed to contain impervious surfaces by the Asbestos Abatement Contractor. In addition, the Asbestos Abatement Contractor shall take full responsibility including all costs associated with approval and/or denial of such actions (i.e. non use of polyethylene) if determined to be deficient by the Owner's Consultant and/or a state or federal agency. If the variance is not permitted by said parties; the Asbestos Abatement Contractor shall proceed with installation of polyethylene sheeting on such surfaces at no additional cost to the Owner.

6. Refer to Attachment A (Table 1.0) for a summary of materials that require abatement at the site. Refer to the Drawings and coordinate all work with the General Contractor.

1.05 SUBMITTALS

A. In addition to items required by other sections of the Project Manual, the following submittals are required for review and approval by the Architect on/or before the Pre-Construction Meeting:

1. Copy of Massachusetts MADLS Asbestos Abatement Contractor's License
2. Copy of the asbestos Notification (ANF01)
3. Chain-Of-Command list of all personnel on-site and emergency contact person(s)
4. Work plan which dictates all removal procedures to be implemented
5. Proposed waste hauler and disposal site for asbestos
6. Copy of proposed Waste Shipment Record to be used for disposal of asbestos.

B. In addition to the items required by other sections of the Project Manual, the following submittals are required for final payment

1. Copy of Waste Shipment Records

1.06 CODES AND STANDARDS

A. All work shall conform to the standards set by applicable Federal, State and local laws, regulations, ordinances, and guidelines in such form in which they exist at the time of the work on the contract, and as may be required by subsequent regulations. In addition to any detailed requirements of the Specification, the Asbestos Abatement Contractor shall at his own cost and expense comply with all laws, ordinances, rules and regulations of Federal, State, Regional and Local Authorities regarding handling and storing of asbestos waste material. This includes all applicable OSHA regulations.

B. All regulations and other governing agencies in their most current version are applicable throughout this project. Where there is a conflict between this Specification and the cited State, Federal, or local regulations, the more restrictive or stringent requirements shall prevail. This Section refers to many requirements found in these references, but in no way is it intended to cite or reiterate all provisions therein or elsewhere. It is the Asbestos Abatement Contractor's responsibility to know, understand, and abide by all such regulations and common practices.

1.07 FEES, PERMITS & LICENSES

A. The Asbestos Abatement Contractor shall pay all licensing fees, royalties, and other costs necessary for the use of any copyrighted or patented product, design, invention, or process in the performance of the work specified in this section. The Asbestos Abatement Contractor shall be solely responsible for costs, damages, or losses resulting from any infringement of these patent rights or copyrights. The Asbestos Abatement Contractor shall hold the Owner, Consultant and Architect harmless from any costs, damages, and losses resulting from any infringement of these patent rights or copyrights. If the Contract Specification requests the use of any product, design, invention, or process that requires a licensing, patent or royalty fee for use in the performance of the job, the Asbestos Abatement Contractor shall be responsible for the fee or royalty fee and shall disclose the existence of such rights.

B. Asbestos Abatement Contractor shall be responsible for costs for all licensing requirements, where applicable and notification requirements and all other fees related to the Asbestos Abatement Contractors ability to perform the work in this Section.

C. Secure all necessary permits for work under this Section, including hauling, removal, and disposal, fire, and materials usage, or any other permits required to perform the specified work.

1.08 CLEANING

A. Maintain the work site in a neat and orderly manner at all times, so as not to interrupt or infringe upon the work of other trades. Perform all final cleaning of abatement work areas as required by this Section and Massachusetts Regulations to the approval of the Owner’s Consultant. Upon completion of work in any given area, Asbestos Abatement Contractor shall remove all material and equipment associated with the work, not necessary to complete other phases of the work in that area.

B. Comply with all requirements for final clearance and release of a work area as described in this Section and required by the Massachusetts Regulations prior to take down of polyethylene and area clean-up.

1.09 COORDINATION

A. Extend full cooperation to Owner in all matters involving the use of Owner's facilities. At no time shall the Asbestos Abatement Contractor cause or allow to be caused conditions, which may cause risk or hazard to the general public, or conditions that might impair safe use of the facility.

B. Coordinate the work of this section with that of all other trades as directed by the General Contractor and at the express consent of the Owner and Architect. Phasing and scheduling of this project will be subject to the approval of the Owner and Architect. The work of this Section shall be scheduled and performed so as not to impede the progress of the project as a whole. Work shall not proceed in any area without the express consent of the Owner and Architect. The Asbestos Abatement Contractor shall be available within 24 hours notice for additional work if after acceptance of the work it is found that full abatement was not achieved from the initial work effort as determined by the Owner, Architect or Consultant.

C. Complete Asbestos activities in the phases of the final schedule agreed upon by Owner and General Contractor.

1.10 SUBSTITUTION OF MATERIALS OR METHODS

A. Owner and Architect approval is required for all modifications to methods, procedures, and design, which may be proposed by the Asbestos Abatement Contractor. It is the intent of these documents to allow the Asbestos Abatement Contractor to present alternative methods to the abatement processes herein, for review by Owner and Architect. Any such modifications or substitutions to methods, procedures, or design shall comply with applicable regulations. Asbestos Abatement Contractor shall submit the proposed modification or substitution in accordance with the requirements of the General Conditions, and no later than fifteen (15) working days prior to planned commencement of proposed modification, for review and approval.

B. Unless requests for modification or substitution are made in accordance with the above instructions and the instruction of the General Conditions, supported by sufficient proof of equality, Asbestos Abatement Contractor shall be required to furnish the specifically named or designed items, methods or procedures designated in this Section.

C. If the modification or substitution necessitates changes or additional work, same shall be provided and the Asbestos Abatement Contractor shall assume the cost and the entire responsibility thereto unless performed under the approved Change Order Process.

D. The Owner and Architect's permission to make such substitution shall not relieve the Asbestos Abatement Contractor from full responsibility for the work.

1.11 SITE SECURITY

A. The Asbestos Abatement Contractor is responsible for performing all work under this contract without contaminating the building environment with asbestos fibers. This includes interiors of duct work, outside containment locations, machinery and equipment and any other release into unregulated spaces. The Asbestos Abatement Contractor is responsible for making right and clean-up of any such contamination if found to be present.

B. The Asbestos Abatement Contractor will be responsible for the security of the abatement area, allowing only authorized personnel into the area, and securing assigned entrances and exits with locked doorway's at the end of the work day. Signs will be posted prior to asbestos removal as required in 29 CFR 1926.1101.

1.12 PROJECT MONITOR

A. The Owner has retained ATLAS as their Consultant for the technical advisement and project management during the Project. In addition, ATLAS will perform project monitoring services during abatement activities. The Contractor shall regard ATLAS's direction, as authoritative and binding as provided herein, in matters outlined by this Section.

B. ATLAS's licensed Project Monitor, acting as the Owner's Representative, will perform monitoring of Contractor work practices and performance, inspection of the worksites, and air sampling and analysis for each phase of the asbestos removal project. Quality control and testing criteria has been established in these specifications, and will be strictly enforced. ATLAS's Project Monitor will review matters relating to safety, interpretation of the specifications, and scheduling of work, and will make decisions upon consultation with the Architect and Owner.

1.13 TEMPORARY FACILITIES

A. Use of Owner provided facilities is specified in Division 1 and shall be coordinated through the Owner and General Contractor.

PART II - PRODUCTS

2.01 MATERIALS

A. All materials and equipment proposed to be used on this project shall be subject to the acceptance of the Owner, Architect and Consultant. The Asbestos Abatement Contractor shall comply with local, state and federal regulations pertaining to the selection and use of materials and equipment on this project. The Asbestos Abatement Contractor shall provide a submittal on all materials and equipment to be used for review and approval by the Architect and Consultant prior to commencement of the work.

PART III - EXECUTION

3.01 PREPARATION

A. Critical Barriers: Prior to any masking and sealing operations which will make up the asbestos removal work area, windows, doors, openings, ducts, drains and vents will be masked and sealed with a minimum of one layer of six (6) mil polyethylene sheeting. Large openings to occupied areas, such as open doorways, hallways, passageways and major openings shall be sealed with permanent, solid construction materials and made air tight in accordance with MADLS regulations 454 CMR 28.00. Voids in the walls and ceilings that are due to penetrations of conduits and pipes shall be sealed with fire retardant spray foam. Exposed electrical panels in work areas will be shut off when possible, and masked and sealed with a minimum of two (2) layers of six (6) mil polyethylene and duct tape.

B. Decontamination Chambers: It is the Asbestos Abatement Contractor's responsibility to provide Decontamination Chambers consisting of an equipment room, shower and clean room for personnel involved in asbestos removal. The Chamber shall be masked and sealed with two layers of six mil polyethylene sheeting with flaps between each room. Each of the three rooms will be of a sufficient size to accommodate the Asbestos Abatement Contractor's contaminated personnel and related equipment. The rooms will be framed, masked, sealed and attached and sealed to the entry/exit ways of asbestos worksites. Adequate heat and light will be safely provided. The Asbestos Abatement Contractor shall provide a minimum of one water heater per work area decontamination chamber. Waste water will be filtered by 20 micron and 5 micron filters in series prior to discharge.

3.02 ABATEMENT PROCEDURES

A. General: The following paragraphs detail the work requirements for the regulated area. Workers shall wear tyvek suits and respiratory protection for all removals.

B. Masking and Sealing

1. Critical Barriers

a. Prior to any masking and sealing operations which will make up the asbestos removal work area, windows, doors, openings, ducts, drains and vents will be masked and sealed with a minimum of one layer of six (6) mil polyethylene sheeting. Voids in the walls and ceilings that are due to penetrations of conduits and pipes shall be sealed with fire retardant spray foam. Large opening to occupied areas, such as open doorways, hallways, passageways and major openings shall be sealed with permanent, solid construction materials and made air tight in accordance with MADLS regulations 454 CMR 28.00.

b. In areas where drains or sump pumps are located, primary filters will be placed in drain and openings sealed with 6 mil polyethylene sheeting, in addition to floor masking and sealing requirements.

c. Any furniture, fixtures, or stored material that cannot be removed or that must remain in the work area will be covered, masked and sealed with a minimum of one layer of six (6) mil polyethylene sheeting. If the surfaces of these materials are determined to be contaminated with asbestos fibers, the Contractor shall remedial clean them prior to masking and sealing.

d. Exposed electrical panels in work areas will be shut off when possible, and masked and sealed with a minimum of two (2) layers of six (6) mil polyethylene and duct tape.

2. Full Containment:

a. Unless otherwise specified, floors and walls will be masked and sealed with two layers of six mil polyethylene sheeting with a minimum overlap of two feet at seams and up walls. Where it is necessary to mask and seal ceiling areas, a minimum of two (2) layers of four mil polyethylene sheeting will be used.

b. The floors shall be covered first and the flooring plastic shall extend up on the walls. The walls shall then be covered with plastic from ceiling to floor level, thus overlapping the floor plastic. The floor shall then be covered with the second layer of plastic, the plastic extended up the walls and the edges sealed to the wall plastic. The walls shall then be covered with a second layer of plastic from ceiling to floor level, thus overlapping the second layer of floor plastic. The bottom portion of the wall plastic shall thus be sandwiched between the layers of the floor plastic. If the floor or wall plastic necessitates seams, the seams in successive layers of plastic sheet shall be staggered so as to reduce the potential for water or asbestos to penetrate through the covering.

c. The two separate layers of six-mil polyethylene sheeting on walls and floors shall constitute the primary and secondary containment barriers, respectively. This containment, along with the decontamination chamber, will constitute full containment, and will isolate the contained worksite from surrounding areas except where air must enter the worksite due to the use of exhaust equipment.

C. Personal Air Sampling: Daily personal and excursion sampling will be the responsibility of the Contractor to check personal exposure levels versus respiratory protection and to check work practices. At least 25% of the workers in each shift, but not less than 2, shall be sampled. The Contractor is responsible for his own personal sampling as outlined in OSHA Regulation 1926.1101. The Contractor shall post the personal air sample results within 24 hours.

D. Remedial Cleaning: Remedial cleaning of horizontal surfaces, ledges, and equipment will be required prior to masking and sealing operations of work areas. Cleaning will be done using HEPA vacuums and wet methods. Determinations of additional remedial cleaning will be made on the basis of hazard potential to workers and the outside environment relating to setup and masking and sealing operations (as deemed by the

Consultant). Respiratory protection and protective clothing will be required for the cleaning. Prior to remedial cleaning negative air filtration units and a three stage decontamination shall be in place and running and all wall and ceiling penetrations shall be sealed with fire retardant spray foam.

E. Decontamination Chambers: The Contractor shall construct a decontamination chamber in accordance with local, state and federal regulations governing asbestos abatement.

F. Negative Air Filtration: The Contractor shall establish negative pressure air filtration within the work areas. The Contractor shall install, operate, and maintain a sufficient number of Negative Air Filtration Units (NAFU's) to meet the requirements of local, state and federal regulations.

G. Removals: Removal of asbestos containing materials, unless specified otherwise, will be performed using negative air filtration techniques, wet methods, attached three stage decontamination chambers, the masking and sealing of openings, ducts and vents, full two-layer plastic containment's and the encapsulation of post removal surfaces. Removals will be as indicated and as specified herein, and will be performed in a neat and workman like manner to the limits indicated or specified. Asbestos will be consistently and thoroughly wetted with a fine spray of amended water and will be carefully removed and immediately placed in approved and properly labeled six mil polyethylene disposal bags. Asbestos residual materials will be diligently scraped or brushed from surfaces. After brushing and scraping, surfaces will be free of visible debris and fibers and surfaces will be HEPA vacuumed clean.

H. Visual Inspections: Work areas shall pass a visual inspection conducted by the Site Supervisor responsible for the project and the Owner's Project Monitor (i.e. Consultant). The criterion for this inspection will be the absence of visible debris in accordance with ASTM standard E1368-90. A certificate of visual inspection will be signed by the Project Monitor and the Site Supervisor after final inspection clearance. The Contractor will be responsible for the costs of visual inspection and testing required for any work which fails clearance air quality criteria.

I. Encapsulation: A bridging encapsulant/lockdown sealant will be applied to remaining surfaces in direct contact with removal operations, polyethylene sheeting and on any porous surfaces within the work site. The chosen encapsulant must be compatible with the replacement materials and conform to the proper edition of applicable fire and electrical standards.

J. Work Completion: Final air clearance testing shall be performed by the Project Monitor for all areas.

3.03 GLOVEBAG WORK PROCEDURE REQUIREMENTS

A. General: Glovebag removals shall be performed in accordance with OSHA 29 CFR 1926.1101 and Massachusetts DLS 454 CMR 28.00 Regulations. A two stage decontamination unit shall be used for all glovebag work that does not exceed 25 square/linear feet. All work involving greater than 25 square/linear feet shall have a three-stage decontamination unit. At a minimum, critical barriers shall be constructed.

All persons except those directly involved in the glovebag operation shall be excluded from the work area. Physical barriers shall be used, where necessary, to limit access to the work area for the duration of the glovebag operation. All movable objects shall be removed from the work area. Non-movable objects remaining in the work area shall be covered completely with six (6) mil polyethylene sheeting securely taped so as to prevent their contamination. Objects that have already been contaminated shall be thoroughly cleaned with a HEPA filtered vacuum or be wet wiped before they are moved from the work area or covered in place.

B. Installation: Glovebags shall only be used on surfaces that do not exceed 150 F. Glovebags must be installed to completely cover the pipe or other structure where asbestos work is to be done. Glovebags shall be smoke-tested for leaks and any leaks sealed prior to removals. Prior to installation any loose or friable ACM adjacent to the glovebag operation shall be wrapped and sealed with two layers of 6 mil poly sheeting or otherwise rendered intact.

C. Removal: A minimum of two (2) workers per glovebag is required. Before, during and following removal of the ACM in the glovebag must be thoroughly wetted with a wetting agent. The wetting agent is applied with an airless sprayer through the pre-cut port provided in most glovebags or applied through a small hole in the bag. After removal of the layer of ACM, the pipe from which asbestos has been removed must be thoroughly cleaned and wet-wiped with a wetting agent until no traces of the ACM can be seen. Any asbestos containing insulation edges that have been exposed as a result of the removal or maintenance activity must be encapsulated with bridging encapsulant and sealed with 8-ounce rewettable cloth to ensure that the edges do not release asbestos fibers into the atmosphere after the glovebag has been removed.

D. When the asbestos removal and encapsulation have been completed, the glovebag shall be collapsed with the use of a HEPA vacuum in order to remove any air in the bag that may contain asbestos fibers. When the air has been removed from the bag, the bag should be squeezed tightly (as close to the top as possible), twisted, and sealed with duct tape, to keep the asbestos materials safely in the bottom of the bag. The HEPA vacuum can then be removed from the bag, the hole sealed, and the glovebag removed from the work area and disposed of properly.

E. Protective Equipment: Workers using glove bags shall use disposable full body protective clothing and a minimum of a half-face air purifying respirator with HEPA cartridges as outlined in these specifications. At the end of the work by glovebag, the protective suit must be removed inside-out and the worker shall proceed directly to the shower and clean-up facility.

3.04 DISPOSAL

A. Packaging: Prior to post-abatement inspection, asbestos- containing waste material (ACWM) shall be packaged in sealed double containers and removed from the work area to a specified transportation vehicle or a designated holding area approved by the Owner.

At the end of each work day the Asbestos Abatement Contractor shall remove the debris accumulated during that day's work activities using procedures outlined in the Specifications. The Asbestos Abatement Contractor shall provide a daily tally of all bags removed.

B. Temporary Storage of Waste: An area for temporary storage of ACWM must be approved by the Owner. ACWM must be stored in a restricted area and must be in an **enclosed container** which is posted and secured whenever not in use. ACWM shall NOT be store outside the building on the ground, pavement areas or other non-enclosed area. ACWM waste material shall be loaded into a waste transportation vehicle/dumpster and hauled away as soon as there is a sufficient quantity available for direct transportation to the approved disposal site. ACWM waste shall **NOT** be transferred back to the Asbestos Abatement Contractor's yard/facility unless approved by the Owner. ACWM shall only be stored at:

1. An approved refuse transfer station facility permitted or that is managing such wastes in accordance with 310 CMR 19.061 and/or;
2. The site of generation of the asbestos abatement activity.

Note: All ACWM shall be shipped from the site for disposal within 30 days after completion of the work and acceptance of a final visual inspection by the Consultant.

C. OSHA/EPA labeling: Asbestos warning labels having permanent adhesive and waterproof print, or being permanently printed on the container, shall be affixed to the outside of all asbestos containers, and each inside bag. Labels will be conspicuous and legible and shall contain the following warning:

DANGER
CONTAINS ASBESTOS FIBERS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
DO NOT BREATH DUST
AVOID CREATING DUST

The Asbestos Abatement Contractor is directed to properly label each waste bag in accordance with the latest NESHAP standard, Section 61.150, with the following information:

SITE OWNER'S NAME
SITE NAME

D. DOT labeling and marking: A DOT "class 9" shipping label and DOT mark shall be applied to or be printed on each packaging of ACWM.

E. Waste Transportation: All ACWM waste shall be containerized pursuit to 310 CMR 7.15 prior to being transported. All ACWM waste shall be transported in totally enclosed vehicles or containers that are designed, constructed, and operated to prevent spills, leaks or emissions. All ACWM waste shall be transported in compliance with 40 CFR Part 61

and applicable Department of Transportation (DOT), OSHA and local regulations. Each vehicle transporting asbestos-containing waste shall be marked with asbestos danger signs during loading and unloading of the waste, in accordance with the NESHAP, 40 CFR 61.150.

F. Asbestos waste shipment records: The Asbestos Abatement Contractor shall prepare the waste shipment records for disposal of the ACWM. **All ACWM waste to be disposed of from the site shall be shipped on an approved "Asbestos Waste Shipment Record". A representative from the Owner shall sign-off as "Generator" on the Asbestos Waste Shipment Record for each shipment leaving the site.**

G. The following information shall be included on the waste shipment record for each and every load of ACM transported off-site:

1. The name, address and telephone number of the owner/operator of the facility or dumping ground where asbestos abatement activities have occurred;
2. The quantity and type (friable or non-friable) of the ACWM in cubic meters (cubic yards) and a description of the container used for shipment;
3. The name, address and telephone number of the person who conducted any asbestos abatement activity;
4. The name and telephone number of the disposal site operator;
5. The name and physical location of the disposal site;
6. The date transported;
7. The name, address, and telephone number of the transporter(s);
8. Certification by the owner/operator of the facility or dumping ground where asbestos abatement activities have occurred/where asbestos waste was generated that the contents of each shipment have been characterized, packaged, marked and labeled in accordance with 310 CMR 7.15;
9. Signature of each transporter confirming the contents of each shipment are in all respects in the proper condition for transport according to applicable international, federal, state and local regulations;
10. Signature by the receiving disposal facility confirming that: i) the quantity of ACWM listed on the waste shipment record is the same as the quantity accepted for disposal; and ii) it holds appropriate permits and/or authorizations to accept for disposal ACWM described on waste shipment records.

Note: The final waste shipment records (with signature of acceptance at the landfill) for disposal of ACM from the project site shall be received by the Owner within 35 days of shipment from the site.

3.05 QUALITY CONTROL AND TESTING

A. The Asbestos Abatement Contractor shall be responsible for achieving acceptable visual and final air clearance testing for ALL abatement areas as follows:

- Clearance inspection: ATLAS's Project Monitor shall inspect the work area and surrounding areas for clearance using visual and physical methods, prior to clearing the project for air monitoring clearance procedures.

- Post-abatement Clearance Air Monitoring: For each abatement areas, post abatement clearance air samples will be taken when a visual inspection by ATLAS's Project Monitor detects no visible debris, and surfaces are encapsulated and dry.
- Phase Contrast Microscopy (PCM) clearance testing will be performed to confirm the completion of removal. All clearance testing shall be performed in accordance with state of Massachusetts Regulations. The work areas shall be considered complete if the following criteria is met:

    1. Containment's cleared and samples analyzed by Phase Contrast Microscopy (PCM): Maximum airborne fiber concentration of <0.01 fibers per cubic centimeter for each sample.

Note: Should results indicate a fiber concentration greater than the clearance criteria stated above or if the visual inspection fails, the Asbestos Abatement Contractor shall reclean the entire work at no additional cost to Owner, utilizing the methods specified in this section. The Asbestos Abatement Contractor shall pay for all additional testing and inspections until the clearance level is achieved as per this Section. The cost of additional testing and inspection shall be paid by the Asbestos Abatement Contractor by subtracting the cost for analysis and inspector's time from the Contract total. This shall also include resampling of any areas where air cassettes became overloaded due to construction activities.

ATTACHMENT A

TABLE 1.0
SUMMARY OF ACM TO BE ABATED

TABLE 1.0 SUMMARY OF ACM TO BE ABATED			
LOCATION	**MATERIAL**	**QUANTITY**	**NOTES**
Stairwell	Pipe Insulation	2 LF	Includes removal of the insulation and remnant asbestos debris on pipe
Lower Room by Elevator	Pipe Insulation	3 LF	Includes removal of the insulation and remnant asbestos debris on pipe

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SECTION 02.08.10

DISTURBANCE OF LEAD, CADMIUM & CHROMIUM MATERIALS

PART I - GENERAL

1.01 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 1 – GENERAL REQUIREMENTS, which are hereby made a part of this section of the specifications.

1.02 DEFINITIONS

A. The following definitions shall be applicable to this Section:

"Site": Refers to the South Worcester Neighborhood Improvement Center located in Worcester, Massachusetts as described by the Contract Documents and Drawings.

"Owner": Refers to the City of Worcester and their designated, authorized personnel.

"Architect": Refers to Nault Architects Inc., 71 Hope Avenue, Worcester, Massachusetts and their designated, authorized personnel.

"Consultant": Refers to Atlas Technical Consultants, LLC (ATLAS), 73 William Franks Drive, West Springfield, Massachusetts and their designated, authorized personnel.

"Contractor": Refers to the General Contractor and all Subcontractors who are performing construction work outlined by the Contract Documents. Contractor as referenced, applies to **ALL** trades (including Filed Subcontractors) working at the site.

1.03 DESCRIPTION OF WORK

A. The Contractor shall be made aware that lead, cadmium and chromium is present within painted substrates or within building components throughout the site building which will be impacted by renovation activities on this project.

B. The Contractor shall be required to comply with all aspects of the Occupational Safety and Health Administration (OSHA) Regulations pertaining to lead, cadmium and chromium with regards to disturbance of these materials when performing their work.

C. It shall be the sole responsibility of the Contractor for compliance with this Section, including all costs associated with, but not limited to:

- Compliance with OSHA 29 CFR 1926.62 Lead Regulations.
- Compliance with OSHA 29 CFR 1926.1127 Cadmium Regulations.
- Compliance with OSHA 29 CFR 1926.1126 Chromium Regulations.
- Development and implementation of a Compliance Program.

- Development and implementation of a Respiratory Program.
- Development and implementation of a Medical Monitoring Program.
- Development and implementation of a Hazard Communication Program.
- Performance of any lead, cadmium or chromium testing required on the project.
- Performance of any Negative Exposure Assessments required.
- Providing all medical examinations required.
- Providing all equipment required (Including appropriate PPE)
- Providing all engineering controls and associated work practices.
- Disposing of all demolition material in accordance with local, state and federal regulations

D. It should be noted that abatement of lead paint by a licensed Abatement Contractor shall not be required for performance of the renovation and/or demolition work outlined under this Contract. The building is not considered a residence where children under the age of six (6) reside, therefore, abatement of lead-containing components will not be required as per Massachusetts Department of Public Health (DPH) "Child Lead Poisoning and Prevention Regulations.

E. However, if the Contractor deems that removal of the lead, cadmium or chromium paint will be an appropriate "engineering control" for compliance with their OSHA programs, then such removal shall be performed at the Contractor's own expense in accordance with applicable requirements. No additional compensation shall be granted for any engineering control methods employed by the Contractor for compliance with this Section, OSHA or other applicable requirements. In addition, all costs associated with removal of paint to meet compliance with applicable construction standards (i.e. welding, torch cutting, grinding, etc.) shall be the responsibility of the Contractor.

F. Due to the age of the building and previous painting history, the Contractor shall assume all painted surfaces to contain lead, cadmium and chromium and comply with this Section and OSHA Regulations accordingly. In addition, building components such as pipe sleeves, conduit, electrical equipment, etc. may also contain lead, cadmium or chromium that will require compliance accordingly. The Contractor, at their own discretion may elect to perform testing to confirm the presence of lead, cadmium and chromium in the building. However, all costs associated with additional testing and compliance with this Section shall be borne by the Contractor. It should be noted that results of any testing performed must achieve a detection limit of 0.0 in order for the work to not fall under the OSHA standards for lead, cadmium or chromium as outlined herein.

G. OSHA regulates activities that disturb the lead, cadmium and chromium by the use of manual techniques. Regulated activities include abrasive blasting, welding, and cutting, burning on structures, manual scraping or sanding, and manual demolition of structures or components. The work practices described in this Section are intended to adequately protect the workers from exposure to lead, cadmium and chromium, provide a safe workplace, and protect the environment. However, it shall be the Contractors responsibility to comply with this Section as well as any other provisions/requirements outlined by OSHA and other applicable regulations.

H. Materials and Equipment: The work of this Section, without limiting the generality thereof, includes the furnishing of labor, materials, tools, equipment, services and incidentals necessary to safely accomplish tasks which will disturb lead, cadmium and chromium.

I. Approvals and Inspections: Temporary facilities, work procedures, equipment, materials, services, and agreements must fully comply with EPA, OSHA, and NIOSH recommendations, standards and guidelines, as well as any other applicable federal, state, and local regulations. Where there exists an overlap of these regulations and guidelines, the most stringent shall apply.

J. Disposal: The Contractor shall dispose of demolition debris and associated materials in accordance with Part 3.06 of this Section.

1.04 SITE WORK DEFINITIONS

A. Action Level: Action Level as defined by OSHA shall refer to employee exposure, without regard to the use of respirators, to an airborne concentration of lead, cadmium or chromium calculated as an 8-hour time-weighted average (TWA).

B. Competent Person: Competent Person shall refer to a person who is capable of identifying existing and predictable hazards in the surroundings or working conditions and who has authorization to take prompt corrective measures to eliminate them.

C. HEPA Filter: HEPA Filter shall refer to a filter capable of filtering out monodispersive particles of 0.3 microns or greater diameter from a body of air at 99.97 percent efficiency or greater.

D. Lead, Cadmium and Chromium Paint: Shall refer to paint found to contain lead, cadmium and chromium in any concentration or paint assumed to contain lead, cadmium and chromium as indicated in this Section.

E. Permissible Exposure Limit (PEL): PEL shall refer to employee exposure, without regard to the use of respirators, to an airborne concentration of lead, cadmium or chromium calculated as an 8 hour time-weighted average.

1.05 PERMITS AND INSPECTIONS

A. Notifications/Approvals: The Contractor shall make, in proper and timely fashion, any necessary notifications to relevant Federal, State, and local authorities and shall obtain and comply with the provisions of all permits or applications required by the work specified, as well as make all required submittals required under those auspices. The Contractor shall indemnify the Owner, their representatives and agents from, and pay for claims resulting from failure to adhere to these provisions. The costs for permits, applications, and the like, are to be assumed by the Contractor.

B. Fees, Permits and Licenses: The Contractor shall pay licensing fees, royalties, and other costs necessary for the use of any copyrighted or patented product, design, invention, or processing the performance of the job specified in this Section. The Contractor shall be solely responsible for costs, damages or losses resulting from any infringement of these patent rights

or copyrights. The Contractor shall hold the Owner and Consultant harmless from any costs, damages, and losses resulting from any infringement of these patent rights or copyrights. If the Specification requests the use of any product, design, invention, or process that requires a licensing fee or royalty fee for use in the performance of the job, the Contractor shall be responsible for the fee or royalty and shall disclose the existence of such rights.

C. Contractor shall be responsible for costs for licensing requirements and notification requirements and other fees related to the ability to perform the work in this Section. The Contractor shall be responsible for securing necessary permits for work under this Section, including removal, materials usage, or any other permits required to perform the specified work.

1.06 SUBMITTALS

A. Pre-Construction Submittals: Prior to the commencement of the required work, the Contractor shall provide the following to the Architect for approval:

- A written description detailing the means and methods to achieve compliance with the OSHA standards as well as the provisions outlined herein.
- A written description detailing the means and methods for properly disposing of all demolition debris in accordance with local, state and federal regulations.

B. Post-Construction Submittals: Final payment to the Contractor shall not be made unless the following items are submitted to the Architect for approval:

- Original Copy of Waste Disposal Manifests acknowledging disposal of any hazardous and non-hazardous waste material from the project showing delivery date, quantity, and appropriate signature of landfill's authorized representative.

1.07 QUALITY CONTROL/ASSURANCE

A. Training Requirements: Workers who will have the potential of lead, cadmium and chromium exposure shall have proof of successfully completing a training course which covers the topics required by OSHA. Contractors are also advised that training in other areas may be required by OSHA and are responsible to ensure that all training requirements for appropriate trades and procedures are met.

B. Specified Supervisor Qualifications: The Contractor shall specify an on-site Supervisor or Competent Person who is fully qualified in all aspects of safe work practices and procedures, and have (or will have) completed a training course within the previous year prior to the commencement of the work. The training course will cover all topics required by OSHA as well as training in relevant federal, state and local regulatory requirements, procedures and standards, supervisory techniques, and proper disposal procedures.

C. Site Specific Written Compliance Program: The program will be evaluated to ensure the elements required by OSHA are specific to the conditions at the job site.

D. Respiratory Protection Program: The Contractor must provide for review a written respiratory protection program in accordance with 29 CFR 1920.103 if respiratory protection is to be worn during this project.

E. Fit Test Records: If respiratory protection is to be worn as part of this project, records of successful respirator fit testing performed by a qualified individual within the previous 12 months, for each employee to be used on this project with the employee's name and social security number with each record.

F. Medical Surveillance: The Contractor shall provide biological monitoring to workers who have the potential of lead, cadmium and chromium exposure. This monitoring shall be performed in accordance with OSHA. If workers are expected to exceed the action level for more than 30 days in any consecutive 12 months the Contractor shall institute a medical surveillance program in accordance with OSHA. A laboratory approved by OSHA shall conduct Blood level sampling and analysis.

1.08 CODES AND STANDARDS

A. Work shall conform to the standards set by applicable federal, state and local laws, regulations, ordinances, and guidelines in such form in which they exist at the time of the work on the contract and as may be required by subsequent regulations.

B. In addition to any detailed requirements of the Specification, the Contractor shall at his own cost and expense comply with all laws, ordinances, rules and regulations of federal, state, regional and local authorities regarding handling and storing of waste material.

NOTE: Regulations by the above and other governing agencies in their most current version are applicable throughout this project. Where there is a conflict between this Specification and the cited federal, state or local regulations or guidelines, the more restrictive or stringent requirements shall prevail. This Section refers to many requirements found in these references, but in no way is it intended to cite or reiterate all provisions therein or elsewhere. It is the Contractor's responsibility to know, understand, and abide by all such regulations, guidelines and common practices.

PART 2.0 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. The Contractor shall be responsible for providing all material and protective equipment required for performance of the work. The Contractor shall comply with all local, state and federal regulations pertaining to the selection and use of materials and equipment on this project. The Contractor shall provide a submittal on all materials and equipment to be used for review and approval by the Architect.

PART 3.0 - EXECUTION

3.01 WORKER PROTECTION

A. Initial Determination: The Contractor shall determine, through personal exposure monitoring on the job site or through relevant documentation from other similar jobs, whether workers will be exposed to airborne lead, cadmium or chromium at or above the OSHA Action Level and Permissible Exposure Limit. If exposures at or above the action level are documented, appropriate health and safety procedures identified herein shall be followed. If levels below the action level are documented, the Contractor shall exercise an appropriate level of care to ensure that exposures above the action level do not occur. Whenever there is a chance of equipment, process, control, personnel or a new task has been initiated that may result in additional employees being exposed to lead, cadmium or chromium at or at or above the action level or may result in employees already exposed at or above the action level being exposed above the PEL, the Contractor shall conduct additional monitoring.

Note: The Contractor shall be responsible for performing a negative exposure assessment on each trade subject to the OSHA Regulation. The assessment shall take place during routine work activities, which will simulate employees, actual exposure levels to lead, cadmium and chromium. All assessments shall take place over an 8-hour time period and shall include all appropriate PPE and biological monitoring required as stated herein.

B. Personal Hygiene Practices: Where exposures to airborne lead, cadmium and chromium above the OSHA PEL occurs or may be expected to occur, the Contractor shall enforce and follow good personal hygiene practices. These practices shall be performed until personal exposure sampling indicates that exposures are below the PEL at which time the Contractor has the option to continue or discontinue the use of personal hygiene facilities. These practices shall l include but not be limited to the following:

1. No eating, drinking, smoking, or applying of cosmetics in work area. The Contractor will provide a clean space, separated from the work area, for these activities.
2. Workers must wash upon leaving the work area. The Contractor will provide wash facilities. This wash facility will consist of, at least, running potable water, towels, and a HEPA vacuum. Upon leaving the work area, each worker will remove and dispose of work suit, wash and dry face and hands, and vacuum clothes.
3. Disposable clothing, such as TYVEK suits, and other personal protective equipment (PPE) must be donned prior to entering work area. A clean room will be provided for workers to put on suits and other personal protective equipment and to store their street clothes. Disposable suits shall be used once, then properly discarded.
4. A lavatory facility must be provided and located adjacent to the work area. The eating and drinking area, clean room, and the lavatory facility must be maintained in a clean and orderly fashion at all times. The Contractor will provide portable lavatories when needed and disinfect them daily.
5. If air-monitoring data gathered by the Contractor shows that employees' exposure to airborne lead, cadmium or chromium exceeds the PEL, the following conditions apply:

    a. Showers must be provided. Shower water must pass through at least a 5.0 micron filter before returning to the public waste system.

b. Workers must shower upon leaving work area.
c. Three-stage decontamination unit must be established consisting of an Equipment Room, Shower, and Clean Room in series.

3.02 WORK AREA SET UP

A. Site Safety: The Contractor is responsible for all safety at the work site. This includes, but is not limited to, electrical safety, mechanical (tool) safety, fire safety, and personnel protective safety. Safety requirements are, for the most part, common sense and sound business practice; however, the Contractor is advised that federal, state, and local regulations exist which govern safety on the work site. Therefore, in addition to the following, the Contractor is responsible for adhering to the most stringent requirements in effect.

B. Signage: Prior to the preparation for work which will disturb lead, cadmium or chromium, the Contractor shall place warning signs immediately outside all entrances and exists to the area, warning that lead, cadmium and chromium work is being conducted in the vicinity. The signs shall be at least 20" x 14" and read:

WARNING:
LEAD, CADMIUM, CHROMIUM WORK AREA
POISON
NO SMOKING, EATING OR DRINKING
ALLOWED IN THE WORK AREA

The signs shall be in bold lettering with lettering not smaller than two inches tall. Should personal exposure monitoring results indicate that exposures are below the Action Level, then the signs will not be required.

C. Access to Work Areas: It will be the Contractor's responsibility to allow only authorized personnel into the work area. Barrier tape shall be used to limit access to the exterior work area. Contractor shall maintain a bound logbook, in which any person entering or leaving the work area must sign and enter the dates and times of entry and departure. Should personal exposure results indicate the exposures are below the Action Level, then a logbook will not be required. The Contractor or competent person will not allow anyone access to the work area unless they have successfully passed an approved training program, and have been fitted and wearing a properly fitted respirator.

D. Dumpsters used to store hazardous waste shall be DOT approved, solid enclosed containers and locked and secured at all times.

E. Containment controls (including critical barriers, protective coverings, HEPA-filtered ventilation and decontamination facilities) may be required for renovation/demolition work. The degree of containment shall be appropriate for the anticipated levels of airborne dust. The lower the level of airborne dust, the lesser the requirements necessary to control lead, cadmium and chromium emissions at the job site.

F. The Contractor shall isolate work areas for the duration of work by completely sealing off all openings in the work area. Isolation scaling shall be accomplished by constructing critical barriers where necessary around the work area perimeter. The work area shall be sealed airtight to the greatest extent possible.

G. The Contractor shall erect one or more Decontamination Facilities (if applicable) to serve each work area. The facility will consist of series of two or more connected chambers including, at a minimum, a clean room and a shower/wash room, separated by an air lock. Unless otherwise specified, the shower/wash room shall be contiguous to the work area. Non-contiguous, remote, three-chamber decontamination facilities may be substituted with the Consultant's prior written approval. Three-chamber decontamination facilities shall include an equipment room to be used for removal and temporary storage of contaminated worker clothing, equipment, and other items leaving the work area, prior to decontamination in the shower/wash room of the decontamination facility. In all cases, non-emergency access between contaminated and uncontaminated rooms or areas shall only be through the Decontamination Facility/Wash Room.

H. Ensure that barriers and linings are effectively sealed and taped at all times, and that the Shower/Wash Room floor is completely watertight. Repair damaged barriers, and remedy defects immediately upon discovery. Visually inspect enclosures at the beginning of each work period.

I. All renovation/demolition work areas shall remain isolated from all other trades on the project and remain inaccessible to the public. Contractor shall monitor the access to the renovation/demolition work areas. The below listed items are required to control the generation of lead, cadmium and chromium containing dust during renovation/demolition activities if worker exposure is above the PEL. The Contractor is ultimately responsible for cleaning all generated dust and debris from renovation/demolition operations and must maintain work areas free from dust generated from renovation/demolition activities.

1. Signs shall be posted at all approaches to the work area warning that work involving lead is being conducted in the vicinity. Signs shall be in bold lettering not smaller than two inches tall.
2. Barriers shall not be removed until the work areas are thoroughly cleaned and approved by the Consultant.

3.03 WORK PROCEDURES

A. The Contractor shall initiate, and continue, sufficient engineering and work practice controls, as described in the Contractor's Compliance Programs, to reduce and maintain worker exposures to lead, cadmium and chromium at or below the Action Level or Permissible Exposure Limit.

B. The following work practices are specifically required by these specifications:

1. All persons except those directly involved in the work shall be excluded from the work area. Physical barriers shall be used, where necessary, to limit access to the work area for the duration of the renovation activities. (Warning signs may need to be posted in accordance with applicable regulations.)

2. Provide hand washing facilities and assure that all workers thoroughly wash their hands and face upon exiting the work area. Workers shall pay careful attention to cleanse the hands and face when decontaminating (Provide hygiene facilities, including shower, as required based on initial assessment and continued monitoring.)
3. Thoroughly wet the areas to be demolished and mist the air to reduce the potential for creating airborne lead, cadmium and chromium dust.
4. All equipment used by the workers inside the work area shall be either left in the work area or thoroughly decontaminated before being removed from the area. Extra work clothing (in addition to the disposable suits supplied by the Contractor) shall be left in the clean area until the completion of work in that area. The clean area shall be cleaned of all visible debris and disposable materials daily.
5. Under no circumstances shall workers or supervisory personnel eat, drink, smoke, chew gum, or chew tobacco in the work area; to do so shall be grounds for the Engineer to stop all demolition operations. Only in the case of life threatening emergency shall workers or supervisory personnel be allowed to remove their protective respirators, if applicable, while in the work area. In this situation, respirators are to be removed for as short a duration as possible.
6. Feasible engineering controls shall be implemented by the Contractor to minimize the possibility of contamination of areas adjacent to the work area. The following activities are the minimum requirements of this section and affect the renovation/demolition performed on the project:

    a. No torch cutting, mechanical sanding or stripping or abrasive methods of paint removal shall occur.
    b. No renovation/demolition activities may occur which increase the workers exposure above the Action Level or Permissible Exposure Limit as described under OSHA.

7. Workers shall be informed of the components to be impacted during renovation/demolition that are identified as containing lead, cadmium and chromium.
8. Separation of Trades: Unprotected, untrained workers or trades shall not perform any related work within the same areas as demolition involving components identified as containing lead, cadmium and chromium. Other trades may not enter these areas until clean-up procedures are completed.

3.04 AIR SAMPLING – CONTRACTOR

A. Personal Exposure Monitoring: The Contractor shall perform personal exposure sampling to monitor personal exposure levels to airborne lead, cadmium and chromium. Samples shall be taken for the duration of the work shift or for eight hours, whichever is greater. Personal samples need not be taken every day after the first day if working conditions remain unchanged, but must be taken every time there is a change in the removal operation, either in terms of the location or the type of work. Sampling will be used to determine eight-hour Time-Weighted-Averages (TWA). The Contractor is responsible for personal sampling as outlined in the OSHA Standards.

B. Frequency: Air monitoring frequency will be established in accordance with the requirements set forth the OSHA Standards.

3.05 CLEAN-UP PROCEDURES

A. When work is in progress, the work site shall be cleaned at end of each day's activities. The building shall be secured to prevent entry by any person after termination of workday. Durable equipment, such as power and hand tools, generators, and vehicles shall be cleaned monthly.

B. Clean-up shall also include all paint chips and/or debris existing prior to the start of the contract and as generated during construction. This shall also include any paint that becomes dislodged and falls to the floor as a result of construction activities.

C. Equipment shall be cleaned by HEPA vacuuming. Surfaces shall be maintained as free as practicable of accumulations of dust and debris. Clean up of dust and debris shall be accomplished with a HEPA vacuum or wet methods. The debris shall be misted with water with an airless type sprayer and collected with a mop or broom.

3.06 DISPOSAL OF WASTE MATERIAL

A. General:

All costs associated with proper disposal of the waste materials (whether hazardous, non-hazardous or regulated) shall be borne by the Contractor under the Base Bid. All materials, whether hazardous, non-hazardous or regulated shall be disposed of in accordance with all laws, and the provisions of this Section and any or all other applicable federal, state county or local regulations and guidelines. It shall be the sole responsibility of the Contractor to assure compliance with all laws and regulations relating to disposal.

B. Non-Hazardous Materials: The Contractor shall contact the regional EPA, State and local authorities to determine disposal requirements for construction and demolition debris that contains lead, cadmium or chromium (non-hazardous). The Contractor shall be responsible for providing all dumpsters/containers required for collection and disposal of such material as well as disposal in an approved landfill.

C. Hazardous Waste/Regulated Materials: All materials which are determined to be hazardous waste or regulated waste for lead, cadmium or chromium shall be disposed of by the Contractor as specified herein. The Contractor shall perform representative Toxicity Characteristic Leaching Procedure (TCLP) tests of demolition debris to ensure the material is properly profiled for disposal. This shall also include all testing required by the disposal or recycling facility. All costs associated with TCLP testing to profile the waste material shall be borne by the Contractor. If the material is found to be hazardous waste or regulated waste, the Contractor shall provide appropriate drums/containers for use. The Contractor shall properly handle and transport all hazardous waste or regulated waste material into the drums/containers provided.

D. All TCLP sampling and analysis shall be subject to approval by the Owner. A submittal shall be provided by the Contractor which details the procedures for the sampling including the name of the sampler, methodology for sample collection, sample preparation and chain-of-custody procedures. The laboratory to be used shall be certified by the State of Massachusetts and the American Industrial Hygiene Association (AIHA).

E. No demolition or recyclable material shall be removed from the site unless approved by the Owner. The Contractor shall provide the name of the transporter and disposal facility for each type of waste (i.e. hazardous, non-hazardous, regulated or recyclable) for review and approval by the Owner.

F. Recyclable/Salvaged Materials (Non-Hazardous): The Contractor shall note that any demolition material deemed to be recyclable or salvageable by the Contractor may contain lead, cadmium or chromium which could result in the recycling or salvage facility rejecting acceptance regardless of the lead, cadmium or chromium content or TCLP result. The Contractor is hereby notified of this fact and shall bear all responsibilities and costs associated with acceptance and/or rejection of such materials in a C&D landfill, waste disposal facility and/or a recycling/salvage facility under their Base Bid.

G. The following materials are considered Hazardous Waste (Lead, Cadmium or Chromium) if they are generated in a form by themselves and shall be disposed of as such:

    a. Paint chip and paint chip debris

H. The Contractor shall be responsible for proper disposal of all materials outlined herein. In addition, all costs associated with worker protection or environmental protection requirements for such work shall be the responsibility of the Contractor.

END OF SECTION

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SECTION 02.40.00

SELECTIVE DEMOLITION

I. PART 1 - GENERAL

1.01 GENERAL

A. The **Conditions of the Contract** and all sections of **Division 01**, General Requirements shall be part of this section unless otherwise specifically excluded.

B. This Contractor must be familiar with all other Divisions and Sections which affect this Work.

1.02 DESCRIPTION OF WORK

A. **Work included:** Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Interior demolition of construction associated with bathroom renovations and building MEP upgrades.
2. Removal of existing acoustic tile and gypsum board ceilings, where noted.

B. **Alternates:** None.

C. **Items to Be Installed Only:** Install the following items as furnished by the designated Sections:

1. None. All items to be installed by this trade, shall be furnished by this trade.

D. **Items to Be Furnished Only:** Furnish the following items for installation by the designated Sections:

1. None.

E. **Related Work Specified Elsewhere:** The following related work or materials shall be provided under the designated Sections and coordinated by the Contractor:

1. Section 01.73.29 - Cutting & Patching: Minor cutting/coring of existing materials to allow installation of new piping and conduits.
2. Section 01.74.19 - Construction Waste Management and Disposal.
3. Divisions 22 and 23 - Removal of existing plumbing and mechanical items scheduled to be removed.
4. Division 26 - Removal of all electrical components scheduled to be removed.

1.03 SUBMITTALS

A. Refer to SECTION 01.33.00 - SUBMITTALS for submittal provisions and procedures.

B. Schedule: Provide detailed sequence of demolition and removal work.

1.04 JOB CONDITIONS

A. Condition of Structures: Owner assumes no responsibility for actual condition of items or structures to be demolished.

B. Protections: Provide temporary barricades and other forms of protection as required to protect Owner's personnel and general public from injury due to selective demolition work.

1. Provide protective measures as required to provide free and safe passage of Owner's personnel.

2. Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations. Protect site with suitable coverings when necessary.

3. Remove protections at completion of work.

C. Damages: Promptly repair damages caused to adjacent facilities by demolition work at no cost to Owner.

D. Traffic: Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.

E. Do not close, block or otherwise obstruct streets, walks or other occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

F. Utility Services: Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations.

G. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.

H. Environmental Controls: Use temporary enclosures, and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level. Comply with governing regulations pertaining to environmental protection.

II. PART 2 - PRODUCTS (Not Applicable).

III. PART 3 - EXECUTION

3.01 INSPECTION

A. Prior to commencement of demolition work, inspect areas in which work will be performed. Photograph existing conditions to structure surfaces, equipment or to surrounding properties which could be misconstrued as damage resulting from selective demolition work; file with Architect prior to starting work.

B. Where materials scheduled for demolition are removed, revealing mold on materials scheduled to remain, treat the afffected areas with a moldicide prior to proceeding with the installation of new materials.

3.02 PREPARATION

A. Submit a demolition plan and schedule under the provisions of Section 01.33.00 - Submittals, prior to performing any demolition work.

B. Sequence work in occupied areas so as to minimize disruption, and to allow continued use of spaces.

C. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement or collapse of structures to be demolished and adjacent facilities to remain.

D. Cease operations and notify the Owner's Representative immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.

E. Erect and maintain dust-proof partitions and closures as required to prevent spread of dust or fumes to occupied portions of the building.

F. Ensure areas to be demolished have been made safe by sub-trades thorough disconnection of utility services, prior to start of work.

3.03 DEMOLITION

A. Demolition shall include the removal of all incidental items associated with the work shown to be demolished. This includes all cleats, nailers, blocking, brackets, clips and hangers, nails and fasteners, etc. After demolition:

1. The substrates to receive new work shall be sound and smooth, ready for attachment of new materials

2. No unnecessary or abandoned items shall remain in the area, whether in the way of new work or not.

B. Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on Drawings in accordance with demolition schedule and governing regulations.

C. Cut plaster in neat straight lines. Remove existing trim in such a manner as to allow new trim to abut existing trim with straight neat joints. Salvage trim where possible to permit re-installation.

D. Provide services for effective air and water pollution controls as required by local authorities having jurisdiction.

E. If unanticipated mechanical, electrical or structural elements which conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Designer in written, accurate detail. Pending receipt of directive from Designer, rearrange selective demolition schedule as necessary to continue overall job progress without delay.

F. Notify Architect immediately if materials scheduled to remain are found to be unsuitable for the installation of the new work, or if existing conditions deviate substantially from those shown on the drawings. Remove and replace, or make good, any existing materials unsuitable for installation of new work.

G. Sequence work in accordance with requirements of Section 01.31.00. Schedule new work to coincide with demolition work, to minimize amount of disruption.

3.04 FLOOR DEMOLITION

A. Where flooring removal is noted on the drawings, demolition scope includes removal of all flooring, down to the existing subfloor, including wood and/or vinyl baseboards.

B. After removal of all flooring, inspect underlayment and sub-floor areas for rot or damage, or other conditions unsuitable to receive new materials, and photograph the existing conditions.

1. Unsuitable materials shall be removed and replaced with materials as specified in Section 06.10.00 - Rough Carpentry.

2. All quantities of materials removed and replaced are required to be observed, verified and recorded by the Owner Compensation for new materials which were covered by the Contractors before verification will not be considered.

C. After removal of flooring and replacement of unsuitable materials, all remaining sub-floor boards shall be resecured to the floor framing with coated deck screws, whether loose or not.

1. Where driving screws in loose boards leaves existing nail heads sticking up above the boards, they shall be removed, and not driven back into the framing.

2. Each sub-floor board shall have a minimum of 2 fasteners securing it.

3.05 WALL DEMOLITION

A. Demolition of wall finishes includes all finishes to the studs.

B. Demolition at exterior walls or interior unit dividing walls will include the removal of the existing insulation for replacement with new materials specified elsewhere.

1. This includes areas where removal of wall finish alone is shown.

2. For purposes of bidding, contractors shall assume existing insulation is batt insulation.

3. Insulation shall be removed for replacement regardless of whether it remains intact within the stud cavity, after removal of the wall finish.

4. After removal of the insulation, but prior to the installation if new, the Contractor shall inspect the condition of the exterior wall sheathing for rot or insect damage. If damage is encountered, notify the Owner prior to placing new materials.

3.06 CEILING DEMOLITION

A. Acoustic Panel Ceiling Demolition:

1. Remove existing ceilings where indicated, taking care to protect all ceiling mounted items from damage.

(a) Demolition shall include all suspension system elements including but not limited to suspension wires, channels and strapping.

2. Provide temporary support of ceiling mounted items until they can be properly integrated into the new ceiling.

3. Protect smoke detectors from dust whenever work is performed on the ceilings. Remove protections any time work is not being performed, to ensure that the system is fully functional.

B. Gypsum Board Ceiling Demolition:

1. Demolition of ceiling finishes will include the removal of the existing insulation for replacement with new materials specified elsewhere.

(a) For purposes of bidding, contractors shall assume existing insulation is batt insulation.

3.07 DISPOSAL OF DEMOLISHED MATERIALS.

A. All demolished materials shall be removed to dumpsters, and segregated where hazardous materials are involved and where recycling is possible. Refer to 01.74.19 for mandatory and voluntary recycling requirements.

B. The General Contractor shall provide dumpsters for all trades.

C. Transport and legally dispose of materials off site. Furnish waste manifests with close-out documentation wherever the disposal of hazardous materials is required.

D. Where hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling and protection against exposure or environmental pollution.

E. Burning of removed materials is not permitted on project site.

3.08 CLEAN-UP AND REPAIR

A. Upon completion of demolition work, remove tools, equipment and demolished materials from site. Remove protections and leave interior areas broom clean.

B. Repair demolition performed in excess of that required. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition work. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

END OF SECTION

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SECTION 05.52.00

METAL RAILS

I. PART 1 - GENERAL

1.01 GENERAL

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.02 DESCRIPTION OF WORK

A. **Work included:** Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Steel tube railings.

B. **Alternates:** None.

C. **Items to Be Installed Only:** Install the following items as furnished by the designated Sections:

1. Not Applicable.

D. **Items to Be Furnished Only:** Furnish the following items for installation by the designated Sections:

1. None.

E. **Related Work Specified Elsewhere:** The following items are not included in the Section, and will be performed under the designated Section:

1. None.

1.03 PERFORMANCE REQUIREMENTS

A. Structural Performance of Railings: Provide railings capable of withstanding the effects of gravity loads and Code required loads and stresses within limits and under conditions indicated:

1. Capable of withstanding uniform and horizontal loads as listed in 780CMR 1607.

1.04 SUBMITTALS

A. Product Data: For metal stairs and the following:

1. Paint products.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Provide templates for anchors and bolts specified for installation under other Sections.
2. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer licensed in the Commonwealth of Massachusetts responsible for their preparation. All costs for professional engineering shall be included in the bid price for the Work of this Section.

C. Welding certificates.

D. Qualification Data: For professional engineer licensed in the Commonwealth of Massachusetts.

1.05 QUALITY ASSURANCE

A. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer.

B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the Commonwealth of Massachusetts and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of metal stairs that are similar to those indicated for this Project in material, design, and extent.

C. Installer Qualifications: Fabricator of products.

D. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," for class of stair designated, unless more stringent requirements are indicated.

1. Preassembled Stairs: Commercial class.
2. Ornamental Stairs: Architectural class.

E. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.3, "Structural Welding Code--Sheet Steel."

1.06 COORDINATION

A. Coordinate installation of anchorages for metal rails. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

II. PART II - PRODUCTS

2.01 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.02 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Steel Tubing: ASTM A 500 (cold formed) or ASTM A 513, Type 5 (mandrel drawn)

C. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

D. Uncoated, Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M either commercial steel, Type B, or structural steel, Grade 30, unless another grade is required by design loads.

E. Galvanized Steel Sheet: ASTM A 653/A 653M, G90 coating, either commercial steel, Type B, or structural steel, Grade 33, unless another grade is required by design loads.

2.03 FASTENERS

A. General: Provide zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 25 for exterior use, and Class Fe/Zn 5 where built into exterior walls. Select fasteners for type, grade, and class

required.

2.04 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Shop Primers: Provide primers that comply with Section 09.90.00 - PAINTING AND COATING.

2.05 FABRICATION, GENERAL

A. Provide complete stair assemblies, including metal framing, hangers, struts, railings, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.

1. Join components by welding, unless otherwise indicated.
2. Use connections that maintain structural value of joined pieces.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work true to line and level with accurate angles and surfaces and straight edges.

E. Weld connections to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Weld exposed corners and seams continuously, unless otherwise indicated.
5. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts unless otherwise indicated. Locate joints where least conspicuous.

2.06 STEEL TUBE RAILINGS

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of tube, post spacings, and anchorage, but not less than that needed to withstand indicated loads.

B. Welded Connections: Fabricate railings with welded connections. Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

C. Form changes in direction of railings as detailed on the Drawings.

D. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

E. Close exposed ends of railing members with prefabricated end fittings.

F. Extend rails beyond top and bottom landings as required by code.

1. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.

G. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnecting components and for attaching to other work. Furnish inserts and other anchorage devices for connecting to concrete or masonry work.

1. Connect wall rails to wall or posts using steel wall brackets, Wagner Companies, Style C Bracket with two mounting holes, #3490.
2. For nongalvanized railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors embedded in exterior masonry and concrete construction.

H. Fillers: Provide fillers made from steel plate, or other suitably crush-resistant material, where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses and to produce adequate bearing area to prevent bracket rotation and overstressing of substrate.

2.07 FINISHES

A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

2. Where field welding is required, touch up prime coat after grinding field welds.

III. PART III - EXECUTION

3.01 INSTALLATION, GENERAL

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing assemblies to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.

C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

E. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

3.02 INSTALLING STEEL TUBE RAILINGS

A. Adjust railing systems before anchoring to ensure matching alignment at abutting joints. Secure rail ends to

building construction to resist code require loads.

1. Anchor posts to steel by welding directly to steel supporting members.
2. Anchor handrail ends to concrete and masonry with steel round flanges welded to rail ends and anchored with postinstalled anchors and bolts.

B. Attach handrails to wall with wall brackets. Provide bracket with 1-1/2" clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

1. Use type of bracket with flange for concealed anchorage to threaded hanger bolt.
2. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
3. For hollow masonry anchorage, use toggle bolts.
4. For steel-framed gypsum board assemblies, fasten brackets directly to steel framing or concealed steel reinforcements using self-tapping screws of size and type required to support structural loads.

3.03 ADJUSTING AND CLEANING

A. Touchup Coating: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and touch-up shop primer.

END OF SECTION

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SECTION 06.10.00

ROUGH CARPENTRY

I. PART 1 - GENERAL

1.01 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 1 - GENERAL REQUIREMENTS, which are hereby made a part of this Section of the Specifications.

B. This Contractor must be familiar with all other Divisions and Sections of the Specifications which affect the work of this Section.

1.02 DESCRIPTION OF WORK

A. **Work included:** Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Partition wall framing.
2. Resilient flooring sub-floor and underlayment.
3. Wood closet shelving.
4. Interior wood blocking materials.
5. Nails, bolts and fasteners for securing items of this section.

B. **Alternates:** None.

C. **Items to Be Installed Only:** Install the following items as furnished by the designated Sections:

1. None. All items to be installed by this trade, shall be furnished by this trade.

D. **Items to Be Furnished Only:** Furnish the following items for installation by the designated Sections:

1. None.

E. **Related Work Specified Elsewhere:** The following items are not included in this Section, and will be performed under the designated Section:

1. None.

1.03 SUBMITTALS

A. Submit manufacturer's literature on carpentry products, identifying grade, moisture content, preservative treatments and other certifications.

1.04 REFERENCES

A. APA: American Plywood Association.

B. AWPA (American Wood Preservers Association) C1 - All Timber Products Preservative Treatment by Pressure Process.

C. NFPA: National Forest Products Association.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with the following agencies:

1. Lumber Grading Agency: Certified by ALSC.
2. Plywood Grading Agency: Certified by APA.

B. The maximum moisture content for lumber products shall be 19 percent on air-dried stock, and 15 percent maximum on kiln-dried (KD) stock. All lumber stock shall be furnished air-dried unless specifically noted otherwise.

C. Except when particular types of dressing are specified for certain products, surface lumber four sides (S4S).

1.06 DELIVERY AND STORAGE

A. Keep materials dry during delivery and storage. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber and plywood, and provide air circulation within stacks. Do not store or erect material in wet or damp portions of the building or in areas where plastering or similar work is to be executed until such work has been completed and has become reasonably dry.

B. Deliver, store, and handle composite wood in accordance with manufacturer's instructions.

1.07 JOB CONDITIONS

A. Installer must examine the substrate and supporting structure and the conditions under which the carpentry work is to be installed, and notify the Contractor in writing of conditions detrimental to the Work. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

B. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Coordinate location of furring, nailers, blocking, grounds and similar supports to allow proper attachment of other Work.

II. PART 2 - PRODUCTS

2.01 GENERAL

A. Concealed blocking may be provided as dimensional lumber or panel products (contractor's choice) meeting the criteria specified herein.

B. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.

1. Factory mark each piece of lumber with grade stamp of grading agency
2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
3. Provide dressed lumber, S4S, unless otherwise indicated
4. Provide dry lumber with 15 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.

C. Plywood Panels:

1. Plywood: Either DOC PS 1 or DOC PS 2, unless otherwise indicated.
2. Thickness: As needed to comply with requirements specified but not less than thickness indicated.
3. Factory mark panels according to indicated standard.

2.02 MISCELLANEOUS LUMBER

A. General: Provide lumber for support or attachment of other construction, including blocking, furring, grounds, and similar members.

B. Lumber Grading Rules: NFPA, NIST PS 20

C. Nominal sizes are indicated, except as shown by detail dimensions.

D. Fabricate miscellaneous lumber from dimension lumber of sizes indicated, and into shapes shown on Contract documents.

E. Moisture Content: 19 percent maximum for lumber items not specified to receive wood preservative treatment.

F. Grade and Species: For dimension lumber sizes, provide No. 3 or Standard grade lumber per ALSC's NGRs of any species. For board-size lumber, provide No. 3 Common or Standard grade per WWPA of any species.

2.03 PLYWOOD

A. Underlayment at resilient flooring shall be:

1. 3/8" hardwood plywood.
2. APA Trademarked Plywood (or equivalent Agency Certified Plywood) rated as suitable underlayment for resilient floor coverings such as tile or sheet vinyl.
3. C-C Plugged with sanded face.

B. Floor Sheathing: APA-rated sheathing.

1. Thickness as required to match existing subfloor to remain.
2. Exposure Durability Classification: Exposure 1.
3. Span Rating: As required to suit stud or joist spacing indicated.

2.04 SHELF BRACKET

A. Everbilt "Heavy Duty Shelf Bracket" #14327, or equal meeting the following:

1. Material: steel
2. Size: 12" x 8"
3. Finish: white
4. Supports 600 lbs per bracket

2.05 FASTENERS AND ADHESIVES

A. General: Provide fasteners of size and type indicated or required, that comply with requirements specified. Refer to structural drawings for anchoring requirements and anchoring patterns.

1. Where rough carpentry work is exposed to weather, in ground contact, or in areas of high relative humidity, provide fasteners with hot-dip, zinc-coating per ASTM A153

B. Nails, Wire, Brads, and Staples: FS FF-N-105B.

C. Screws:

1. Wood Screws: ASME B18.6.1.

D. Lag Bolts: ASME B18.2.1.

E. Bolts: Steel bolts complying with ASTM A307, Grade A with ASTM A563 hex nuts and, where indicated, flat washers.

F. Fasteners for Subfloor: Coated deck screws, square drive head # 8, 1 ½.

G. Fasteners for Underlayment: 1 1 /2" Ring Shank Nails, minimum 12 ½ gauge shank diameter, non-coated.

H. Adhesive: Waterproof grade interior/ exterior adhesive, meeting or exceeding the following:
   1. Specifically for use on wood framing and wood subfloors
   2. ASTM D34-98, APA AFG-01 and HUD UM60a
   3. Max VOC :388 GPL
   4. Freeze-thaw stable.
   5. Shear strength: 24 hours- 200psi, 48 hours-300psi, 28 days >450psi.

III. PART 3 - EXECUTION

3.01 COORDINATION

A. Installer of blocking shall coordinate with installers of items requiring blocking, to ensure proper placement.

B. For items related to handicapped accessibility, the accurate height and placement of the items is critical. Install blocking of sizes sufficient to allow minor adjustment in the field of the positioning of finished items.

3.02 INSTALLATION

A. Discard units of material with defects that impair quality of rough carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.

B. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted.

C. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.

D. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with Table 2304.5 “Fastening Schedule” in the 9th Edition of the Massachusetts State Building Code (780 CMR).

3.03 WOOD GROUNDS, NAILERS, BLOCKING, AND SLEEPERS

A. Install wood grounds, nailers, blocking, and sleepers where shown and/or at all wall mounted items, and where required for screeding or attaching other work. Form to shapes shown and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated. Where possible, anchor to formwork before concrete placement.

3.04 WOOD FURRING

A. Install plumb and level with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

B. Firestop furred spaces of walls at each floor level, and at ceiling with wood blocking or noncombustible materials, accurately fitted to close furred spaces.

3.05 WOOD FRAMING, GENERAL

A. Framing Standard: Comply with AFPA’s :Manual for Wood Frame Construction,” unless otherwise indicated.

B. Install framing members of size and at spacing indicated.

C. Do not splice structural members between supports.

D. Firestop concealed spaces of wood-framed walls and partitions at each floor level and at ceiling line of top story. Where firestopping is not inherent in framing system used, provide closely fitted wood blocks of 2 in nominal (38 mm actual) thickness lumber of same width as framing members.

E. Arrange studs so that wide face of stud is perpendicular to direction of wall or partition and narrow face is parallel.

1. Provide single bottom plate and double top plates using members of 2 inch nominal (38 mm actual) thickness whose widths equal that of studs; except single top plate may be used for non-load-bearing partitions. Nail or anchor plates to supporting construction, unless otherwise indicated.

F. Construct corners and intersections with three (3) or more studs. Provide miscellaneous blocking and framing as shown, and as required to support facing materials, fixtures, specialty items and trim.

1. Provide continuous horizontal blocking at midheight of single-story partitions over 96 inches (2.4m) high and multistory partitions, using members of 2 inch nominal (38 mm actual) thickness and of same width as wall or partitions.

G. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Set headers on edge and support on jamb studs.

1. For non-load-bearing partitions, provide double-jamb studs with headers not less than 4-inch nominal (89 mm actual) depth for openings 36 inces (914 mm) and less in width, and not less than 6-inch nominal (140 mm actual) depth for wider openings.
2. For load-bearing walls, refer to structural drawings for requirements.

H. Provide bracing in exterior walls and at interior load-bearing walls, refer to structural drawings for requirements.

3.06 SUB-FLOOR AND UNDERLAYMENT

A. Where existing sub-floor remains, or over new sub-floor, install new underlayment prior to installation of resilient flooring.

1. Re-secure all sub-floor boards, whether loose or not, with deck screws. Remove any existing nails or fasteners that become loosened when boards are screwed down, and replace with new screws.

2. Place underlayment perpendicular to existing sub-floor boards. Where existing boards were installed diagonally, place underlayment in the most economical direction, to minimize seams. Stagger sheets so that joints do not align.

3. Cut, scribe or fit underlayment to penetrations and irregularities.

4. Secure underlayment to sub-floor 6” on center along perimeter, and 12” on center in the field.

5. Correct differences in panel thickness by sanding.

END OF SECTION

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SECTION 06.20.00

FINISH CARPENTRY

I. PART 1 - GENERAL

1.01 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.02 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Interior wood wall base.
2. All other finish carpentry items noted on the drawings.

B. Alternates: Not Applicable.

C. Items To Be Installed Only: Not Applicable.

D. Items To Be Furnished Only: Furnish the following items for installation by the designated Sections

1. None.

E. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 09.90.00 - PAINTING for field-finishing the work of this section.

1.03 SUBMITTALS

A. Product Data: For each type of product specified, including finishing materials and processes.

B. Shop Drawings: Not required.

C. Samples for Verification:

1. Furnish (1) 12" long sample of each profile specified.
2. Furnish (3) finish samples to match existing stain.

D. Qualification Data: For Installer and fabricator.

1.04 QUALITY

A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

B. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production of interior architectural woodwork with sequence-matched wood veneers.

C. Quality Standard: Unless otherwise indicated, comply with AWI/AWMAC/WI's "Architectural Woodwork Standards" (AWS) for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.06 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.

D. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.07 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

II. PART 2 - PRODUCTS

2.01 INTERIOR RUNNING TRIM

A. Grade: AWS Custom.

B. Wood Species: Any closed-grain hardwood.

C. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.

D. Baseboard: Match existing (similar to Brosco 8712 silhouette)

E. Finish: Match existing stain

2.02 MISCELLANEOUS MATERIALS

A. Adhesives, General: Do not use adhesives that contain urea formaldehyde.

B. VOC Limits for Installation Adhesives and Glues: Use installation adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Wood Glues: 30 g/L.
2. Contact Adhesives: Not permitted on the Project without Designer's prior approval.

2.03 FABRICATION, GENERAL

A. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.

B. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.

C. Complete fabrication, including assembly, finishing, and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

III. PART 3 - EXECUTION

3.01 PREPARATION

A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas.

B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming

3.02 INSTALLATION

A. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.

B. Assemble woodwork and complete fabrication at Project site to comply with requirements for fabrication in Part 2, to extent that it was not completed in the shop.

C. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches.

D. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

E. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.

F. Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Do not use pieces less than 60 inches long, except where shorter single-length pieces are necessary. Scarf running joints and stagger in adjacent and related members.

1. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base if finished

2. Install running trim with no more variation from a straight line than 1/8 inch in 96 inches.

G. Touch up finishing work specified in this Section after installation of woodwork. Fill nail holes with matching filler where exposed.

3.03 ADJUSTING AND CLEANING

A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION

SECTION 07.20.00
INSULATION AND BARRIERS

I. PART 1 GENERAL

1.01 GENERAL

A. The 00.72.00 **Conditions of the Contract** and all sections of **Division 01**, General Requirements shall be part of this section unless otherwise specifically excluded.

B. This Contractor must be familiar with all other Divisions and Sections which affect this Work.

1.02 DESCRIPTION OF WORK

A. **Work included:** Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Wall insulation.
2. Ceiling insulation.
3. Acoustical Insulation.

B. **Alternates:** None.

C. **Items to Be Installed Only:** Install the following items as furnished by the designated Sections:

1. None. All items to be installed by this trade, shall be furnished by this trade.

D. **Items to Be Furnished Only:** Furnish the following items for installation by the designated Sections:

1. None.

E. **Related Work Specified Elsewhere:** The following items are not included in the Section, and will be performed under the designated Section:

1. Section 06.10.00 - Rough Carpentry
2. Section 09.20.00- Gypsum Board Assemblies

1.03 REFERENCES

A. 780 CMR, Massachusetts State Building Code, 9th Edition, Massachusetts Amendments

B. International Energy Conservation Code (IECC) 2018

C. ASTM C 665

D. ASTM E96, vapor transmission, desiccant method

E. ASTM C 518

F. UL D369

1.04 SUBMITTALS

A. Submit in accordance with Section 01.33.00.

1.05 QUALITY ASSURANCE

A. Exterior envelope performance requirements shall conform to 2018 IECC, 2015 9th Edition MSBC.

B. Insulation and barrier installation techniques shall conform to 2018 IECC, 2015 9th Edition MSBC.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect stored materials from damage and moisture, before, during and after installation.

1.07 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity and ventilation) within limits recommended by the manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.08 WARRANTY

A. Installer's Warranty: 1 year labor and materials on all products installed.

II. PART 2 PRODUCTS

2.01 WALL INSULATION

A. Thermal Insulation
1. Mineral wool complying with ASTM C 665, Type I, such as Roxul, Owens Corning "Thermafiber," or equal.
2. ASTM E136: Non-combustible.
3. ASTM E84 - Fire:0, Smoke:0.
4. Type: unfaced
5. Thickness: as required to fill stud cavity depth.
6. R-15 for 3-1/2" batts, R-23 for 5-1/2" batts, as tested by ASTM C 518, Refer to drawings for locations.

B. Thermal Insulation
1. Mineral wool complying with ASTM C 665, Type I, such as Roxul, Owens Corning "Thermafiber," or equal.
2. ASTM E136: Non-combustible.
3. ASTM E84 - Fire:0, Smoke:0.
4. Type: kraft-paper faced.
5. Thickness: as required to fill stud cavity depth.
6. R-15 for 3-1/2" batts, R-23 for 5-1/2" batts, as tested by ASTM C 518, Refer to drawings for locations.

C. Acoustical Insulation
1. Fiberglass batt insulation complying with ASTM C 665, Type I, such as Owens Corning "Sonobatts" or approved equal.
2. ASTM E136: Non-combustible.
3. ASTM E84 - Fire:0, Smoke:0.
4. Type: unfaced
5. Thickness: as required to fill stud cavity depth.
6. NRC: 1.05 min, STC: 45 min.

III. PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and openings are ready to receive work and field measurements are as shown on shop drawings.

B. Verify that mechanical, electrical, and building items affecting work of this Section are placed and ready to receive this work.

C. Beginning of installation means acceptance of existing conditions.

3.02 PREPARATION

A. Verify that framing is straight and true, and ready to receive the work of this section.

B. Correct any defects prior to installation of new materials.

3.03 INSTALLATION

A. Batt Insulation

1. Friction fit infaced batts between studs. Batts shall fit neatly and be cut to fit smaller cavities. Fit insulation neatly and fully around all cavity utilities. Install spray foam at any areas that are too small to insulate properly.

2. Staple kraft paper facing tabs to bottoms of joists. Support batts with wood strapping, 24" on center.

3. Use continuous lengths of insulation, wherever possible. Where multiple lengths are required, butt batts together to eliminate any joints.

4. Insulate all cavities at jack studs and other such framing, by loosely filling gaps with insulation material. Insulation of cavities which will be concealed through the process of framing, should be performed by the framing installers as that work progresses.

3.04 ADJUSTMENT, CLEANING AND PROTECTING.

A. Inspect and repair any defects or damage in barriers, prior to installation of wall finishes

END OF SECTION

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SECTION 08.20.00

DOORS AND FRAMES

I PART 1 - GENERAL

1.01 GENERAL PROVISIONS

A. The General Conditions, Supplementary General Conditions, and applicable parts of Division I as part of this Section.

B. This Contractor must be familiar with all other Divisions and Sections which affect this Work.

1.02 DESCRIPTION OF WORK

A. **Work included:** Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

(1.) Wood interior doors.
(2.) Hollow metal door frames.
(3.) Installation accessories.

B. **Alternates:** None.

C. **Items to Be Installed Only:** Install the following items as furnished by the designated Sections:

(1.) None. All items to be installed by this trade, shall be furnished by this trade.

D. **Items to Be Furnished Only:** Furnish the following items for installation by the designated Sections:

(1.) None.

E. **Related Work Specified Elsewhere:** The following items are not included in this Section, and will be performed under the designated Section:

(1.) Section 09.99.00 - PAINTING, for field finishing of hollow metal frames.

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM):

(1.) ASTM E 90 – Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
(2.) ASTM E 283 – Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Difference Across the Specimen.
(3.) ASTM E 330 – Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
(4.) ASTM E 331 – Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
(5.) ASTM E 413 – Classification for Rating Sound Insulation (STC).
(6.) ASTM E 547 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and

Curtain Walls by Cyclic Static Air Pressure Difference.
(7.) ASTM E 1300 – Standard Practice for Determining Load Resistance of Glass in Buildings.
(8.) ASTM E 1332 – Standard Classification for Determination of Outdoor-Indoor Transmission Class.
(9.) ASTM E 2235 – Standard Test Method for Determination of Decay Rates for Use in Sound Insulation Test Methods.

B. Code of Federal Regulations:

(1.) CFR 1201 Part 2 – Safety Standard for Architectural Glazing Materials.

C. National Fenestration Rating Council

(1.) NFRC 100 – Procedure for Determining Fenestration Product U-Factors.
(2.) NFRC 200 – Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance (VT) at Normal Incidence.
(3.) NFRC 400 – Procedure for Determining Fenestration Product Air Leakage.

1.04 SUBMITTALS

A. Refer to Division 01.33.00 Submittal Procedures.

B. Product Data: Submit door manufacturer current product literature, including installation instructions.

C. Shop Drawings: Submit manufacturer's shop drawings, indicating dimensions, construction, component connections, anchorage methods and locations, accessories, hardware locations, and installation details.

D. Samples: Submit full-size or partial full-size verification sample of door illustrating glazing system, quality of construction, texture, and color of finish.

1.05 QUALITY ASSURANCE

A. Product Data: for all materials specified herein.

B. Mockup: not required.

C. Quality Assurance Submittals:

(1.) Provide documentation for specified performance as required.
(2.) Manufacturers' installation instructions.

D. Manufacturer Qualifications: Manufacturer shall have successful experience in producing the type of product required for project applications equivalent to the requirements for this project.

E. Installer Qualifications: Installer shall be a properly licensed and insured contractor who is routinely involved in the execution of door replacement in residential housing, and can demonstrate a successful track record of similar installations for a period of not less than 5 years.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site undamaged with labels clearly identifying manufacturer, product name, and installation instructions

B. Storage: Store materials in an upright position, off ground, under cover, and protected from weather, direct sunlight, and construction activities.

C. Handling: protect materials and finish during handling and installation to prevent damage.

1.07 WARRANTY

A. Manufacturer shall warrant that doors, frames and manufacturer's components, including rot-resistant frames, mullions, and brickmould sourced from door manufacturer used in multi-residential projects will be free from material and workmanship defects for a period of three years from Substantial Completion.

B. Installer shall warranty the installation, and make any repairs or adjustments including costs for labor and materials, for a period of 1 year after substantial completion.

II PART 2 PRODUCTS

2.01 INTERIOR WOOD DOORS

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

(1.) Flush Wood Doors:
(a.) Algoma Hardwoods Inc.
(b.) Eggers Industries; Architectural Door Division.
(c.) Marshfield DoorSystems.
(d.) Oshkosh Door Company
(e.) VT Industries Inc.

2.02 DOOR CONSTRUCTION, GENERAL

A. Low-Emitting Materials: Provide doors made with adhesives and composite wood products that contain no added urea formaldehyde.

B. Doors for Transparent Finish:

(1.) Grade: AWI Custom, with AWI Grade A faces.
(2.) Species and Cut: Face veneers shall be hardwood and shall match adjacent doors in species and in color.
(3.) Match between Veneer Leaves: Book match.
(4.) Assembly of Veneer Leaves on Door Faces: Running match.
(5.) Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
(6.) Stiles: Manufacturer's standard laminated stile construction with exposed surface the same species as faces.

2.03 SOLID-CORE DOORS

A. Cores: Comply with the following requirements:

(1.) Particle Core: ANSI A 208.1, Grade 1-LD-2, contributes to MR 4 and MR7.
(2.) Structural Composite Lumber Core: Timberstrand LSL, contributes to IEQ 4.4 and MR 7.
(3.) Provide doors with structural composite lumber cores instead of particleboard cores at locations where exit devices are indicated or where light or louver cutouts exceed 40% of the door area.

B. Interior Veneer-Faced Doors:

(1.) Construction: Five plies with stiles and rails bonded to core, then entire unit abrasive planed before

veneering.

2.04 HOLLOW METAL FRAMES

A. General: Comply with ANSI A250.8 and with details indicated for type and profile.

B. Interior Frames: Fabricated from cold-rolled steel sheet, unless otherwise indicated to comply with exterior frame requirements.

(1.) Fabricate frames with mitered or coped and welded face corners and seamless face joints at all new walls.
(2.) 0.053-inch-thick (16 gauge) steel sheet.

C. Fire rated frames: Fabricate frames in accordance with NFPA80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.

2.05 FRAME ANCHORS

A. Jamb Anchors:

(1.) Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.

B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:

(1.) Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2.06 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8

C. Interior Wood Doors:
(1.) Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:

(a.) Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements in NFPA 80 for fire-rated doors.

(2.) Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

(a.) Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining. Drill pilot holes for screws for butt hinges and lock fronts at the factory.
(b.) Metal Astragals: Premachine astragals and formed-steel edges for hardware for pairs of fire-rated doors to receive concealed vertical rod exit devices as required by manufacturer’s label listings.

D. Hollow Metal Frames:

(1.) Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and not visible.
  (a.) Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be sued to seize the frame opening.
(2.) Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated. Proved security screws at exterior locations.
(3.) Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
(4.) Jamb Anchors: Provide number and spacing of anchors as follows:
  (a.) Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
  (i.) Three anchors per jamb up to 60 inches high.
  (ii.) Four anchors per jamb from 60 to 90 inches high.
  (iii.) Five anchors per jamb from 90 to 96 inches high.
  (iv.) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
  (v.) Two anchors per head for frames above 42 inches wide and mounted in metal-stud partitions.
(5.) Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.
  (a.) Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
  (b.) Double-Door Frames: Drill stop in head jamb to receive two door silencers.

E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.

F. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Section 08.71.00 - DOOR HARDWARE.

(1.) Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
(2.) Reinforce frames to receive nontemplated, mortised and surface-mounted door hardware.
(3.) Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
(4.) Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

2.07 WOOD FINISHES

A. Transparent Finish:
(1.) Grade: AWI Premium, with AWI Grade A faces.
(2.) Secies and Cut: Face veneers shall be hardwood and shall match adjacent doors in species and in color.
(3.) Cross-Banding: 1/8" high density fiberboard, urea formaldehyde free.

2.08 STEEL FINISHES

A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.

(1.) Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

III PART 3 EXECUTION

3.01 EXAMINATION

A. Examine doors and installed door frames before hanging doors.

(1.) Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
(2.) Reject doors with defects.

B. Examine areas to receive doors. Notify Architect in writing any unacceptable conditions that would adversely affect installation or subsequent performance of the product. Do not proceed with installation until unsatisfactory conditions are corrected.

3.02 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:

(1.) Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
(2.) Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
(3.) Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
(4.) Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.

C. Drill and tap frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.03 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Wood Doors Manufacturer's Written Instructions: Install doors to comply with manufacturer's written instructions, referenced quality standard, and as indicated.

(1.) Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.
(2.) Install smoke- and draft-control doors according to NFPA 105.

C. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.

(1.) Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
(a.) At fire-protection-rated openings, install frames according to NFPA 80.
(b.) Install frames with removable glazing stops located on secure side of opening.
(c.) Install door silencers in frames before grouting.
(d.) Remove temporary braces necessary for installation only after frames have been properly set and secured.
(e.) Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.

(f.) Field apply bituminous coating to backs of frames that are filled with grout.

(2.) Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.

(a.) Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.

(3.) Stud Partitions: Solidly pack mineral-fiber insulation behind frames.

(4.) Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

(a.) Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.

(b.) Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.

(c.) Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.

(d.) Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

D. Install wood doors in full compliance with manufacturer's written instructions and approved shop drawings.

E. Maintain alignment and compatibility with adjacent work.

F. Install frames plumb and level. Shim at attachment points to provide solid support and eliminate deflection of materials.

G. Hang doors on frames, and adjust for smooth operation of door, without binding or dragging, and with a positive seal between weatherstripping and door face for the full perimeter of the door.

H. Install hardware on door, and adjust for secure latching.

3.04 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Check to ensure that locking doors lock securely, and adjust as required.

C. Clean installed work, leaving doors and frames suitable for painting.

D. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

3.05 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products prior to Substantial Completion in accordance with manufacturer's written recommendations.

END OF SECTION 08.20.00

SECTION 08.71.00

DOOR HARDWARE

I. PART 1 - GENERAL

1.01 GENERAL

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.02 DESCRIPTION OF WORK

A. **Work Included:** Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Commercial door hardware.

B. **Alternates:** Not Applicable.

C. **Items To Be Installed Only:** Not Applicable.

D. **Items To Be Furnished Only:** Furnish the following items for installation by the designated Sections:
1. None.

E. **Related Work:** The following items are not included in this Section and will be performed under the designated Sections:

1. Section 26.00.00 - Electrical, for all wiring of electrified hardware.

1.03 SUBMITTALS

A. Product Data: Include installation details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Details of electrified door hardware, indicating the following:

1. Wiring Diagrams: Detail wiring for power, signal, and control systems and differentiate between manufacturer-installed and field-installed wiring. Include the following:

(a) System schematic.
(b) Point-to-point wiring diagram.
(c) Riser diagram.
(d) Elevation of each door.

2. Detail interface between electrified door hardware and fire alarm access control and building control and security systems.

C. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."

2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete

designations of every item required for each door or opening.

(a) Organize door hardware sets in same order as in the Door Hardware Schedule at the end of Part 3.

3. Content: Include the following information:

(a) Type, style, function, size, label, hand, and finish of each door hardware item.
(b) Manufacturer of each item.
(c) Fastenings and other pertinent information.
(d) Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
(e) Explanation of abbreviations, symbols, and codes contained in schedule.
(f) Mounting locations for door hardware.
(g) Door and frame sizes and materials.
(h) Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.

(i) Sequence of Operation: Include description of component functions that occur in the following situations: authorized person wants to enter; authorized person wants to exit; unauthorized person wants to enter; unauthorized person wants to exit. Reset time period for time delayed hardware.

(i) Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

D. Keying Schedule: Not required. Keying of the new lock shall match the existing lock.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Supplier Qualifications: Door hardware supplier with warehousing facilities in Project's vicinity and who is or employs a qualified Architectural Hardware Consultant, available during the course of the Work to consult with Contractor, Designer, and the Project Manager about door hardware and keying.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

1.06 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

B. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

1.07 WARRANTY

A. General Warranty: Special warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of operators and door hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

C. Warranty Period: Three years from date of Substantial Completion, unless otherwise indicated.

D. Warranty Period for Manual Closers: Ten years from date of Substantial Completion.

1.08 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for the facility's continued adjustment, maintenance, and removal and replacement of door hardware.

II. PART 2 - PRODUCTS

2.01 SCHEDULED DOOR HARDWARE

A. Scheduled and acceptable manufacturers must provide all the functions and features of the specified product or it will not be approved.

Item	Scheduled Manufacturer	Acceptable Manufacturers
Standard Hinges	Hager(HAG)	Ives
Electrified Hinges	Schlage (SCH)	Stanley, Mckinney
Electrified Lockset	Schlage (SCH)	Best, Sargent
Electrified Strike	Von Duprin (VDP)	Stanley, Rutherford Controls
Automatic Operator	LCN (LCN)	Stanley, Besam
Actuator Plates	LCN (LCN)	Stanley, Besam
Indicator Plate	Schlage (SCH)	Stanley, Besam
Push Button	Schlage (SCH)	Stanley, Besam
Power Supply	Schlage (SCH)	Stanley, Besam
Door Position Switch	Schlage (SCH)	GE, Sentrol
Silencers	Ives (IVES)	Rockwood
Privacy Function Lockset	Schlage (SCH)	Best, Sargent
Office Function Lockset	Schlage (SCH)	Best, Sargent

B. 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.

C. 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 Designer'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.

4. All hardware shall be installed with the fasteners provided by the hardware manufacturer.

B. Hinges:

1. Provide five-knuckle, ball bearing hinges conforming to ANSI/BHMA A156.1.

2. 1-3/4" inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:

(a) Interior: standard weight, ball bearing, steel, 4-1/2" high

3. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height.

4. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:

(a) Non-Ferrous Hinges: Stainless steel pins

5. Width of hinges: 4-1/2 inches (114 mm) at 1-3/4 inch (44 mm) thick doors. Adjust hinge width as required for door, frame and wall conditions to allow proper degree of opening.

2.03 MORTISE LOCKS

A. Manufacturers and Products

1. Scheduled Manufacturer and Product: Schlage L9000 series.
2. Acceptable Manufacturers and Products: Corbin Russwin.

B. Requirements:

1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1, and UL Listed for 3 hour fire doors.

2. Provide locks manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance.

3. Provide lock case that is multi-function and field reversible for handing without opening case.

4. Provide locks with standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latchbolt. Provide deadbolt with full 1 inch (25 mm) throw, constructed of stainless steel.

5. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.

6. Provide electrified options as scheduled in the hardware sets. Where scheduled, provide switches and sensors integrated into the locks and latches.

7. Provide motor based electrified locksets with electrified options as scheduled in the hardware sets and

comply with the following requirements:

(a) Universal input voltage - single chassis accepts 12 or 24V DC to allow for changes in the field without changing lock chassis.
(b) Fail Safe/Fail Secure - changing mode between electrically locked (fail safe) and electrically unlocked (fail secure) is field selectable without opening the lock case.
(c) Low maximum current draw - maximum 0.4 amps to allow for multiple locks on a single power supply.
(d) Low holding current - maximum 0.1 amps to produce minimal heat, eliminate 'hot levers" in electrically locked applications, and to provide reliable operation in wood doors that provide minimal ventilation and air flow.
(e) Connections - provide quick-connect Molex system standard.

8. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.

(a) Lever Design: Match existing, or if no levers exist provide Schlage Longitude.

2.04 CYLINDERS

A. Manufacturers:

1. Scheduled Manufacturer: Corbin Russwin.

B. Requirements

1. Provide interchangeable cylinders/cores to match Owner's existing key system, compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset, manufacturer's series as indicated.

2.05 ELECTRO-MECHANICAL AUTOMATIC OPERATORS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: LCN Senior Swing.
2. Acceptable Manufacturers and Products: Besam Swingmaster MP, Horton 4000LE series.

B. Requirements:

1. Provide low energy automatic operator units that are electro-mechanical design complying with ANSI/BHMA A156.19.

(a) Opening: Powered by DC motor working through reduction gears.
(b) Closing: Spring force.
(c) Manual, hydraulic, or chain drive closers; Not permitted.
(d) Operation: Motor is off when door is in closing mode. Door can be manually operated with power on or off without damage to operator. Provide variable adjustments, including opening and closing speed adjustment.
(e) Cover: Aluminum.

2. Provide units with manual off/auto/hold-open switch, push and go function to activate power operator, vestibule interface delay, electric lock delay, hold-open delay adjustable from 2 to 30 seconds, and logic terminal to interface with accessories, mats, and sensors.

3. Provide drop plates, brackets, or adapters for arms as required to suit details.

4. Provide hard-wired motion sensors and/or actuator switches for operation as specified. Provide weather-resistant actuators at exterior applications.

5. Provide key switches, with LED's, recommended and approved by manufacturer of automatic operator as required for function as described in operation description of hardware sets.

6. Provide complete assemblies of controls, switches, power supplies, relays, and parts/material recommended and approved by manufacturer of automatic operator for each individual leaf. Actuators control both doors simultaneously at pairs. Sequence of operation of exterior and vestibule doors with automatic operators to allow ingress or egress through both sets of openings as directed by Architect. Locate actuators, key switches, and other controls as directed by Architect.

7. Provide units with inputs for smoke evacuation doors, where specified, which allow doors to power open upon fire alarm activation and hold open indefinitely or until fire alarm is reset, presence detector input, which prevents closed door from opening or door that is fully opened from closing, hold open toggle input, which allows remote activation for indefinite hold open and close second time input is activated, vestibule inputs, which allow sequencing operation of two units, and SPDT relay for interfacing with latching or locking devices.

2.06 ELECTRIC POWER TRANSFER

A. Manufacturers:

1. Scheduled Manufacturer: Von Duprin EPT-10.
2. Acceptable Manufacturers: No Substitute.

B. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number and gage of wires sufficient to accommodate electric function of specified hardware.

C. Locate electric power transfer per manufacturer's template and UL requirements, unless interference with operation of door or other hardware items.

2.07 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer: Ives
2. Acceptable Manufacturers: Burns, Rockwood

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide convex type where mortise type locks are used and concave type where cylindrical type locks are used.

2. Where a wall stop cannot be used, provide universal floor stops for low or high rise options.

3. Where wall or floor stop cannot be used, provide medium duty surface mounted overhead stop.

2.08 FINISHES

A. Finish: BHMA 626/652 (US32D); except:

1. Hinges at Exterior Doors: BHMA 630 (US32D)
2. Continuous Hinges: BHMA 630 (US32D)
3. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
4. Protection Plates: BHMA 630 (US32D)
5. Overhead Stops and Holders: BHMa 630 (US32D)
6. Door Closers: Powder Coat to Match
7. Wall Stops: BHMA 630 (US32D)
8. Latch Protectors: BHMA 630 (US32D)

9. Weatherstripping: Clear Anodized Aluminum
10. Thresholds: Mill Finish Aluminum

2.09 KEYING

A. Provide 2 keys per office door (cut). Other locks will be pinned with no keys.
B. No key cabinet is required.

2.10 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer: Ives
2. Acceptable Manufacturers: Burns, Rockwood

B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

III. PART 3 - EXECUTION

3.01 SEQUENCE OF OPERATION

A. New hardware at one new toilet room will incorporate powered door openers to assist wheechair users, and shall be configured and installed to operate as follows:

1. Door normally closed, lockset unlocked, actuator switches enabled.

2. Entering:

(a) User enters room by use of auto operator, or lever on lockset and manual use of door. Pressing the exterior actuator button releases the electric strike and powers the auto operator. Depressing the lever retracts the latch allowing the door to be pushed open manually.

(b) User then secures the room for privacy by pressing the interior 621 button. Privacy function can only be activated when door is closed. Upon pressing the privacy button:

(i) The exterior lever on the EL lockset becomes locked and the exterior actuator button becomes disabled.

(ii) The halo indicator on the 621 button changes from green to red indicating for the occupant that the room is secured.

(iii) The 800 L2 monitoring system on the exterior side of the door changes from green to red, indicating to the public that the room is occupied.

3. Exiting: Free egress is always possible with no special knowldge of the hardware. Any of the following actions will open the door from within the room when privacy mode is engaged:

(a) Depressing the interior lever on lockset retracts the latch allowing the door to be manually opened.

(b) Pressing the interior actuator button releases the electric strike and powers the auto operator.

(c) Either action resets system; unlocks lockset, and reactivates exterior actuator.

4. Emergency access to the room is possible by key override. Building staff will hold the key secure, for emergency use only.

3.02 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

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

3.03 PREPARATION

A. Steel Doors and Frames: Comply with DHI A115 series.

1. Surface-Applied Door Hardware: Drill and tap doors and frames according to SDI 107.

B. Where on-site modification of doors and frames is required, prepare hardware locations in accordance with the following:

1. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.

3.04 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: in accordance with 521 CMR, Massachusetts Architectural Access Regulations.

B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.

2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

3.05 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Door Closers: Adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.

3.06 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.
B. Clean operating items as necessary to restore proper function and finish.
C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.07 CLEANING AND PROTECTION

A. Hardware items are referenced in the following hardware. Refer to the above-specifications for special features, options, cylinder/keying and other requirements.

B. Hardware Sets:

HARDWARE SET: 01 (new office suite door 01, existing office door 04)

QTY	DESCRIPTION	CATALOG NUMBER	MFR
2 EA	Standard hinges	BB1199 4.5 X 4.5, US 32D	Hager
1 EA	Lockset, office function	ND50 X RHO Entrance Lockset 32D	Schlage
3 EA	Silencers	SR64	Ives

HARDWARE SET: 02 (new toilet room door 02)

QTY	DESCRIPTION	CATALOG NUMBER	MFR
2 EA	Standard hinges	BB1199 4.5 X 4.5, US 32D	Hager
1 EA	Lockset, privacy function	L9044 X-283-712 Indicator 32D	Schlage
3 EA	Silencers	SR64	Ives

HARDWARE SET: 03 (new toilet room door 03)

QTY	DESCRIPTION	CATALOG NUMBER	MFR
2 EA	Standard hinges	BB1199 4.5 X 4.5, US 32D	Hager
1 EA	4-wire Electrified hinge	4.5 X 4.5 TW 4, US 32D	Schlage
1 EA	Electrified lockset, fail safe	L9092 EL RX, lever trim, match existing finish	Schlage
1 EA	Fail secure electrified strike	6400	Von Duprin
1 EA	Automatic operator	4630 for pull side or 4640 for push side	LCN
2 EA	Actuator plates per wall / frame	8310-853T, 4-¾" square button with logo and text	LCN
1 EA	Indicator plates	800 L2	Schlage
1 EA	Push buttons	621 BK L2	Schlage
1 EA	Power supply	PS902-4R-FA	Schlage
1 EA	Door position switch	679-05 series	Schlage
3 EA	Silencers	SR64	Ives
2 EA	Custom signs for privacy button and occupancy indicator		

END OF SECTION
08.71.00

SECTION 09.20.00

GYPSUM BOARD ASSEMBLIES

I PART 1 GENERAL

1.01 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 1 - GENERAL REQUIREMENTS, which are hereby made a part of this Section of the Specifications.

B. This Contractor must be familiar with all other Divisions and Sections of the Specifications which affect the work of this Section.

1.02 DESCRIPTION OF WORK

A. **Work included:** Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Gypsum wallboard for new partition walls.
2. Moisture-resistant drywall for toilet room new partition walls.
3. Gypsum board ceiling for kitchen.
4. Taped and sanded joint treatment.
5. Repairs to existing wall and ceiling boards and plaster.
6. All required accessories.

B. **Alternates:** None.

C. **Items to Be Installed Only:** Install the following items as furnished by the designated Sections:

1. None.

D. **Items to Be Furnished Only:** Furnish the following items for installation by the designated Sections:

1. None.

E. **Related Work Specified Elsewhere:** The following items are not included in the Section, and will be performed under the designated Section:

1. Section 01.73.19 - CUTTING AND PATCHING for repairs to gypsum wallboard
2. Section 06.10.00 - ROUGH CARPENTRY for blocking incorporated behind board materials.

1.03 REFERENCES

A. ANSI/ASTM C1396 - Gypsum Wallboard.

B. ANSI/ASTM C475 - Joint Treatment Materials for Gypsum Wallboard Construction.

C. ANSI/ASTM C754 - Installation of Framing Members to Receive Screw Attached Gypsum Wallboard, Backing Board, or Water Resistant Backing Board.

D. ASTM E84- Surface Burning Characteristics.

E. ASTM D3273- Mold Growth ASTM D3273-00 - “Standard Test Method for Resistance to Growth on Mold...”

F. GA-201 - Gypsum Board for Walls and Ceilings.

G. GA-216 - Recommended Specifications for the Application and Finishing of Gypsum Board.

H. ASTM E119: Test Method for Fire Tests of Building Construction and Materials.

1.04 SUBMITTALS

A. Product Data: submit manufacturer's literature for each product specified, indicating conformance to specifications.

B. Samples: not required.

C. Qualification Data: submit evidence of fire resistance for all rated materials specified.

1.05 QUALITY ASSURANCE

A. Source limitations: obtain all boards, joint compound and accessories from a single manufacturer, to constitute a "system".

B. Installation shall conform to the requirements of 780 CMR, Massachusetts State Building Code.

C. Fire Resistance Rated Assembly Characteristics: Provide materials and construction identical to those tested in accordance to ASTM E 119 by an independent testing and inspection agency acceptable to authorities having jurisdiction.

1. Fire Resistance Ratings: Indicated by design designations from UL Fire Resistance Directory.

1.06 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack panels flat to prevent sagging.

1.07 PROJECT CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

B. Do not install interior products until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

II PART 2 PRODUCTS

2.01 GYPSUM BOARD MATERIALS

A. Manufacturers:

1. USG Corporation, or other approved equal.

B. Gypsum Board, toilet room walls, kitchen ceiling:

1. Mold and mildew resistant high impact.
2. Thickness: 5/8", maximum permissible length; ends square cut, tapered edges.
3. Surface Characteristics per ASTM C1629-D4977
   (a) Surface Abrasion: Level 3
   (b) Indentation: Level 1, minimum.
   (c) Soft-Body Impact: Level 3
   (d) Hard-Body Impact: Level 3
4. Water Absorption: Not greater than 5% per ASTM C 473
5. Mold resistance score of 10 when tested to ASTM D3273-00.
6. Flame spread of 15 and smoke developed of 0, per ASTM E84.

C. Gypsum Board at all other locations:

1. Thickness: ½" thickness, maximum permissible length; ends square cut, tapered edges.
2. Water Absorption: Not greater than 5% per ASTM C 473
3. Mold resistance score of 10 when tested to ASTM D3273-00.
4. Flame spread of 15 and smoke developed of 0, per ASTM E84.

2.02 ACCESSORIES

A. All accessories shall meet ASTM C 1047.

B. Joint Materials: ANSI/ASTM C475; GA 201 and GA 216; reinforcing tape, joint compound, adhesive, water, and fasteners.

C. Joint Compound: ASTM C 475, drying or setting type (contractor's preference)

D. Joint Reinforcing: ASTM 474

1. Outside corners shall be metal or metal/paper combination.
2. Inside corners shall be paper tape.
3. Joints where drywall meets other materials shall receive plastic L trim with tear-away strips.

E. Fasteners: as recommended by board manufacturer for specific application.

III PART 3 EXECUTION

3.01 COORDINATION

A. Coordinate the location of blocking at all wall mounted items, such as grab bars, sinks and shelving.

3.02 INSPECTION

A. Verify that site conditions are ready to receive work and opening dimensions are as indicated on shop drawings and instructed by the manufacturer.

B. Verify that all required blocking for wall mounted items has been installed in proper locations.

C. Beginning of installation means acceptance of conditions.

3.03 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.

3.04 GYPSUM BOARD INSTALLATION

A. Install gypsum board in accordance with GA 201 and GA 216 and manufacturer's instructions.

B. Install gypsum board in accordance with associated UL listed assembly number.

C. Extend all new work to floor framing or other existing construction above the new work, and finish joint following specified procedures.

D. Erect single-layer standard gypsum board in most economical direction, with ends and edges occurring over firm bearing. Install gypsum board tight to underside of structure on both face of each partition.

E. Use drywall screws of appropriate size for both layers, no less than 12" o/c in all directions, to wood framing.

F. Treat cut edges and holes in moisture resistant gypsum board with sealant.

G. Place control joints consistent with lines of building spaces as indicated or as directed.

H. Place corner beads at external corners. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials.

3.05 JOINT TREATMENT

A. Finish drywall installations in accordance with Gypsum Association’s GA-214 as follows:

1. Finished spaces, level 4 minimum.
2. Concealed spaces, such as above ceilings, may be rough taped and sanded.

B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes in strict accordance with the manufacturer’s instructions.

C. Use a 3-coat application at all joints, sanded smooth between applications. Feather coats onto adjoining surfaces. Place corner beads at external corners. Place edge trim where gypsum board abuts dissimilar materials.

3.06 WALL AND CEILING REPAIRS

A. Correct all existing remaining wall and ceiling damage throughout the work area, leaving walls and ceilings suitable for final cleaning, prep and painting, or for final wall protection surfaces, following procedures listed in 01.73.29 - Cutting and Patching.

1. This includes filling nail holes, treating cracks, seams, etc.
2. Tape, fill and sand repairs as required to provide a uniform surface.
3. Finished spaces, level 4 minimum.
4. Vacuum all dust generated by repairs.

END OF SECTION

SECTION 09.51.13

ACOUSTICAL PANEL CEILINGS

I. PART I - GENERAL

1.01 GENERAL

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.02 DESCRIPTION OF WORK

A. **Work included:** Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Acoustical ceiling tiles and panels.
2. Suspension systems, grid systems and ceiling hangers.

B. **Alternates:** Not Applicable.

C. **Items to Be Installed Only:** Install the following items as furnished by the designated Sections:

1. None.

D. **Items to Be Furnished Only:** Not Applicable.

E. **Related Work Specified Elsewhere:** The following items are not included in the Section, and will be performed under the designated Sections:

1. Section 09.21.16 - GYPSUM BOARD ASSEMBLIES, for gypsum board ceilings.
2. Section 23.00.01 - HEATING AND VENTILATION, for air distribution components located in the ceiling.
3. Section 26.00.01 - ELECTRICAL, for electrical components located in the ceiling.

1.03 SUBMITTALS

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

B. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.

1. Acoustical Panel: Set of 6 inch square Samples of each type, color, pattern, and texture.
2. Exposed Suspension System Members, Moldings, and Trim: Set of 12 inch long Samples of each type, finish, and color.

C. Asbestos Certification: Manufacturer's written certification that acoustical ceiling products contain no asbestos (0.0000%). Product labels indicating that it is the user's responsibility to test the products for asbestos are unacceptable and sufficient cause for rejection of the product on site.

D. Maintenance Data: For finishes to include in maintenance manuals.

1.04 QUALITY ASSURANCE

A. Source Limitations:

1. Acoustical Ceiling Panels: Obtain each type through one source from a single manufacturer.

2. Suspension Systems: Obtain each type through one source from a single manufacturer.

B. Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:

1. Fire-Resistance Characteristics: Where indicated, provide acoustical panel ceilings identical to those of assemblies tested for fire resistance per ASTM E 119 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

(a) Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency.
(b) Identify materials with appropriate markings of applicable testing and inspecting agency.

2. Surface-Burning Characteristics: Provide acoustical panels complying with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84:

C. Mockups: Not required.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.06 PROJECT CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.07 COORDINATION

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

1.08 EXTRA MATERIALS

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

1. One case of each type of tile installed, plus all unused and uncut tiles left after installation.

II. PART II - PRODUCTS

2.01 ACOUSTICAL PANELS, GENERAL

A. Available Manufacturers:

1. Subject to source limitations, provide products by one of the following:

(a) Armstrong

(b) USG
(c) Certainteed

B. Type A: General use (offices, corridors, bathrooms and as indicated).

1. Manufacturer and Model Number: Armstrong “Fine Fissured” Model 1754 or approved equal.
2. Panel Size: 24" x 24" x 7/8".
3. Panel Edges: Square.
4. Noise Reduction Coefficient (NRC): Not less than 0.75.
5. Ceiling Attenuation Class (CAC): Not less than 35.
6. Color: White.
7. Grid Material: Prelude, 15/16", white.

2.02 METAL SUSPENSION SYSTEMS

A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.

1. Manufacturer: manufacturer of grid shall be the same manufacturer of the tiles.
2. Structural Classification: Intermediate-duty system.
3. End Condition of Cross Runners: Override (stepped) or butt-edge type.
4. Face Design: Flat, flush.
5. Cap Material: Steel or aluminum cold-rolled sheet.
6. Color: White, prefinished.
7. Grid Face Width: As specified with ACT type.

B. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated.

1. Anchors in Concrete: Anchors with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing per ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency; zinc-plated for Class SC1 service.

2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing and inspecting agency.

C. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106 diameter wire.

D. Hold-Down Clips: At vestibules and areas subject to wind uplift, provide manufacturer's standard hold-down clips spaced 24 inches on all cross tees.

2.03 METAL EDGE MOLDINGS AND TRIM

A. Roll-Formed Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit acoustical panel edge details and suspension systems indicated; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.

III. PART III - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

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

3.02 COORDINATION

A. To the best degree possible, measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

B. Record the location of all ceiling mounted devices, detectors, registers, grilles and diffusers, to ensure that they are reinstalled in the same location on the new ceilings..

3.03 INSTALLATION

A. General: Install acoustical panel ceilings to comply with ASTM C 636 per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

1. The layout and installation of acoustical panel ceilings and suspension systems shall be coordinated with other work penetrating the ceiling. This includes, but is not limited to, light fixtures, HVAC diffusers and equipment, and fire suppression system components.

2. Acoustical panels shall be cut and fit around light fixtures, HVAC diffusers and equipment and fire suppression system components to set flush or recessed as recommended by manufacturer.

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
6. Do not attach hangers to steel deck tabs.
7. Space hangers not more than 48 o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.

C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

D. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

E. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

3.04 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION
09.51.13

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SECTION 09.65.00

RESILIENT FLOORING

I. PART 1 - GENERAL

1.01 GENERAL

A. The 00.72.00 **Conditions of the Contract** and all sections of **Division 01**, General Requirements shall be part of this section unless otherwise specifically excluded.

B. This Contractor must be familiar with all other Divisions and Sections which affect this Work.

1.02 DESCRIPTION OF WORK

A. **Work included:** Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Sheet Vinyl.
2. Vinyl base.
3. Adhesives and accessories.

B. **Alternates:** None.

C. **Items to Be Installed Only:** Install the following items as furnished by the designated Sections:

1. None.

D. **Items to Be Furnished Only:** Furnish the following items for installation by the designated Sections:

1. None.

E. **Related Work Specified Elsewhere:** The following items are not included in the Section, and will be performed under the designated Section:

1. Section 02.40.00 - SELECTIVE DEMOLITION, for removal of all other components not impacted by asbestos.

1.03 SUBMITTALS

A. Submit under provisions of Section 01.33.00.

B. Submit product information on all flooring and base, along with all adhesives and installation requirements. Adhesive literature must state that it is approved for use with the submitted flooring.

C. Submit samples of full range of colors available for flooring and base.

D. If required by flooring manufacturer, submit qualifications that installer has attended approved training clinics or have received manufacturers approval to install product.

1.04 ENVIRONMENTAL REQUIREMENTS

A. Store materials for three days prior to installation in area of installation to achieve temperature stability.

B. Maintain ambient temperature required by adhesive manufacturer three days prior to, during, and 24 hours after installation of materials.

1.05 WARRANTIES

A. Provide manufacturer's standard warranty on installed products. Arrange inspections by manufacturer's authorized representatives if required as a condition for the warranty. Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.

1.06 EXTRA MATERIAL

A. None Required.

II. PART 2 PRODUCTS

2.01 SHEET VINYL FLOORING (SV)

A. Manufacturer: Mannington "BioSpec SR- Slip Resistant" or approved equal homogeneous sheet vinyl commercial flooring by Armstrong, or Altro, meeting or exceeding the following:

B. SV Properties:

1. Size: roll stock, width as required to install in room with minimal seaming.

2. Thickness: .080"

3. Seams: welded.

4. ASTM E648, Class 1.

5. ASTM F1913

6. Static Load Limit: 2000 PSI.

7. Comply with Americans with Disabilities Act requirements for slip resistance.

8. Warranty: 5 year Commercial Warranty.

C. Adhesive: premium grade adhesive, as recommended by manufacturer.

D. Color: One color throughout, as selected by Owner.

2.02 VINYL BASE (VCB)

A. Armstrong, or approved equal, by Johnsonite or Roppe, meeting the following criteria:

1. 4 inches high, 0.125 gauge thick
2. Rounded top with cove base, and ribbed back.

3. Interior corners shall be cut and coped (not mitered or formed from a single piece)
4. Exterior corners shall be pre-molded.
5. Color: **One** color throughout, as selected by Owner.

2.03 ACCESSORIES

A. Sub-Floor Filler shall be as recommended by the manufacturer of the materials used.

B. Primers and Adhesives shall be waterproof and of type and shall be manufactured by, and recommended by, the manufacturer of the flooring it is to be used with. Adhesives shall be low odor and low VOC type.

C. Trowelable Leveling and Patching Compounds: Latex-modified, Portland cement based or blended hydraulic cement based formulation provided or approved by resilient product manufacturer for applications indicated.

D. Transition strips where flooring meets dissimilar material shall be vinyl.

III. PART 3 EXECUTION

3.01 EXAMINATION

A. Coordinate installation to insure all other construction operations have been completed.

B. Provide fans, filters or other mechanical ventilation as required, to permit the continuous occupancy and use of the project area.

C. Beginning of installation means acceptance of existing substrate and site conditions.

3.02 PREPARATION

A. Refer to Section 01.11.00 for phasing requirements.

B. Prepare concrete slabs per ASTM F170 to manufacturer’s requirements.

C. Fill small damaged areas, low spots, with manufacturer’s recommended sub floor filler.

D. Remove sub-floor ridges and bumps.

E. Apply, trowel, and float all repair materials to leave a smooth, flat, hard surface.

F. Prohibit traffic from area until filler is cured.

G. Vacuum clean substrate. Floors must be free of all foreign materials.

H. Apply primer if recommended by flooring manufacturer, in compliance with manufacturer's directions.

3.03 FIELD QUALITY REQUIREMENTS

A. Manufacturer’s Field Services: Provide manufacturers field service consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturers’s instructions.

3.04 FLOORING INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install sheet vinyl with minimal seams. Heat weld all seams per manufacturer's instructions.

C. Spread only enough adhesive to permit installation of materials before initial set.

D. Set flooring in place and press with heavy roller to attain full adhesion.

E. Terminate flooring or make color change at the exterior edge of door frames where adjacent floor finish is dissimilar.

F. Install transition strips at unprotected or exposed edges, and where flooring meets dissimilar flooring thicknesses.

G. Scribe flooring to walls, columns, floor outlets, and other appurtenances to produce tight joints.

3.05 VINYL BASE INSTALLATION

A. Use the longest pieces of base possible, minimizing joints. Where joints are unavoidable, coordinate so that they fall behind appliances or similar items.

B. Fit joints of vinyl bases tight and vertical. Maintain minimum measurement of 18 inches between joints.

C. Miter internal base corners. At external corners, use premolded units. At exposed ends use premolded units.

D. Install base on solid backing. Repair existing plaster or drywall as required to create a level, sound substrate. Bond tight to wall and floor surfaces.

E. Scribe and fit to door frames and other interruptions.

F. Spot repair and paint walls where disturbed by base removal and not covered by new base installation.

3.06 PROTECTION

A. Newly installed flooring should not be exposed to routine rolling load traffic (wheelchairs, walkers, carts, lifters, etc.) for at least 72 hours after installation to allow setting and drying of adhesives. If rolling loads cannot be avoided, protect the installation for 72 hours after installation by covering with ram boards.

3.07 CLEANING AND FINISHING

A. Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean in accordance with manufacturer's instructions.

END OF SECTION

SECTION 09.90.00

PAINTING

I PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 1 - GENERAL REQUIREMENTS, which are hereby made a part of this Section of the Specifications.

B. This Contractor must be familiar with all other Divisions and Sections of the Specifications which affect the work of this Section.

1.02 DESCRIPTION OF WORK

A. **Work included:** Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Final preparation of new substrates to be painted.
2. Caulking around all items abutting surfaced scheduled to be painted, including door frames, countertops and splashes etc.
3. Priming of all surfaces to receive paint.
4. Painting surfaces as scheduled herein.
5. All other painting noted on the Drawings.

B. **Alternates:** None.

C. **Items to Be Finished Only:** Finish the following items as furnished by the designated Sections:
1. None.

D. **Items to Be Furnished Only:** Furnish the following items for installation by the designated Sections:
1. None.

E. **Related Work Specified Elsewhere:** The following items are not included in the Section, and will be performed under the designated Section:

1. Section 05.52.00 - METAL RAILS for shop primed steel railings.
2. Section 08.20.00 - DOORS AND FRAMES for shop primed hollow metal door frames.

1.03 DEFINITIONS AND EXTENT

A. General: Standard coating terms defined in ASTM D 16 apply to this Section.

1. Flat: a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
2. Eggshell: low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
3. Semigloss: medium-sheen with a gloss range between 35 and 70 when measured at a 60-degree meter.
4. Full gloss: high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

B. This Section includes surface preparation and field painting of exposed exterior and interior items and surfaces.

1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.

C. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Designer will select from standard colors and finishes available.

D. Do not paint pre-finished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

1.04 SUBMITTALS

A. Product Data: on all finishing products under provisions of Section 01.33.00. Submit manufacturer's literature on surface preparation methods.

B. Samples: one complete set of color chips or fan deck for color selection.

1. Final color selections will be made by the Owner from the full range of colors available. No color selections will be made until all materials requiring color selection have been submitted. The designer shall prepare color boards from the samples submitted, for the Owner’s review. Plan adequate time for decisions, when making submittals.

1.05 QUALITY ASSURANCE

A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

B. Source Limitations: Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.

C. Mockups: Provide a full-coat benchmark finish sample for each type of coating and substrate required. Comply with procedures specified in PDCA P5. Duplicate finish of approved sample Submittals.

1. Designer will select one room or surface to represent surfaces and conditions for application of each type of coating and substrate.

(a) Wall Surfaces: Provide samples on at least 4 sq. ft.
(b) Small Areas and Items: Designer will designate items or areas required.

2. Apply benchmark samples, according to requirements for the completed Work, after permanent lighting and other environmental services have been activated. Provide required sheen, color, and texture on each surface.

(a) After finishes are accepted, Designer will use the room or surface to evaluate coating systems of a similar nature.

3. Final approval of colors will be from benchmark samples.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptance.

B. Container labeling to include manufacturer's name, type of paint, brand name, brand code, coverage, surface preparation, drying time, cleanup, color designation, and instructions for mixing and reducing.

C. Store paint materials at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in well ventilated area, unless required otherwise by manufacturer's instructions.

D. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.07 PROJECT CONDITIONS

A. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 45 degrees F for 24 hours before, during, and 48 hours after application of finishes, unless required otherwise by manufacturer's instructions.

B. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

C. Minimum Application Temperature for Varnish and Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.

1.08 WARRANTY

A. Painter shall warranty applied finishes for a period of one year from Substantial Completion.

B. Provide paint manufacturer’s standard warranty on paint products.

II PART 2 PRODUCTS

2.01 MANUFACTURERS

A. All materials specified in the painting schedule are Sherwin-Williams materials.

B. Paint by other manufacturers meeting or exceeding the performance characteristics listed herein may be substituted at other locations.

2.02 MATERIALS

A. Coatings: Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating with a good flow and brushing properties; capable of drying or curing free of streaks or sags.

B. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.

C. All materials shall be zero-VOC where possible. Where zero-VOC products are not available, products shall be of the lowest VOC rating available.

2.03 ACCESSORY MATERIALS

A. Caulking: DAP “Kwik-Seal Plus” or approved equal siliconized latex caulk with integral anti-microbial additive, white, suitable for painting.

III PART 3 EXECUTION

3.01 INSPECTION

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. Verify that all welding work has been completed, and all welds have been ground, dressed or otherwise finished.

D. Beginning of installation means acceptance of existing surfaces.

3.02 PREPARATION

A. Remove electrical plates, hardware, light fixture trim, and fittings prior to preparing surfaces or finishing.

B. Correct minor defects and clean surfaces which affect work of this Section.

C. Shellac and seal marks which may bleed through surface finishes.

D. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

E. Plaster Surfaces: Latex fill minor defects. Spot prime defects after repair.

F. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.

G. Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish: 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.

H. Uncoated Steel and Iron Surfaces: Remove grease, scale, dirt, and rust. Where heavy coatings of scale are evident, remove by 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. Spot prime paint after repairs.

I. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime metal items including shop primed items.

J. Interior Wood Items Scheduled to Receive 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.

K. Exterior Wood Scheduled to Receive Paint Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior caulking compound after prime coat has been applied.

L. Wood and Metal Doors Scheduled for Painting: Seal top and bottom edges with primer.

3.03 PROTECTION

A. Protect elements surrounding the work of this Section from damage or disfiguration. The painter is responsible for protecting surroundings from overspray and drips, regardless of whatever other protection is in place by other trades.

B. Repair damage to other surfaces caused by work of this Section.

C. Furnish drop cloths, shields, and protective methods to prevent spray or droppings from disfiguring other surfaces. Remove empty paint containers from site.

3.04 APPLICATION COATINGS GENERAL

A. Paint:

1. All new materials installed under this project, including areas shown to be concealed behind furniture, equipment or wall mounted accessories.

2. Existing materials abutting new materials, where indicated on the drawings.

3. All areas where cutting/patching is performed on visible surfaces, in accordance with Section 01.73.29.

B. Apply products in accordance with manufacturer's instructions.

C. Do not apply finishes to surfaces that are not dry.

D. Apply each coat to uniform finish.

E. Sand lightly between coats to achieve required finish.

F. Allow applied coat to dry before next coat is applied.

3.05 CLEANING

A. As Work proceeds, promptly remove paint where spilled, splashed, or spattered.

B. During progress of Work maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris.

C. Collect cotton waste, cloths, and material which may constitute a fire hazard, place in closed metal containers and remove daily from site.

3.06 PAINT SCHEDULE

A. Interior walls

1. Surface preparation: new construction - S-W 8
2. First Coat: Sherwin-Williams Harmony Primer
3. Two Coats- Sherwin-Williams Harmony Eg-Shell
4. Color: to be selected by Owner.

B. Interior ceilings

1. Surface preparation: new construction - S-W 8
2. First Coat: Sherwin-Williams Harmony Primer
3. Two Coats- Sherwin-Williams Harmony Flat
4. Color: ceiling white

C. Wood to be painted (wood shelves, plywood sheathing etc.).

1. Surface preparation: S-W 24
2. First Coat: Sherwin-Williams Harmony Primer
3. Two Coats- Sherwin-Williams Harmony Semi-Gloss
4. Color: to be selected by Owner.

D. Steel to be painted (door frames, railings etc.).

1. Surface preparation and First Coat: Factory prepared and primed
2. Two Coats- Sherwin-Williams DTM Semi-Gloss

3. Color: to be selected by Owner.

E. All paint shall include an anti-mildew additive, suitable for use in bathrooms and high humidity areas.

END OF SECTION

SECTION 10.80.00

TOILET ROOM ACCESSORIES

I. GENERAL

1.01 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 1 - GENERAL REQUIREMENTS, which are hereby made a part of this Section of the Specifications.

B. This Contractor must be familiar with all other Divisions and Sections of the Specifications which affect the work of this Section.

1.02 DESCRIPTION OF WORK

A. **Work included:** Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Grab bars.
2. Mirror.

B. **Alternates:** None.

C. **Items to Be Installed Only:** Install the following items as furnished by the Owner:

1. Soap dispensers.
2. Toilet paper holders.
3. Paper towel dispensers.

D. **Items to Be Furnished Only:** Furnish the following items for installation by the designated Sections:

1. None. All of the items being furnished by this trade shall also be installed by this trade.

E. **Related Work Specified Elsewhere:** The following items are not included in the Section, and will be performed under the designated Section:

1. Section 06.10.00 - ROUGH CARPENTRY for wood blocking and/or anchors at wall mounted items.

1.03 SUBMITTALS

A. Submit in accordance with Section 01.33.00.

B. Product Data: For each item specified, submit product data showing quality of construction, fabrication, and installation. Include details of anchors, hardware, and fastenings.

C. Samples for color selection: Where applicable, submit Manufacturer's color charts showing the full range of colors, textures, and patterns available.

1.04 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions in areas of installation by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

II. PRODUCTS

2.01 MANUFACTURERS

A. All items specified in this section are based on a specific manufacturer's product. Substitutions may be made to different manufacturers provided that the quality, size and design is similar to the product specified.

2.02 ACCESSORIES

A. **Grab bars:** Bobrick B-5806 1 1/4" diameter Stainless Steel Grab Bars with snap flange.

1. Material: 304 Stainless Steel; 18-gauge. Mounting flange: 1/8" thick. Snap covers: 22-gauge.
2. Length: 42"
3. Diameter: 1-1/4" (and 1-1/2" from face of wall)
4. Strength: support a load in excess of 900lbs.
5. Finish: Satin finish with peened or roughened gripping surface.
6. Attachment: welded flanges with snap-on stainless steel covers.
7. Fasteners: stainless steel, size and type as recommended by manufacturer for code required loads.
8. Meeting MAAB / ADA standards.

B. **Mirrors:** Bobrick B-165 - Mirror with Stainless Steel Channel Frame

1. Size: 24" x 36" (Coordinate height bathroom layout).
2. Concealed Wall Hanger: Galvanized steel construction
3. Frame: Type-430 stainless steel (½" x ½" x 3/8") channel with 1/4" return with 90 degree mitered corners
4. Glass: #1 quality 1/4" float glass suitable for mirror applications, electrostatically copper-plated by the galvanic process. Guaranteed for 15 years against silver spoilage.
5. Shelf: none.
6. Meeting MAAB / ADA standards.

III. PART 3 - EXECUTION

3.01 PREPARATION

A. Coordinate the location of anchors or blocking if required to receive and support all wall mounted accessories. Advise trade installing blocking of weight requirements.

B. Examine project area to verify that fixtures and wall materials are in place and secured.

C. Confirm walls are sufficiently plumb to receive installation within specified tolerances.

D. Coordinate with Electrical and Plumbing Contractors. Plumbing locations are typically dictated by the Access Code, and cannot be relocated.

E. Have all unsuitable conditions corrected prior to installing work. Start of installation constitutes acceptance of existing conditions.

3.02 EXAMINATION

A. Examine areas to receive the work of this section prior to the installation of products specified herein.

B. Start of installation constitutes acceptance of existing conditions.

3.03 INSTALLATION

A. Install products plumb and level, following manufacturer's guidelines, unless noted otherwise.

B. Install at heights as noted and in conformance with 521CMR

C. Securely attach load-bearing items such as grab bars and baby changing stations, etc. with fasteners are required by manufacturer and to resist code-required loading.

D. Test all items following installation. Adjust moving parts for smooth operation. Correct any loose or non-functional conditions.

3.04 ADJUSTING AND CLEANING

A. Maintain any plastic protective films in place, remove following Substantial Completion.

B. Clean mirrors with manufacturer's recommended products. Replace any damaged glass.

C. Clean all items installed with manufacturer's recommended cleaners.

D. Clean adhesive squeeze out per manufacturer's recommendations. Polish or buff seams and joinery as required to provide a uniform finish.

E. Fabricator/Installer is to provide and review the Care and Maintenance procedures and the warranty with the head of maintenance upon completion of project.

END OF SECTION

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SECTION 22.00.00

PLUMBING

PART I - GENERAL

1.1 RELATED DOCUMENTS

A. All of the Contract Documents, including General and Supplementary Conditions and Division 1, General Requirements, are hereby made a part of the work of this Section. Where paragraphs of this Section conflict with Division 1, the more stringent requirements shall govern.

B. All work shall comply with all federal, state and local codes and any other authorities having jurisdiction including any special requirements of the Owner or Architect.

1.2 SCOPE OF WORK

A. The scope of work consists of the installation of all materials to be furnished under Section 22.00.00, and without limiting the generality thereof, consists of furnishing all labor, materials, equipment, plant, transportation, rigging, staging, appurtenances, and services necessary and/or incidental to properly complete all work as indicted herein, as required by code or as reasonably inferred from either, in the opinion of the Architect.

B. Perform work and provide material and equipment as required for a complete and operational plumbing system as specified in this Section. Completely coordinate with work of other trades and provide for complete and fully functional installation.

C. The work shall include, but is not limited to, the following major items of work:

1. Alterations, additions and/or removal of existing plumbing systems and fixtures within the renovated area in order to conform to new space requirements. Refer to demolition drawings for systems and fixture removals.

2. Provide sanitary waste and vent systems for the new restrooms. Sanitary shall connect to the existing piping in the basement either above or below grade. Installation shall be in accordance with the Commonwealth of Massachusetts Plumbing Code and all other applicable codes and authorities having jurisdiction. New vent stacks shall extend through the new roof.

3. Provide domestic cold and hot water systems for the new restrooms. Domestic water shall connect to the existing water piping in the basement and extend to all plumbing fixtures within the building. This Section shall apply for all and pay for all permits.

4. Provide all plumbing fixtures as reflected on the Plumbing and Architectural plans and as specified herein. This shall include all necessary waste, vent, cold water & hot water services.

5. This contractor is responsible for sleeving all holes required of his work prior to pouring of the concrete slabs. All holes less than or equal to 1-1/2” shall be the responsibility of this contractor to core. Sizes larger shall be cored by the G.C. However, if coring is required due to the failure of this contractor to set a sleeve prior to pouring than this contractor shall be responsible for bearing the cost of any of this additional coring work required of the G.C.

6. Firestopping of all pentrations of the rated assembly. Sealing, air tight, all pentrations of the structure.

7. Obtain all permits and approvals required for work under this Section.

1.3 COORDINATION

A. Before starting work, visit site and examine conditions under which work shall be performed including preparatory work by others. Report conditions which might adversely affect the work in writing to the Architect. Do not proceed with the work until the defects have been corrected and conditions are satisfactory. Commencement of work shall be construed as acceptance of preparatory work and existing conditions.

B. Completely coordinate with work of other trades and provide for complete and fully functional installation. Although not specifically shown, provide supplementary or miscellaneous items, devices, appurtenances and materials incidental to or necessary for sound, secure and complete installation.

1.4 RELATED WORK

A. Carefully examine all of the Contract Documents for requirements which affect work of this Section.

B. Other specification sections which directly relate to the work of this Section include, but are not limited to, the following:

- Section 23.00.00 – HEATING AND VENTILATION (HV)

C. The following related work will be performed by other Divisions of the specifications:

1. Concrete work, including housekeeping pads.
2. Installation of access panels in ceilings and walls. Access panels shall be furnished by this Section.
3. Painting, except as specified herein.
4. Electric power wiring for all equipment. Control wiring shall be performed by this Section.
5. Structural supports except as specified herein.
6. Temporary light, power, water, heat, gas and sanitary facilities for use during construction and testing, unless required by the Architect elsewhere.

1.5 CODES, STANDARDS AND AUTHORITIES

A. Perform all work in strict accordance with all rules, regulations, standards, codes, ordinances and laws of local, state and Federal governments, and other authorities having lawful jurisdiction, and be responsible for compliance therewith. Such authorities include but are not limited to the following: NFPA, OSHA, AGA, & EPA.

B. Give notices, file plans, obtain licenses and permits, and obtain necessary approvals from authorities having jurisdiction. The Shrewsbury Housing Authority will pay all permit and inspection fees.

C. Material and equipment shall be Underwriters' Laboratories (UL) listed for the service for which it is being used.

D. Whenever two or more codes, regulations, etc., conflict with each other or with the Contract Documents, the more severe requirements shall govern the conduct of the work.

1.6 GUARANTEE

A. Guarantee work performed under this Section in accordance with Division 1, General Requirements. Operation of systems or equipment for temporary services does not constitute beginning of guarantee period.

B. The Contractor also agrees to furnish service of the equipment for the above period, such service to be rendered quickly and promptly at the request of the Owner. This shall not be misconstrued to include routine maintenance.

1.7 DISCREPANCIES IN DOCUMENTS

A. Where Drawings or Specifications indicate discrepancies or are unclear, advise Architect in writing before award of Contract. Otherwise, Architect's interpretation of documents shall be final and no additional compensation shall be permitted due to discrepancies or unclear items.

B. Where Drawings or Specifications do not coincide with recommendations of the manufacturer of a material or piece of equipment, this shall be brought to the attention of the Architect in writing before installation of item in question. Otherwise, make changes in installation as Architect requires without additional cost to the Owner.

1.8 RECORD DRAWINGS

A. Maintain record drawings during construction in accordance with the General Conditions of the Contract.

B. At the completion of construction furnish the Architect with one reproducible set of As-Built drawings.

1.9 SUBMITTALS

A. Submit five copies of shop drawings and product data to Architect for approval. Any deviation from the Contract Documents, or proposed substitution of materials or equipment for those specified, must be requested by the Contractor in a separate letter, whether the deviations are due to field conditions, standard shop practices or other cause. Where any deviation or substitution is permitted, the Contractor shall fully coordinate all related changes to Architectural, Structural, Fire Protection, HVAC, Electrical or other work, and shall accomplish these related changes at no additional cost to the Owner.

B. Submit shop drawing or product data for the following:

1. Plumbing fixtures, faucets and accessories.
2. Piping, valves, and accessories.
3. Pipe insulation.

1.10 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Prior to the final inspection, the Plumbing Contractor shall provide to the Architect three (3) sets of operating and maintenance instructions. The Architect shall review the instructions for completeness prior to turning them over to the Owner.

B. Instructions: The Contractor shall provide qualified, factory-trained manufacturers' representative to give detailed instruction to assigned Owner personnel in the operation and complete maintenance for all equipment. All such training will be at the job site.

PART 2 - PRODUCTS

2.1 PRODUCTS CRITERIA

A. Standard Products: Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of the products for at least 3 years. See other specification sections for any exceptions.

B. Multiple Units: When two or more units of materials or equipment of the same type or class are required, these units shall be products of one manufacturer.

C. Nameplates: Nameplate bearing manufacturer's name or identifiable trademark shall be securely affixed in a conspicuous place on equipment, or name or trademark cast integrally with equipment, stamped or otherwise permanently marked on each item of equipment.

D. Asbestos products or equipment or materials containing asbestos shall not be used.

2.2 PLUMBING FIXTURES

A. Provide plumbing fixtures as specified herein. Fixture trim, traps, faucet, escutcheons and waste pipes exposed to view in finished spaces shall be I.P.S. brass with polished chromium plating over nickel finish. Fixtures shall have manufacturer's label or trademark indication first quality. Provide fixtures in quantity and location as shown on Architectural plans. Where accessible units are shown provide accessible fixtures.

B. Fixtures with wall outlet flanges shall be set proper distance from floor or wall to make first-class joint with closet setting compound or gasket.

C. Mounting heights shall be as shown on architectural details.

D. Each individual fixture shall be provided with supply stops for each water service.

E. Fixture Schedule: Unless otherwise specified, fixtures shall be Toto, American-Standard, Kohler, Eljer or equal. Model numbers are provided to set standard of fixture.

F. Exposed piping below handicap lavatories and sinks shall be insulated with PVC coated insulation similar to Truebro or equal.

P-1 Water Closet (Handicap): Toto “Drake” #CST744SL#01, two-piece toilet, 1.6 gpf, vitreous china, front gravity feed G-Max flush8ing system, elongated bowl, 17-1/2” high bowl, chrome trip lever, floor outlet, closet flange, setting ring; nuts, bolts and caps; tank w/ float valve and all trim; Toto #SC504 white, open front, elongated seat or equal. Ball valve shut-off with chrome wall escutcheon.

P-2 Wall Hung Lavatory (Handicap): Toto #LT307.4 Commercial Wall-Hung Lavatory , ADA compliant, 21”x18-1/4” lavatory with backsplash, vitreous china, includes wall hanger, 4” faucet centers; Symmons Symmetrix #S-20-G centerset faucet, renewable seats, aerator outlet, 0.5 gpm flow restrictor, washerless, with chrome plated flange and stopper; 1-1/4” tailpiece, grid drain; single handle control; 3/8 inch chrome plated supplies with wheel handle stop, angle type, and escutcheon plate; 1-1/4" x 1-1/2" offset chrome plated "P" trap with wheelchair lavatory strainer and cover tube extension (offset required where handicap) to wall with escutcheon plate. Provide under pipe insulation with PVC coating. Set maximum water outlet temperature to 110°F.

2.3 PIPE MATERIALS

A. Sanitary, waste and vent pipe and fitting above ground: 2-1/2 inches and larger - hubless cast iron, service weight soil pipe, mechanical joint. 2 inch and smaller - Type DWV, hard temper copper pipe with cast brass, 95/5 solder joints, solder joint drainage fittings. PVC piping with cemented joints shall be an acceptable alternate to the cast iron and copper waste piping above ground however, all penetrations of common tenant walls and other fire rated assemblies must be protected with expanding fire coupling and sealer rated and listed for the application as manufactured by 3M or approved equal.

B. Hot and cold water pipe above ground: Seamless copper water tube, Type L, hard temper, wrought copper sweat fittings, 95-5 tin-antimony solder.

C. Sanitary, waste and vent pipe and fittings below ground: Service weight cast iron sold pipe and fittings coated with tar and asphaltum. Joints to be packed oakum and molten lead or mechanical joint with resilient gaskets.

2.4 VALVES / SPECIALTIES

A. Each valve type shall be of same manufacturer and appropriate for service in which used, valves shall be Milwaukee, Watts, Apollo or approved equal. Valves shall comply with all requirements of the Massachusetts Plumbing and Fuel Gas Code; type proposed for each service shall be submitted for approval. In general, shut-off valves, except for exposed chrome stops at plumbing fixtures, shall be full port ball valves.

B. Each system shall be provided with valves as required by Code and as specified. Valves shall be installed for isolation and to facilitate operation, replacement and repair. Provide access panels where valves are concealed behind non-removable ceilings or walls. Provide shut-off valves for gas and water supply piping to individual fixtures and appliances. Provide shut-off valves with drains at the base of every CW, HW serving each bathroom group.

D. Ball Valves:

1. On water lines inside the building, ball valves 3 in. and smaller shall be as manufactured by Consolidated Valve Industries, Inc.'s "Apollo" 95-200-03 Series stop and drain with 1-1/4 in. extended stems for piping 1/2 in. to 1 in. size; 70-100/200 Series with 1-1/4 in. extended stems for piping 1-1/4 in. to 3 in. size. Valves shall be provided with stainless steel ball, reinforced Teflon seats and seals, bronze body, 400 PSI WOG, positive l00 percent shutoff.

2. Drain valves at all low points shall be "Apollo" 78-100 or 78-200 Series, 1/2 in. or 3/4 in. solder by 3/4 in. hose end with attached cap and chain.

3. Valves on gas lines shall be UL listed, 250 PSI LP gas rated, "Apollo" Model 80-100-YRPV Series with tee or lever handle, as approved by the Massachusetts Fuel Gas Code. Where indicated on the Drawings, for Classroom zone shutoffs, ball valves shall be enclosed in a recessed valve box, as hereinafter specified.

4. Ball valves shall be of one (1) manufacturer, Conbraco Industries, Inc., "Apollo," Watts Regulator, Nibco/Scott, or approved equal.

2.5 TRAPS

A. Provide separate traps with integral cleanouts on fixtures and equipment requiring connections to sanitary system. Exceptions are fixtures with integral traps. Traps exposed to view, including connecting drain lines, shall be chrome plated. Unless specified otherwise, no trap shall be less than 1-1/2 inch and all shall be sized as required by Code.

2.6 INSULATION

A. Provide 1/2 inch thick fiberglass insulation on new cold water and hot water piping. No insulation shall be applied until piping has passed tests as required by authorities having jurisdiction. Insulation, jackets and adhesives shall be flame retarding and shall have flame spread rating of 25. All pipe insulation shall have a vapor retardant all service jacket with seams taped and sealed tight. Zeston fitting covers shall be used at all fittings and as required. Insulation shall be equal to Owens-Corning model ASJ-II.

B. Pipe hangers shall be outside insulation and shall be provided with 12" long, minimum 24 gauge galvanized steel insulation protection shields. Insulation on piping which passes through walls pr partitions shall pass continuously through sleeves, except at fire walls, smoke partitions and floor penetrations where space between sleeves and piping shall be firestopped with approved packing.

2.7 HANGERS

A. Hangers shall 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. Hangers shall be adjustable clevis type; trapeze hangers may be used where conditions permit. Conform to MA code seismic requirements.

B. Hanger spacing shall conform to requirements of state and local plumbing codes; in no case shall horizontal piping be supported at intervals greater that 10 ft.

C. Hanger rods shall be connected to beam clamp as required to attach to the building construction. No ram-set or shot shields will be allowed.

2.8 CLEANOUTS

A. Cleanouts shall be provided in soil and waste pipes at changes in direction, where shown on Drawings, and at other points required by Code so that lines will be readily accessible for cleaning or rodding out; provide a minimum of 24 inch clearance for rodding. Cleanouts shall be same size as pipe in which they are installed but not larger than four inches.

B. Cleanouts shall be installed so that cleanout opens in direction of flow of drainage line served or at right angles thereto. Cleanout plug shall be kept free of dirt and construction materials and shall not be covered with cement, plaster or other permanent finishing materials.

C. Cleanouts shall consist of "Y" fittings and 1/8 inch bends with brass or bronze screw plugs. Cleanouts in tile floors shall have Square top covers recessed for tile insertion; in carpeted areas, provide carpet cleanout markers.

D. Provide cleanouts a base of vertical stacks with cleanout plug located approximately 30 inches above floor. Extend cleanouts to wall with access covers. Cleanout shall consist of sanitary tees. Furnish nickel-bronze square frame and cover with minimum opening 6 x 6 inches at each wall cleanout.

E. In horizontal runs above grade, cleanouts shall consist of cast brass screw plug in fitting or in caulked cast iron ferrule.

2.9 JOINTING COMPOUNDS

A. Provide pipe dope, Teflon tape, wax rings, neoprene gaskets and other jointing compounds as required by best standard practice and only on service as recommended by the manufacturer. Work shall conform to manufacturer’s recommendations with regard to use of putties, jointing compounds or both in installing plumbing fixtures and trim.

PART 3 - EXECUTION

3.1 SPECIAL RESPONSIBILITIES

A. Cooperate and coordinate with other trades in executing work of this Section. Perform work such that progress of entire project including work of other trades shall not be interfered with or delayed. Provide information on items furnished under this Section to be installed by other Sections.

1. Obtain detailed information from manufacturers of equipment as to proper method of installation. Give full information so that openings required for work of this Section may be coordinated with other work and other openings and many be provided for in advance. In case of failure to provide information, cutting and patching will be done at the expense of this Section to the satisfaction of the Architect.

B. During progress of work, remove and properly dispose of resultant dirt and debris and keep premises reasonably clean. Upon completion of work, remove equipment and unused material provided for work.

C. Extreme care shall be observed to prevent debris from entering new piping systems. All new piping, floor drains and fixtures shall be protected from the entry of debris by temporary plugs and covers.

3.2 MATERIALS AND WORKMANSHIP

A. Work shall be executed in a workmanlike manner and shall present neat appearance when completed. Piping shall rum concealed except in mechanical rooms and areas where no hung ceiling exists. Material and equipment shall be installed according to manufacturer's recommended best practice.

B. Materials and equipment shall be new, unless otherwise noted.

3.3 ESCUTCHEONS

A. Escutcheons shall be installed around exposed pipe passing through finished floor, wall or ceiling. Escutcheons shall be heavy cast brass, chrome-plated, adjustable, of sufficient outside diameter to cover sleeve opening and to fit snugly around pipe or insulation.

3.4 SLEEVES AND INSERTS

A. Sleeves for piping between floors and through fire walls or smoke partitions shall be installed with approved packing between sleeves and piping to provide firestop.

3.5 INTERIOR WATER SUPPLY SYSTEM

A. Water supply piping shall be run as indicated on the Drawings, including new connections to mains and supplies to fixtures. Connections to fixtures shall be from top of mains and piping shall be pitched at least 1 inch in 40 feet in the direction of flow so that it can be drained completely at low points. Provide drain valves where necessary. Piping shall be pitched up towards fixtures for proper air relief.

B. Provide water hammer arrestors of proper size and type at end of each water branch with flush valves.

C. Provide ball type shut-off valves on CW & HW water service to each apartment unit and at the base of each water riser. All new valves shall be ball valves.

3.6 SANITARY, WASTE AND VENT PIPING

A. Interior horizontal sanitary and waste piping shall be installed in practical alignment at uniform grade of 1/8 inch per foot minimum (1/4 inch per foot if possible or as required by code such as for sanitary waste piping under 4” in size).

3.7 JOINTS AND CONNECTIONS

A. Joints and connections of piping shall be made permanently gas and water tight.

B. Dielectric couplings or unions shall be used where dissimilar piping materials are joined.

C. Final plumbing and gas connections to all equipment furnished or installed by others shall be by this Section.

3.8 DISINFECTION

A. The domestic water distribution piping system shall be thoroughly disinfected with solution containing not less than 50 parts per million of available chlorine. Solution shall be introduced into system for period of eight hours, during which time valves and faucets shall be opened and closed several times. After disinfection, solution shall be flushed from system with clean water until residual chlorine content is not greater than 0.2 parts per million.

3.9 CLEANING

A. Upon completion of work but prior to final system testing, all parts of installation shall be thoroughly cleaned. Fixtures, pipe, valves and fittings shall be completely cleaned of grease, metal cuttings, dirt, etc. Protective covers shall be removed and fixtures shall be cleaned and ready for use.

3.10 TESTING

A. Provide testing of plumbing systems as required by authorities having jurisdiction, including Owner and Architect. Tests shall be conducted as part of work of this Section and shall include labor, equipment, apparatus and services required to perform tests.

B. Prior to final acceptance, furnish Architect with certificates of testing and inspection for plumbing systems indicating approval of authorities having jurisdiction and conformance with requirements of Contract Documents.

C. Notify Architect and authorities involved at lest 48 hours prior to testing and inspection. Do not paint, cover or conceal work prior to testing, inspecting and obtaining approval.

D. Provide temporary piping and connections for testing, flushing or draining systems to be tested. Leaks, damage or defects discovered or resulting from test shall be repaired or replaced to like-new condition. Piping must be absolutely tight before it will be accepted and joints shall be made tight without caulking.

E. After soil and waste pipes have been installed, outlets shall be temporarily plugged up. Fill pipes with water to top of vertical lines and allow to remain for 6 hours. Repair leaks and retest as required.

F. Water piping shall be tested tight for 6 hours under hydrostatic pressure 1-1/2 times system working pressure. Tests shall be witnessed by Architect and approved before water is drained off. Repair leaks and retest as required.

END OF SECTION 22.00.00

SECTION 23.00.00

HEATING AND VENTILATION

PART I - GENERAL

1.01 RELATED DOCUMENTS

A. All of the Contract Documents, including General and Supplementary Conditions and Division 1 General Requirements, are hereby made a part of the work of this Section. Where paragraphs of this Section conflict with Division 1, the more stringent requirements shall govern.

B. All work shall comply with all federal, state and local codes and any other authorities having jurisdiction.

1.02 SUMMARY

A. Provide all materials, labor and equipment required to perform the work of this section, as shown on the Contract Drawings and as specified herein, to include:

1. Ceiling Exhaust Fans, ductwork and wall cap.
2. Electric Cabinet Heaters.
3. Miscellaneous supports and hangers as required.

B. Related Work Specified Under Other Divisions

1. Power circuiting.

1.03 SUBMITTALS

A. Product data: within 30 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

1. Coordinated shop drawings, showing proposed layout of equipment, and other components of the system.

2. Manufacturers catalogs, samples and other items needed to fully demonstrate the quality of the proposed materials and equipment including product data on exhaust fans and thermal insulation.

B. Record Drawings:

1. Submit one reproducible copy of As-Built drawings at completion of project.

1.04 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. The Contractor's superintendent shall conduct all coordination between the Contractor, the Architect, the Engineers, etc., and shall fully represent the Contractor's position in his absence. All decisions by the superintendent shall become the responsibility of the Contractor and binding to the Contract. The Contractor shall be responsible for the drawings, and that which is written or implied in the specifications.

C. Without additional cost to the Owner, provide such other labor and materials as are required to complete the work of this Section in accordance with the requirements of governmental agencies having jurisdiction, regardless of whether such materials and associated labor are called for elsewhere in these Contract Documents.

D. Before submitting the final proposal examine the site of the proposed work to determine existing conditions that may effect the work, as this section will be help responsible for any assumption in regard thereto.

1.05 GUARANTEE

A. The Contractor shall guarantee every component part of the system for a minimum of one year parts and labor. The contractor shall also provide the Owner with factory warranties for all equipment.

1.06 DRAWINGS

A. The Contractor shall examine the requirements and provisions of the Contract Documents and ascertain the extent of work and materials required or reasonably implied. The drawings pertaining to the work of this section are DH-1 and H-1.

1.07 PAYMENT

A. Payment for work of the Section will be made for the quoted Contract Price and will constitute payment in full for all costs for furnishing all labor, materials and equipment necessary to complete the work as required. Payment under this contract shall be made in partial payments as approved by the Architect as the work progresses.

PART 2 - PRODUCTS

2.01 DUCTWORK

A. For the Heating, Ventilating and Air conditioning systems, provide galvanized sheet metal ducts fabricated and installed to pertinent ASHRAE and SMACNA standards, except as otherwise indicated. Duct systems shall comply with the pressure velocity classification in compliance with the SMACNA HVAC Duct Construction Standards, 2005 third edition. Minimum pressure classification shall be 2”w.g.

B. Furnish and install the size, connections and run of ducts as indicated on the drawings. Drawings indicate inside clear dimensions.

C. The sheet metal ductwork shall, whether indicated or not, rise and drop and change in shape to clear lighting fixtures, plumbing and structural framing etc., to maintain the desired clearances within the spaces.

D. The ductwork shall be continuous, with airtight joints and seams presenting a smooth surface on the inside and neatly finished on the outside. Ducts shall be constructed with curves and bends so as to effect an easy flow of air. Unless otherwise shown on the Drawings, the inside radius of all curves and bends shall be not less than width of ducts in plane of bend.

E. Seal all duct seams, transverse and longitudinal, air tight with 3M “ED800” or equal duct sealing compound. Ensure that the existing ductwork is sealed as it will now be concealed above the ceiling instead of exposed within the space.

2.02 COMBINATION CEILING EXHAUST FAN/LIGHT

A. Exhaust fans shall be of the type and capacity shown on the Drawings; Greenheck, Broan, Panasonic, Nutone, or equal. Fans shall be tested in accordance with AMCA and bear the AMCA Certified Performance Ratings Seal; fans shall be UL Listed. All fans shall come equipped with factory mounted back-draft dampers.

B. CEX-1: Ventilator shall be Panasonic model #FV-0511VKL2 or approved equal. Customizable ceiling mount ventilating fan with light, low Sone and rated for continuous operation. ENERGY STAR® rated and certified by the Home Ventilating Institute (HVI). Evaluated by the Underwriters Laboratories and conforms to both UL and cUL standards. Provide grille mounted motion sensor for the fan. Light shall be 10W dimmable LED chip panel, 3000 Kelvin, warm white/90CRI/700 Lumens/70 LPW/50,000 hours rated average life/<1 Watt LED night light included.

C. Motor/Blower:

- Enclosed brushless ECM smart motor technology rated for continuous operation
- Adjustable ventilation rates at 50 – 80 – 110 CFM
- Power rating of 120 volts and 60 Hz
- UL and cUL listed for tub/shower enclosure when GFCI protected
- Motor equipped with thermal cutoff fuse
- Removable permanently lubricated plug-in motor

D. Housing:

- Environmentally friendly 26 gauge housing using Zinc-Aluminum-Magnesium (ZAM) coating
- Integrated dual 4” or 6” diameter duct adapter
- Built-in damper reduces back draft and helps with blower door testing
- Built-in metal flange provides blocking for penetrations through drywall as an Air Barrier, and assists with the decrease in leakage in the Building Envelope during blower door testing
- Suitable for installation in ceilings insulated up to R60
- Articulating and expandable installation bracket up to 24"

E. Grille:

- Attractive design using Poly Pro material
- Attaches directly to housing with torsion springs
- Includes a motion sensor cap for use as a cover when the motion sensor Plug ’n Play™ module has not been selected

F. Provide hooded wall cap for exhaust fan duct termination through wall. Wall cap shall be aluminum construction with aluminum finish. It shall have a built-in birdscreen and damper. Duct connection size of wall cap shall match duct outlet size of fan.

2.03 ELECTRIC CABINET HEATER

A. Furnish and install Electric Cabinet Heaters in locations indicated on the drawings. They shall match the scheduled capacity and power requirements. Electric Cabinet Heaters shall be by QMark, Berko, Electromode, Indeeco, or equal.

B. The heating equipment shall include a electric automatic fan-forced air heater suitable for small area heating as manufactured by QMark, A Marley Engineered Products Brand, Bennettsville, SC, or equal. The heater shall be designed for recessed wall mounting. Heaters shall be UL Listed.

1. BACK BOX: The back box shall be designed as a recessed rough-in box in either masonry or frame installations and is also used when surface mounting frames are used in surface mounting installations. The back box shall be heavy gauge galvanized steel and shall contain knockouts through which power leads enter.

2. INNER FRAME ASSEMBLY: The heater assembly, which fits into the back box, shall consist of a heavy gauge steel fan panel to which all of the operational parts of the heater are mounted. The inner frame assembly shall be completely pre- wired.

3. HEATING ELEMENT: The heating element shall be of the non-glowing design consisting of an 80/20 nickel-chromium resistance wire enclosed in a steel sheath to which plate fins are copper brazed. The element shall cover the entire air discharge area to ensure uniform heating of all discharged air. It shall be warrantied for 5 years.

4. ON/OFF SWITCH: A double-pole, single throw on/off switch shall be mounted on the back box for positive disconnect of power supply. It will be completely concealed behind the front cover.

5. MOTOR AND CONTROLS: The fan motor shall be impedance protected, permanently lubricated. Fan control shall be of the bi-metallic, snap-action type and shall activate fan after heating element reaches operating temperature, and continue to operate the fan after the thermostat is satisfied and until all heated air has been discharged. The thermostat shall be single-pole type on all models. Thermal cutout shall be self- hold (manual-reset) type designed to shut off heat in the event of overheating. The fan shall be four-bladed aluminum. A back- up (End of Life) thermal fuse shall be provided for additional safety.

6. SURFACE MOUNTING FRAME: The surface mounting frame shall be of heavy gauge steel designed to mount around the back box for a finished surface installation. Slot knock outs shall be provided for power supply conduit.

7. FRONT COVER: The louvered front cover shall be of heavy gauge steel with a powder paint finish. A plug button will be provided to replace the thermostat knob and render the unit tamper-resistant.

8. FINISH: All sheet metal parts, except the galvanized steel back box, shall be phosphatized, then completely painted by a powder paint process.

2.04 CONTROLS

A. Furnish and install all control components necessary to obtain a fully functional control system as described herein. The contractor is responsible for providing all controls, relays, etc. necessary to provide for a full turn-key installation.

B. CEX-1 ceiling exhaust fan shall run when the motion sensor detects movement in the room. There shall be a built-in time delay so that the fan continues to operate for 5 minutes once motion ceases.

C. ECH-# electric wall cabinet heater has an on/off switch and an integral thermostat. The light shall be controlled by a wall switch.

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of heating, ventilating and air conditioning system will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 INSTALLATION

A. Install equipment ductwork, piping and controls where shown with recognized industry standards and practices, to ensure that installation complies with requirements and serves intended purposes.

B. Coordinate with other work as necessary to interface installation of equipment with other components of systems.

C. Installation of Equipment:

1. Contractor shall examine location where equipment is to be installed and determine space conditions and notify Architect, in writing, of conditions detrimental to proper and timely completion of work.

2. Install equipment where shown in accordance with manufacturer's written instructions.

3.03 FIELD QUALITY CONTROL

A. Upon completion of installation test system to demonstrate compliance with requirements. When possible, field correct malfunctioning items then retest to demonstrate compliance. Replace materials which cannot be satisfactorily corrected. Refer to Section - Test and Balancing.

3.04 CLEANING

A. Clean all piping, equipment, etc. at completion of work for turnover to Owner.

END OF SECTION 23.00.00

SECTION 26.00.00

ELECTRICAL

I PART 1 - GENERAL

1.01 CONTRACT DOCUMENTS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.02 TIME, MANNER AND REQUIREMENTS FOR SUBMITTING SUB-BIDS:

A. Sub-bids for work under this Section shall be for the complete work and shall be filed in a sealed envelope with the City of Worcester, Department of Public Works and Parks, Architectural Division, 50 Skyline Drive, Worcester, MA 01605 at time and place stipulated in the "invitation to Bid/Notice to Contractors". The following shall appear on the upper left hand of the envelope:

Name of Sub-Bidder: Print Name of Sub-bidder
Project: Interior Accessibility Improvements
South Worcester Neighborhood Improvement Center
Sub-Bid for Section: 260001 – Electrical Work

B. Each sub-bid submitted for work under this Section shall be on forms furnished by the City of Worcester as required by Section 44F of Chapter 149 of the General Laws, as amended. Sub-Bid forms may be obtained at the Department of Public Works and Parks, Architectural Division, 50 Skyline Drive, Worcester, MA 01605 in person, or by written request.

C. Sub-bids filed with the City of Worcester shall be accompanied by a BID BOND or CASH or CERTIFIED CHECK or a TREASURER'S or CASHIER'S CHECK issued by a responsible blank or trust company payable to the City of Worcester in the amount of five (5) percent of the bid. A sub-bid accompanied by any other form of bid deposit than those specified will be rejected.

D. Additional Requirements:

1. Sub-Bidder's attention is directed to Massachusetts G.L. Chapter 149 §44H, as amended, which provides in part as follow:

2. Each sub-bidder shall list in Paragraph E of the "Form for Sub-bids" the name and bid price of each person, firm or corporation performing each class of work or part thereof for which the Section of the Specifications for that sub-sub trade requires such listing, provided that, in the absence of a contrary provision in the Specifications, any sub-bidder may, without listing any bid price, list his own name or part thereof and

perform that work with persons on his own payroll, if such sub-bidders, after sub-bid openings, shows to the satisfaction of the Awarding Authority that he does customarily perform such class of work with persons on his own payroll and is qualified to do so. This Section of the Specifications requires that the following classes of work shall be listed in Paragraph E under the conditions indicated herein.

Class of Work	Reference Section
None	

E. The work done by this subcontractor is shown on the following drawings:

1. E0, E1, E2, E3, ED1, ED2, ED3, EH1, ER1, and ER2.

1.03 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials, and equipment necessary to complete the work of this Section, including but not limited to the following:

1. All lighting systems.
2. Grounding and bonding of all electrical systems and equipment.
3. Wiring devices complete with associated wall plates.
4. Testing of all electrical systems.
5. Coordination between electrical and other trades.
6. All other systems hereinafter specified or indicated on the Contract Drawings, complete, leaving ready an electrical system in perfect operating condition.
7. Coordination with General Contractor for use of staging, planking, and scaffolding,

B. Alternates: Not Applicable.

C. The Electrical Sub-Contractor shall be responsible for filing all documents, payment of all fees, and securing of all inspections and approvals necessary for the electrical work.

1.04 SUBMITTALS

A. Comply with requirements specified in Section 01330 – SUBMITTALS.

B. Shop Drawing: Submittals shall include but not be limited to:

1. Overcurrent and switching devices.
2. Wiring devices and wall plates.
3. Wiring and cables.
4. Conduit.

5. Boxes and fittings.

6. Light Fixtures

7. Paddle Fans and Controllers

1.05 REFERENCES

A. 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.

B. 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.

1.06 REGULATORY REQUIREMENTS

A. Comply with all applicable federal and state laws, and all local codes, by-laws and ordinances.

B. Where provisions of the Contract Documents conflict with any codes, rules or regulations, the latter shall govern. Where the contract requirements are in excess of applicable codes, rules or regulations, the contract provisions shall govern unless the Designer rules otherwise.

C. Request inspections from authorities having jurisdiction, obtain all permits and pay for all fees and inspection certificates as applicable and/or required. All permits and certificates shall be turned over to the Owner's Project Manager at the completion of the work. Copies of permits shall be given to the resident engineer prior to the start of work.

D. Unless otherwise specified or indicated, materials and workmanship and equipment performance shall conform with the latest edition of the following standards, codes, specifications, requirements and regulations:

1. State Building Code

2. State Electrical Code

3. National Fire Protection Association (NFPA)

4. Local Town Regulations and By-laws

5. Underwriter's Laboratories, Inc. (UL)

6. National Electrical Manufacturer's Association (NEMA)

7. American National Standards Institute (ANSI)

E. All electrical work shall meet or exceed any other state and local codes and/or authorities having jurisdiction including all other standards indicated herein.

1.07 SURVEYS AND MEASUREMENTS

A. Base all required measurements, both horizontal and vertical, on reference points established by the General Contractor and be responsible for the correct laying out of the electrical work. In the event of a discrepancy between actual measurements and those indicated, notify the General Contractor in writing, and do not proceed with the work required until written instructions have been issued by the General Contractor.

1.08 COORDINATION

A. Electrical Drawings are diagrammatic. They indicate general arrangements of mechanical and electrical systems and other work. They do not show all offsets required for coordination nor do they show the exact routings and locations needed to coordinate with structure and other trades and to meet architectural requirements.

B. Work shall be performed in cooperation with other trades on the project and so scheduled as to allow speedy and efficient completion of the work.

C. Furnish to other trades advance information on locations and sizes of all frames, boxes, sleeves, and openings needed for their work, and also furnish information and shop drawings necessary to permit trades affected by the work to install same properly and without delay.

D. In all spaces, prior to installation of visible material and equipment, including access panels, review Architectural Drawings for exact locations and where not definitely indicated, request information from Designer. Where the electrical work shall interfere with the work of other trades, assist in working out the space conditions to make satisfactory adjustments before installation. Without extra cost to the Owner, make reasonable modifications to the work as required by normal structural interferences. Pay the General Contractor for additional openings or relocating and/or enlarging existing openings through concrete floors, walls, beams and roof required for any work which was not properly coordinated. Maintain maximum headroom at all locations. All piping, duct, conduit, and associated components to be as tight to underside of structure as possible.

E. If any electrical work has been installed before coordination with other trades so as to cause interference with the work of such trades, all necessary adjustments and corrections shall be made by the electrical trades involved without extra cost to the Owner.

F. Where conflicts or potential conflicts exist and engineering guidance is desired, submit sketch of proposed resolution to Designer for review and approval.

G. Protect all materials and work of other trades from damage which may be caused by the electrical work and repair all damages without extra cost to the Owner.

1.09 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 Designer for his determination prior to proceeding with the work.

1.10 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.

1.11 ACCESSIBILITY

A. Install all work such that parts requiring periodic inspection, operation, maintenance, and repair are readily accessible.

B. Furnish all access panels appropriate to conditions, to be installed by trades having responsibility for the construction of actual walls, floors or ceilings at required locations.

1.12 RECORD DRAWINGS, PROJECT CLOSEOUT

A. Comply with requirements specified in Section 01700 – PROJECT CLOSEOUT.

1.13 GUARANTEE/WARRANTY

A. Guarantee Work of this Section in writing for one year following the date of Substantial Completion. The guarantee shall repair or replace defective materials, equipment, workmanship, and installation that develop within this period, promptly and to Designer's satisfaction and correct damage caused in making necessary repairs and replacements under guarantee within Contract Price.

1.14 OPERATING, INSTRUCTION AND MAINTENANCE MANUALS

A. Refer to SECTION 01700 – PROJECT CLOSEOUT for submittal procedures pertaining to operating and maintenance manuals.

B. Each copy of the approved operating and maintenance manual shall contain copies of approved shop drawings, equipment literature, cuts, bulletins, details, equipment and engineering data sheets and typewritten instructions relative to the care and maintenance for the operation of the equipment, all properly indexed. Each manual shall have the following minimum contents:

1. TABLE OF CONTENTS
2. Introduction
    a. Explanation of manual and its purpose and use.
    b. Description of the electrical systems.
    c. Safety precautions necessary for equipment.
    d. Illustrations, schematics and diagrams.
    e. Installation drawing.
3. Maintenance
    a. Maintenance and lubricating instructions.
    b. Replacement charts.
    c. Trouble shooting charts for equipment components.
    d. Testing instructions for each typical component.
    e. Two typed sets of instructions for ordering spare parts. Each set shall include name, price, telephone number and address of where they may be obtained.
4. Manufacturer's Literature
    a. The equipment for which shop drawings have been submitted and approved.

1.15 SERVICE CHARACTERISTICS

A. Secondary Building Voltage – 120/240V single phase three wire

B. All equipment and wiring shall be suitable for the applied voltage.

1.16 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. Be 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.

1.17 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.

II PRODUCTS

2.01 RACEWAYS AND FITTINGS

A. Raceways - General:

1. Manufacturers
   a. Pittsburgh Standard Conduit Company
   b. Republic Steel and Tube
   c. Youngstown Sheet Tube Company
   d. Or approved equal
2. No raceway shall be used smaller than 3/4" diameter. No conduit shall have more than three (3) 90o bends in any one run, and where necessary, pull boxes shall be provided. Intermediate metal conduit is not allowed.
3. Rigid metal conduit conforming to, and installed in accordance with, NFPA 70 shall be heavy wall zinc coated steel conforming to American Standard Specifications C80-1 and may be used for service work, exterior work, slab work, and below grade level slab, wet locations, and in mechanical rooms and where raceway may be subject to mechanical damage, i.e., loading docks, workshops, etc.
4. PVC coated rigid metal conduit shall be used where indicated and conform to the following:
   a. Prior to application of the PVC coatings, all conduit shall conform to Federal Specification WW-C-581 E, ANSI Standard C80.1, UL Standard #6 and shall be hot dip galvanized.

b. The PVC exterior coating shall have a nominal thickness of 40 mils and shall be applied using a fluidized bed process.

c. Interior conduit, interior fitting surfaces and all threads shall all be protected by a two part 2 mil urethane coating.

d. Interior and exterior coatings on conduit shall have sufficient flexibility to permit field bending without damage.

5. Thin wall conduit (EMT), conforming to, and installed in accordance with, NFPA 70 shall be zinc coated steel, conforming to industry standards, may be used in masonry block walls, stud partitions, above furred ceilings where exposed but not subject to mechanical damage, and shall be used for fire alarm work.

6. Flexible metal conduit shall be used for connections to recessed lighting fixtures and motors. Liquid tight flexible metal conduit shall be used for the above connections which are located in moist locations. All flexible connections shall include a grounding conductor.

B. Raceway application

1. Comply with the following indoor applications, unless otherwise indicated:

a. Exposed, Not Subject to Physical Damage: EMT.

b. Exposed and Subject to Severe Physical Damage: Rigid steel conduit. Includes raceways in the following locations:

1) Loading dock.

2) Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.

3) Mechanical rooms.

c. Concealed in Ceilings and Interior Walls and Partitions: EMT.

d. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.

e. Damp or Wet Locations: Rigid steel conduit.

f. Raceways for Optical Fiber or Communications Cable: EMT or plenum rated inner duct.

g. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, stainless steel in damp or wet locations.

C. Fittings:

1. Manufacturers

a. O.Z.

b. Crouse Hinds

c. Appleton

d. Or approved equal

2. Provide insulated bushings on all raceways 1-inch diameter or larger.

3. Manufacturer's standard fittings shall be used for raceway supports.

4. Expansion Fittings: Expansion fittings shall be used where structural and concrete expansion joints occur and shall include a ground strap.

5. Couplings for rigid metal conduit shall be threaded type.

6. Threadless fittings for EMT shall be watertight compression type. Set-screw type fittings are not acceptable. All fittings shall be concrete tight. No diecast fittings allowed except for raceways larger than 1 inch diameter.

7. Cable supports in vertical raceways shall be of the split wedge type. Armored cable supports for vertical runs to be of wire mesh basket design.

8. Wall entrance seals shall be equal to O.Z. Gedney type "WSK".

9. Couplings, elbows, and other fittings used with rigid nonmetallic raceways shall be of the solvent cemented type to secure a waterproof installation.

2.02 WIRING MATERIALS

A. Manufacturers

1. Republic
2. Anaconda
3. General Cable
4. Or approved equal

B. Building Wire and Cable shall be copper, shall have a temperature rating of 90 degrees C and shall have a voltage rating of 600V insulation, THHN/THWN-2 for branch circuitry and XHHW-2 for feeders.

C. Conductors shall be of soft drawn 98% minimum conductivity properly refined copper, stranded construction.

D. Final connections to motors shall be made with 18" of neoprene sheathed flexible conduit.

E. Minimum branch circuit conductor size shall be 12 AWG installed in conduit. Motor control circuit wiring shall be minimum No. 14 AWG installed in conduit.

F. Other wires and cables required for the various systems described elsewhere in this section of the Specifications shall be as specified herein, as shown on the Contract Drawings, or as recommended by the manufacturer of the specific equipment for which they are used, all installed in conduit.

G. Metal Clad sheathed cable NFPA 70, type MC may only be used for fixture whips. Maximum allowable length shall be 4 ft. All type MC cable used shall contain a full-size insulated ground conductor. All conductors shall be copper. All type MC cable insulation used shall have voltage rating of 600 volts, shall

have a temperature rating of 90 degrees C. and shall be thermoplastic material. Armor material shall be steel and armor design shall be interlocked metal tape.

H. Conductor insulation and multi-conductor cable applications and wiring methods

1. Exposed Branch Circuits: Type THHN-THWN-2, single conductors in EMT.

2. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN-2, single conductors in EMT, MC cable.

3. Class 1 Control Circuits: Type THHN-THWN-2, in RMC, EMT.

4. Class 2 Control Circuits: Type THHN-THWN-2, in RMC, EMT.

2.03 OUTLET, JUNCTION, PULL BOXES, AND WIRING TROUGHS FOR ALL SYSTEMS

A. Manufacturers

1. Crouse Hinds

2. Steel City

3. RACO

4. Or approved equal.

B. Outlets:

1. Each outlet in wiring or raceway systems shall be provided with an outlet box to suit conditions encountered. Boxes installed in normally wet locations shall be of cast-metal type having hubs. Concealed boxes shall be cadmium plated or zinc coated sheet metal type. Old work boxes with Madison clamps not allowed in new construction.

2. Each box shall have sufficient volume to accommodate number of conductors in accordance with requirements of NFPA 70. Boxes shall not be less than 1-1/2" deep unless shallower boxes are required by structural conditions and are specifically approved by Designer. Ceiling and bracket outlet boxes shall not be less than 4" octagonal except that smaller boxes may be used where required by particular fixture to be installed. Flush or recessed fixtures shall be provided with separate junction boxes when required by fixture terminal temperature requirements. Switch and receptacle boxes shall be 4" square or of comparable volume.

C. Pull and Junction Boxes: Where necessary to terminate, tap off, or redirect multiple raceway runs or to facilitate conductor installation, furnish, and install appropriately designed boxes. Boxes shall be fabricated from code gauge steel assembled with corrosion resistant machine screws. Box size shall be as required by Code. Where intermediate cable supports are necessary because of box dimensions, provide insulated removable core brackets to support conductors. Junction boxes are to be equipped with barriers to separate circuits. Where splices are to be made, boxes shall be large enough to provide ample work space.

All conductors in boxes are to be clearly tagged to indicate characteristics. Boxes shall be supported independently of raceways. Junction boxes in moist or wet areas shall be galvanized type. Boxes larger than 4 inches square shall have hinged covers. Boxes larger than 12 inches in one dimension will be allowed to have screw fastened covers, if a hinged cover would not be capable of being opened a full 90 degrees due to installation location.

2.04 WIRING DEVICES

A. Manufacturers

1. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
2. Leviton Mfg. Company Inc. (Leviton).
3. Pass & Seymour/Legrand; Wiring Devices & Accessories (Pass & Seymour).
4. Or approved equal.

B. Receptacle Outlets:

1. Straight Blade Receptacles: 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.
   a. Basis of Design:
      1) Single: Pass & Seymour TR5361.
      2) Weather resistant: Pass & Seymour WR5362.
      3) Tamper resistant: Pass & Seymour TR5362.
2. GFCI Receptacles: Straight blade, feed-through type. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, W-C-596, and include indicator light that is lighted when device is tripped. Must have Safe Lock protection: If critical components are damaged and ground fault protection is lost, power to receptacle must be discontinued.
   a. Basis of Design:
      1) Duplex: Pass & Seymour 2095TR.

C. Snap Switches

1. Comply with NEMA WD 1 and UL 20.
2. Switches, 120/277 V, 20 A:
   a. Basis of Design: Pass & Seymour; CSB20AC1 (single pole), PT20AC1 (single pole – use with PTS6STR3 prewired pigtail connector), CSB20AC2 (two pole), CSB20AC3 (three way), PT20AC3 (three way – use with PTS6STR4 prewired pigtail connector), CSB20AC4 (four way).
3. Wall Plates
   a. Single and combination types to match corresponding wiring devices.
   b. Plate-Securing Screws: Metal with head color to match plate finish.

c. Material for Finished Spaces: Stainless Steel

d. Material for Unfinished Spaces: Galvanized steel.

e. Material for Damp Locations: Cast aluminum with spring-loaded lift cover and listed and labeled for use in "wet locations."

4. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with type 3R weather-resistant thermoplastic with lockable while-in-use cover.

D. Installation

1. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.

2. Coordination with Other Trades:

a. Take steps to ensure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.

b. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.

c. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.

d. Install wiring devices after all wall preparation, including painting, is complete.

3. Conductors:

a. Do not strip insulation from conductors until just before they are spliced or terminated on devices.

b. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.

c. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.

d. Existing Conductors:

1) Cut back and pigtail or replace all damaged conductors.

2) Straighten conductors that remain and remove corrosion and foreign matter.

3) Pig tailing existing conductors is permitted provided the outlet box is large enough.

4. Device Installation:

a. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.

b. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.

c. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.

d. Connect devices to branch circuits using pigtails that are not less than 6 inches (152 mm) in length.

e. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.

f. Use a torque screwdriver when a torque is recommended or required by the manufacturer.

g. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.

h. Tighten unused terminal screws on the device.

i. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.

5. Receptacle Orientation:

a. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the left.

6. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

7. on top. Group adjacent switches under single, multi-gang wall plates.

E. Identification

1. Comply with Division 16 Section "Identification for Electrical Systems."

a. Receptacles: Identify panelboard and circuit number from which served. Use hot, stamped or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

F. Field Quality Control

1. Perform tests and inspections and prepare test reports.

a. Test Instruments: Use instruments that comply with UL 1436.

b. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.

2. Tests for Convenience Receptacles:

a. Line Voltage: Acceptable range is 105 to 132 V.

b. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is not acceptable.

c. Ground Impedance: Values of up to 2 ohms are acceptable.

d. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.

e. Using the test plug, verify that the device and its outlet box are securely mounted.

f. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions remove malfunctioning units and replace with new, and retest as specified above.

2.05 GROUNDING REQUIREMENTS

A. Ground all systems and equipment in accordance with best industry practice, the requirements of NFPA 70 and the following:

B. Provide grounding bonds between all metallic conduits of the light and power system which enter and leave cable chambers or other non metallic cable pulling and splicing boxes. Accomplish this by equipping the conduits with bushings of the grounding type individually cross connected.

2.06 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.

120/240 V Circuits	Phase Circuits
Black	A
Red	B
Blue	C
White	Neutral
Green	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.

III PART 3 - EXECUTION

3.01 BASIC REQUIREMENTS

A. Adhere to best industry practice and the following.

B. All work shall be concealed.

C. Route circuitry runs embedded in concrete to coordinate with structural requirements.

D. Equip each raceway intended for the future installation of wire or cable with a nylon pulling cord 3/16 inch in diameter and clearly identify both ends of the raceway.

E. Provide all outlet boxes, junction boxes, and pull boxes for proper wire pulling and device installation. Include those omitted from the drawings due to symbolic methods of notation.

F. Utilize lugs of the limiter type to make connections at both ends of cables installed on the line side of main service overcurrent and switching devices. Provide cable limiters for each end of each service entrance cable.

3.02 TESTING REQUIREMENTS AND INSTRUCTIONS

A. After each electrical system installation is complete, perform the tests to determine that the entire system is in proper working order and in accordance with applicable codes, manufacturer's instructions, drawings, and specifications. Tests are in addition to shop tests of individual items at the manufacturer's plant. Perform insulation and ground resistance tests before operating tests.

B. Perform insulation tests on electrical equipment, apparatus, cables, motors, generators, transformers, circuit breakers and switches, switchgear, motor control centers, and similar electrical equipment, at the following times and conditions:

1. Prior to energization and/or placing into service.
2. When damage to the insulation is suspected or known to exist.
3. After repairs or modifications to the equipment affecting the insulation.
4. Where lightning or other surge conditions are known to have existed on the circuit.

C. Make openings in circuits for test instruments and place and connect instruments, equipment, and devices, required for the tests. Upon completion of tests, remove instruments and instrument connections and restore circuits to permanent condition.

D. List each circuit and measured resistance as test data. Maintain record of insulation resistance values. Identify conductor, or equipment, date that value

was taken and resistance value. Arrange information in tabular form and submit to Engineer.

3.03 FIRESTOPPING

A. Firestopping shall be provided by the Electrical Contractor for all penetrations of conduit, wireways, bus ducts, cable trays, cables. etc. installed by the Electrical Contractor, through fire-rated walls and floors and other fire-rated separations as follows:

1. Excess space in framed openings through structural floors between conduits and concrete shall be grouted in with concrete to a depth of at least the thickness of the slab plus 2" minimum above the slab.
2. Conduit penetration through poured concrete or masonry walls shall be grouted in with concrete and provided with tight fitting escutcheon plates on both sides.
3. Conduit penetrations through fire-rated dry walls shall be with sleeves through the wall fitted with escutcheon plates on both sides with excess openings filled with fire stop material specifically manufactured for the purpose.
4. Excess space within conduit sleeves or stubs through floor slabs or walls where low voltage/telecommunications cables pass through shall be filled with firestopping material specifically manufactured for the purpose.
5. Utilize fire-rated fittings, as specified elsewhere for penetrations through floor slabs for supplying floor outlets.

3.04 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 a #8 AWG neutral conductor.

2. Minimum conductor size shall be No. 12 A.W.G. copper.

3. Conductors operating at 120 volts extending in excess of 100 Ft., or at 277 volts extending in excess of 200 ft., or the last outlet or fixture tap shall be No. 10 A.W.G. copper throughout.

4. Lighting fixtures and receptacles shall not be connected to the same circuit.

5. Circuits shall be balanced on phases at their supply point as evenly as possible.

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.

3.05 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 vaporproof 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.

3.06 LIMITING NOISE PRODUCED BY ELECTRICAL INSTALLATION

A. Perform the following work, in accordance with field instructions issued by the Designer 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.

3.07 SUPPORTS AND FASTENINGS

A. Support work in accordance with best industry standards, Mass. Electric Code and the following:

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 grey 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.

3.08 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.

3.09 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.

3.10 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 12" 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.

3.11 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 Designer and Structural Engineer for review and written approval prior to installation. Any costs associated with the review and approval shall be borne by the Electrical Contractor.
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 Designer 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.

3.12 INSTALLING CIRCUITRY

A. The outside surface of circuitry which is to be embedded in cinder concrete shall be coated with asphaltum paint.

B. In runs of conduit or raceway including flexible limit the number of bends between cable access points to a total which does not exceed the maximum specified for the particular system. Where no such maximum is specified, limit the number to four right angle bends or the equivalent thereof.

C. In each conduit or raceway assigned for the future pulling in of wires, include a nylon drag cord. In raceways 2" trade size and larger, the cord shall be pulled in utilizing a suitable brush, followed by an 85% diameter ball mandrel ahead of the cord in the pulling assembly. In the event that obstructions are encountered, which will not permit the drag cord to be installed, the blocked section of raceway shall be replaced and any cutting and patching of the structure involved in such replacement shall be included as part of the electric work.

D. Circuitry shall be arranged such that conductors of one feeder or circuitry carrying "going" current are not separated from conductors of the same feeder or circuitry carrying "return" current by any ferrous or other metal. Where not within raceways, all "going" and "return" current conductors of one feeder or circuit shall be laces together so as to minimize induction heating of adjacent metal components.

E. Sleeves used where circuitry is to penetrate waterproof slabs, decks and walls, shall be of a type selected to suite the water condition encountered in the field.

END OF SECTION

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