

PROJECT MANUAL

CMHA MEADOWS RAD RENOVATIONS

**4855 PINTAIL CREEK DR
COLUMBUS, OHIO 43211**

PREPARED FOR:



**COLUMBUS METROPOLITAN
HOUSING AUTHORITY**
COMMUNITY. COMMITMENT. COLLABORATION.

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**BID SET
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ACM Report The Meadows Apts
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SECTION 01 12 16

WORK SEQUENCE

PART 1 GENERAL

1.01 SUMMARY

- A. This Section includes specifications for work sequence.
- B. Schedule and conduct all work in a manner consistent with the Contract, specific work sequence and milestones as required.

1.02 WORK SEQUENCE

- A. All portions of work on this project must follow a specific construction sequence.
- B. Contractor to propose and follow a work sequence within established start and finish dates. Coordinate and establish with Owner all appropriate scheduling variables including but not limited to:
 - 1. Unit tenant occupancy.
 - 2. Moving of tenant furniture and possessions within unit.
 - 3. Phasing of work. Quantity of active construction units versus not active.
 - 4. Time of work.
 - 5. Noise and shutdowns.
 - 6. Management, storage and laydown area locations, phasing movement and delivery.
 - 7. Temporary barricading, fencing and safety/security measures.
- C. Construction Schedule: See Section 01 32 16.

END OF SECTION

SECTION 01 23 00

ALTERNATES

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

1.02 GENERAL REQUIREMENTS

- A. Definitions and Explanations: "Alternates" are defined as alternate products, materials, equipment, systems, methods, units of work or major elements of the construction, which may, at Owner's option and under terms established by Instructions to Bidders and in the Contract or Agreement, be selected for the work in lieu of corresponding requirements of Contract Documents. Selection may occur prior to Contract date, or may, by the Agreement, be deferred for possible selection at a subsequent date. Alternates may or may not change scope and general character of the work substantially. Requirements of this section may be related to, but must not be confused with, requirements of Contract Documents related to "allowances", "unit prices", change orders", "substitutions" and similar provisions.
 - 1. Refer to the Contract, and subsequent modifications thereof, for determination of which several scheduled "Alternates" herein have been accepted, and, therefore, are in full force and effect as though included originally in the contract documents for the base bid.
 - 2. The Owner reserves the right to accept or reject any Alternate at the time of awarding the Contract. If, during the progress of the Work, it should become desirable to reinstate any Alternate not included in the Contract, the Owner reserves the right to reinstate the Alternate at the price bid by the Contractor provided that such actions taken in sufficient time as not to delay the progress of the work.
- B. Notification: Immediately following the award of the Contract, prepare and distribute to each entity to be involved in performance of the work, a notification of the status of each alternate scheduled herein and including those subsequently added by notification during bidding. Indicate which alternates have been: 1) accepted, 2) rejected, and, 3) deferred for consideration at a later date as indicated. Include full description of negotiated modifications to alternates, if any.
- C. General: The descriptions herein for each alternate are recognized to be incomplete and abbreviated, but imply that each change must be complete for the scope of work affected. Refer to all other applicable specification sections and to applicable drawings, for specific requirements of the work, regardless of whether references are so noted in the description of each alternate.

It is recognized that descriptions of alternates are primarily scope definitions, and do not necessarily detail full range of materials and processes needed to complete the work as required.

1.02 SCHEDULE OF ALTERNATES

1. Quartz counter tops in lieu of PLAM counter tops. At all kitchens, provide 3 cm quartz countertops as specified. Where quartz countertops are provided, provide tile back splash from top of counter to bottom of cabinet for entire length of countertop. Provide undermount sinks at these locations. At all bathrooms, provide 2 cm quartz countertops and drop-in vitreous sinks.
 - A. Base bid – PLAM countertops with drop-in sinks at kitchens. Bathroom vanity tops to be Rynone/cultured marble – white. Refer to drawings and specs for additional information.
2. Replace existing roofs with asphalt shingle roofing system. At all buildings, remove existing asphalt shingle roofs and replace them with new. Provide new flashing, fascia, gutters etc.
 - B. Base bid – Maintain existing shingle system. Modify shingles as necessary for installation of new flues or other devices for new systems being installed in units. Refer to drawings and specs for additional information.
3. Provide tile back splash at kitchens in lieu if FRP panels. Backsplash to extent full length of counter from top of counter to underside of wall cabinets

END OF SECTION

SECTION 01 22 00

UNIT PRICES

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes administrative requirements and criteria applicable to portions of the work performed under a unit price payment method.

1.02 DEFINITIONS

- A. A unit price is an amount proposed by a bidder and stated on the Bid Form as a price per unit of measurement for materials or services that will be added to or deducted from the Contract Sum by Change Order to the extent that the quantities of work required by the Contract Documents are increased or decreased. In the event greater or lesser quantities of materials are required by the Contract Documents, the Unit Price will be used as the basis for adjustment by Change Order, for the duration of the Contract.
- B. Unit prices are indicated on the Bid Form. Where indicated, refer to individual specification sections for specific information regarding unit prices. A Unit Price schedule is included at the end of this Section. Specification sections referenced in this section contain the specifications for materials and methods described under each unit price.

1.03 DESCRIPTION OF REQUIREMENTS

- A. Include in the total bid amount all unit prices stated in the Contract Documents.].
- B. Requirements of the Work related to Unit Prices are specified in the Contract Documents and indicated on the Bid Form. The work associated with unit prices is over and above that which is identified on the Contract Documents which is base bid or alternate work.
- C. Work associated with unit prices is to be performed only with the prior approval of the Architect. No credit will be given for work performed under a unit price without such prior approval and verification of actual quantity of work completed.

1.04 MEASUREMENT AND PAYMENT OF UNIT PRICES

- A. Take all measurements and compute quantities. The Architect will verify measurements and quantities. Provide necessary equipment and assist in the verification of measurements and quantities.
 - 1. Measurement by Weight: Measured by handbook or scaled weight.

2. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.
 3. Measurement by Area: Measured by square dimension using mean length and width or radius.
 4. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord.
- B. Unit Quantities: Quantities and measurements indicated in the Form of Proposal are for bidding and contract purposes only. Quantities and measurements supplied or placed in the work and verified by the Architect shall determine payment.
- C. Unit Price Includes: Full compensation for all required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; and including overhead and profit.
- D. Payment will not be made for materials wasted or disposed of in a manner that is not acceptable, materials remaining on hand after completion of the work, or installation of materials beyond the lines and levels of the required work.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 UNIT PRICES

- A. Gypsum Board Patching. Provide areas requiring replacement to include damaged areas and as required for new.
1. Description: Cost includes removal of loose, broken delaminated, water damaged and deteriorating gypsum wall board as required for new.
 2. Unit Cost: Include material and labor.
 3. Unit of Measure: Square foot.
 4. Specification Reference: Section 09 29 00.
 5. Quantity of Work: Base 32 SF/Unit
- B. New Sub-Flooring. Provide at new flooring areas as required for new installation.
1. Description: Cost includes removal of loose, broken delaminated, water damaged and deteriorating sub-floor.
 2. Unit Cost: Include material and labor.
 3. Unit of Measure: Square foot.
 4. Specification Reference: Section 06 10 00.
- C. New Underlayment. Provide at new flooring areas as required for new installation.
1. Description: Cost includes removal of loose, broken delaminated, water damaged and deteriorating underlayment.
 2. Unit Cost: Include material and labor.
 3. Unit of Measure: Square foot.

4. Specification Reference: Section 06 10 00.
- D. New Interior Doors. Provide at new locations as required for new doors (assume 36" x 80"). Provide new wood casing and frames.
1. Description: Cost includes removal of damaged and deteriorating doors.
 2. Unit Cost: Include material and labor.
 3. Unit of Measure: Each.
 4. Specification Reference: Section 08 19 00.
 5. Quantity of Work – Base Bid: 95 doors.
- E. New Steel Doors at Exterior Storage Rooms. Provide at new locations as required for new doors.
1. Description: Cost includes removal of damaged and deteriorating doors. Existing frame to remain.
 2. Unit Cost: Include material and labor.
 3. Unit of Measure: Each.
 4. Specification Reference: Section 08 16 13.
 5. Quantity of Work – Base Bid: 20 doors.

END OF SECTION

SECTION 01 23 00

ALTERNATES

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

1.02 GENERAL REQUIREMENTS

- A. Definitions and Explanations: "Alternates" are defined as alternate products, materials, equipment, systems, methods, units of work or major elements of the construction, which may, at Owner's option and under terms established by Instructions to Bidders and in the Contract or Agreement, be selected for the work in lieu of corresponding requirements of Contract Documents. Selection may occur prior to Contract date, or may, by the Agreement, be deferred for possible selection at a subsequent date. Alternates may or may not change scope and general character of the work substantially. Requirements of this section may be related to, but must not be confused with, requirements of Contract Documents related to "allowances", "unit prices", change orders, "substitutions" and similar provisions.
 - 1. Refer to the Contract, and subsequent modifications thereof, for determination of which several scheduled "Alternates" herein have been accepted, and, therefore, are in full force and effect as though included originally in the contract documents for the base bid.
 - 2. The Owner reserves the right to accept or reject any Alternate at the time of awarding the Contract. If, during the progress of the Work, it should become desirable to reinstate any Alternate not included in the Contract, the Owner reserves the right to reinstate the Alternate at the price bid by the Contractor provided that such actions taken in sufficient time as not to delay the progress of the work.
- B. Notification: Immediately following the award of the Contract, prepare and distribute to each entity to be involved in performance of the work, a notification of the status of each alternate scheduled herein and including those subsequently added by notification during bidding. Indicate which alternates have been: 1) accepted, 2) rejected, and, 3) deferred for consideration at a later date as indicated. Include full description of negotiated modifications to alternates, if any.
- C. General: The descriptions herein for each alternate are recognized to be incomplete and abbreviated, but imply that each change must be complete for the scope of work affected. Refer to all other applicable specification sections and to applicable drawings, for specific requirements of the work, regardless of whether references are so noted in the description of each alternate.

It is recognized that descriptions of alternates are primarily scope definitions, and do not necessarily detail full range of materials and processes needed to complete the work as required.

1.02 SCHEDULE OF ALTERNATES

1. Quartz counter tops in lieu of PLAM counter tops. At all kitchens, provide 3 cm quartz countertops as specified. Where quartz countertops are provided, provide tile back splash from top of counter to bottom of cabinet for entire length of countertop. Provide undermount sinks at these locations. At all bathrooms, provide 2 cm quartz countertops and drop-in vitreous sinks.
 - A. Base bid – PLAM countertops with drop-in sinks at kitchens. Bathroom vanity tops to be Rynone/cultured marble – white. Refer to drawings and specs for additional information.
2. Replace existing roofs with asphalt shingle roofing system. At all buildings, remove existing asphalt shingle roofs and replace them with new. Provide new flashing, fascia, gutters etc.
 - B. Base bid – Maintain existing shingle system. Modify shingles as necessary for installation of new flues or other devices for new systems being installed in units. Refer to drawings and specs for additional information.

END OF SECTION

SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.01 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. Administrative and supervisory personnel.
 - 2. Requests for Interpretation (RFIs).
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific contractor.

1.02 RELATED SECTIONS

- A. Project Meetings: Section 01 31 19.

1.03 DEFINITIONS

- A. RFI: Request from Contractor seeking interpretation or clarification of the Contract Documents.

1.03 COORDINATION

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
 - 4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1 Preparation of Contractor's Construction Schedule.
 - 2 Preparation of the Schedule of Values.
 - 3 Installation and removal of temporary facilities and controls.
 - 4 Delivery and processing of submittals.
 - 5 Progress meetings.
 - 6 Preinstallation conferences.
 - 7 Project closeout activities.
 - 8 Startup and adjustment of systems.
 - 9 Project closeout activities.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

1.04 SUBMITTALS

- A. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office and cellular telephone numbers and email addresses. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
 1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.05 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

- A. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.
 1. Include special personnel required for coordination of operations with other contractors.

1.06 REQUESTS FOR INTERPRETATION (RFIs)

- A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.
1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
1. Project name.
 2. Date.
 3. Name of Contractor.
 4. Name of Architect.
 5. RFI number, numbered sequentially.
 6. Specification Section number and title and related paragraphs, as appropriate.
 7. Drawing number and detail references, as appropriate.
 8. Field dimensions and conditions, as appropriate.
 9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 10. Contractor's signature.
 11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.
 - a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.
- C. Hard-Copy RFIs: Identify each page of attachments with the RFI number and sequential page number.
- D. Software-Generated RFIs: Software-generated form with substantially the same content as indicated above.
1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- E. Architect's Action: Architect will review each RFI, determine action required, and return it. Allow 15 days for Architect's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day.
1. The following RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.

- e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or RFIs with numerous errors.
 - 2. Architect's action may include a request for additional information, in which case Architect's time for response will start again.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within 7 days if Contractor disagrees with response.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 31 19

PROJECT MEETINGS

PART 1 GENERAL

1.01 SCOPE

- A. This section specifies administrative and procedural requirements for project meetings including:
 - 1. Pre-Construction Meeting.
 - 2. Progress Meetings.
 - 3. Specially called meetings.

1.02 RELATED SECTIONS

- A. Project Management and Coordination: Section 01 31 00.

1.03 DESCRIPTION

- A. Schedule and administer preconstruction meeting, progress meetings and specially called meetings throughout the progress of the work.
 - 1. Prepare agenda for meetings.
 - 2. Preside at meetings.
 - 3. Record the minutes; include all significant proceedings and decisions.
 - 4. Reproduce and distribute copies of minutes.
 - a. To all participants in the meeting.
 - b. To all parties affected by decisions made at the meeting.
- B. Make physical arrangements for meetings.
- C. Representatives of the Contractors, subcontractors and suppliers attending the meetings shall be qualified and authorized to act on behalf of the entity each represents.

1.04 PRE-CONSTRUCTION MEETING

- A. Scheduled within 15 days after date of Notice to Proceed.
- B. Location: A central site, convenient for all parties, designated by Architect.
- C. Attendance
 - 1. Owner's Representative
 - 2. Architect and Consultants

3. Major Subcontractors
4. Major Suppliers

D. Agenda: Discuss items of significance that could affect progress, including the following:

1. Tentative construction schedule.
3. Critical work sequencing and long-lead items.
4. Designation of key personnel and their duties.
5. Lines of communications.
5. Procedures for processing field decisions and Change Orders.
6. Procedures for RFIs.
7. Procedures for testing and inspecting.
8. Procedures for processing Applications for Payment.
9. Distribution of the Contract Documents.
10. Submittal procedures.
11. Preparation of Record Documents.
12. Use of the premises.
13. Work restrictions.
14. Working hours.
15. Responsibility for temporary facilities and controls.
16. Procedures for moisture and mold control.
17. Procedures for disruptions and shutdowns.
18. Construction waste management and recycling.
19. Parking availability and restrictions.
20. Office, work, and storage areas.
21. Equipment deliveries and priorities.
22. First aid.
23. Security.
24. Progress cleaning.
25. Owner's occupancy requirements.
26. Phasing.

1.05 PROGRESS MEETINGS

- A. Schedule regular periodic meetings, as required.
- B. Hold called meetings as required by progress of work.
- C. Location of the Meetings: Project field office of the General Contractor.
- D. Attendance
 1. Architect and consultants as needed.
 2. Prime Contractors.
 3. Subcontractors as appropriate to the agenda.
 4. Suppliers as appropriate to the agenda.
 5. Owner's Representative

E. Suggested Agenda

1. Review, approval of minutes of previous meeting.
2. Review of work progress since previous meeting.
3. Field observations, problems, conflicts.
4. Problems which impede Construction Schedule.
5. Review of off-site fabrication, delivery schedules.
6. Corrective measures and procedures to regain projected schedule.
7. Revisions to Construction Schedule.
8. Plan progress, schedule, during succeeding work period.
9. Coordination of schedules.
10. Review submittal schedules; expedite as required.
11. Maintenance of quality standards.
12. Review proposed changes for:
 - a. Effect on Construction Schedule and on completion date.
 - b. Effect on other contracts of the project.
13. Status of RFIs.
14. Status of proposal requests.
15. Pending changes.
16. Status of Change Orders.
17. Pending claims and disputes.
18. Documentation of information for payment requests.

END OF SECTION

SECTION 01 32 16

CONSTRUCTION SCHEDULES

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. These requirements generally describe the form of the construction schedule, a basic description of the schedule contents and the submittal procedures. Refer to General Conditions for additional requirements regarding the Contractor's necessity to maintain the approved construction schedule and the project completion.
- B. Authorization to proceed with the work will not be given until the construction schedule has been approved by the Architect.
- C. General Contractor: Provide a coordinated project construction schedule for the entire work.

1.02 FORM OF SCHEDULES

- A. Prepare schedules in the form of a time-scaled logic diagram, defined as a network logic diagram with connecting lines specifically identifying relationships between all activities of the work using the "Critical Path Method".
 - 1. Diagram may be machine plotted or hand drafted showing the activities duration time-scaled to the appropriate calendar in an easily readable format as approved by Architect. Base schedule on the early start early finish dates of the activities. All relationships between activities must be clearly noted including associated lag times, if required. The diagram must also have the critical path (the series of activities with the least value of total float) clearly marked. In addition, the Contractor must provide a tabular report indicating the early start, early finish, late start, late finish, and total float for every activity in the schedule.

1.03 CONTENT OF SCHEDULES

- A. Quantity of Activities: Defined by complexity of the project. An adequate number of activities are to be included in the project in order that sufficient detail of the demolition process (and resulting temporary construction) and weekly progress requirements are clearly stated.
- B. Where applicable, progress schedule must also include a shop drawing schedule with the activities "Prepare Shop Drawings", "Architect Review and Approval", and "Fabricate and Deliver to the Jobsite". This sequential series of activities must be assigned to each item on the project which requires a shop drawing or

performance data submittal prior to its installation. The shop drawing schedule shall be tied directly to the progress schedule, but shall be provided to the Architect as a separate time-scaled logic diagram.

1.04 PROGRESS REVISIONS

- A. Update schedule and submit in the above format each month with pay requests. Progress completion shall be defined as the remaining duration of any activity which started on or before the schedule update. In addition, revise the duration of all activities as more accurate scheduling information becomes available.
 - 1. Indicate progress of each activity to date of submission.
 - 2. Show changes occurring since previous submission of schedule:
 - a. Major changes in scope.
 - b. Activities modified since previous submission.
 - c. Revised projections of progress and completion.
 - d. Other identifiable changes.
- B. Provide a narrative report as needed to define:
 - 1. Problem areas, anticipated delays, and the schedule.
 - 2. Corrective action recommended, and its effect.

1.05 SUBMITTALS

- A. Submit initial schedules within 15 days after award of Contract.
 - 1. Architect will review schedules and return review copy within 10 days after receipt.
 - 2. If required, resubmit within 7 days after return of review copy.
- B. Submit revised progress schedules with each application for payment.
- C. Submit four opaque copies of initial schedule, large enough to show entire schedule for entire construction period.
 - 1. Submit an electronic copy of schedule, using software indicated, in .pdf format. Include type of schedule (Initial or Updated) and date on label.

1.06 DISTRIBUTION

- A. Distribute copies of the reviewed schedules to:
 - 1. Job site file.
 - 2. Subcontractors.
 - 3. Owner.
 - 4. Architect.
 - 5. Other concerned parties.

END OF SECTION

SECTION 01 33 23

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

PART 1 GENERAL

1.01 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

1.02 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect's responsive action.
- B. Informational Submittals: Written information that does not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.03 GENERAL REQUIREMENTS

- A. Requirements of this Section are in addition to the requirements of the General Conditions.
- B. This Section includes procedures for processing:
 - 1. Shop drawings.
 - 2. Product data.
 - 3. Samples.
 - 4. Certificates of compliance.
 - 5. Reports.
 - 6. Schedules.
 - 7. Design data.
 - 8. Other submittals listed.
- C. Submittals as approved do not constitute a change order.
- D. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

- a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- E. Submittals Schedule: See Section 01 32 16, Construction Schedules, for list of submittals and time requirements for scheduled performance of related construction activities.
 - 1. Submittals received prior to receipt of the initial Submittals Schedule will be rejected.
 - 2. Submittals received prior to the time they are indicated on the Submittal Schedule to be submitted will be rejected.
- F. Make all submittals far enough in advance of scheduled dates for installation to provide sufficient time for reviews, for securing necessary approvals, for possible revisions and resubmittals, and for placing orders and securing delivery.
 - 1. Delays caused by the tardiness of the Contractor in preparing and forwarding submittals will not be an acceptable basis for an extension of the Contract completion date or for consideration of alternate products which do not meet the specified requirements of this Project Manual.
 - 2. Initial Review: Allow 14 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 - 3. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 - 4. Resubmittal Review: Allow 14 days for review of each resubmittal.
 - 5. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is necessary, allow 14 days for initial review of each submittal.
 - 6. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 14 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
- G. Identification: Place a permanent label or title block on each submittal for identification.
 - 1. Indicate name of firm or entity that prepared each submittal on label or title block.
 - 2. Provide a space on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 - 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name and address of Contractor.

- e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.
 - 1) Submittal number shall use Specification Section number.
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Location(s) where product is to be installed, as appropriate.
 - l. Other necessary identification.
- H. Notify Architect in writing at time of submittal of deviations from the requirements of the Contract Documents. In addition, highlight, encircle, or otherwise specifically identify deviations.
- I. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review, received from sources other than Contractor.
- 1. Transmittal Form: Provide locations on form for the following information:
 - a. Project name.
 - b. Date.
 - c. Destination (To:).
 - d. Source (From:).
 - e. Names of subcontractor, manufacturer, and supplier.
 - f. Category and type of submittal.
 - g. Submittal purpose and description.
 - h. Specification Section number and title.
 - i. Drawing number and detail references, as appropriate.
 - j. Submittal and transmittal distribution record.
 - k. Remarks.
 - l. Signature of transmitter.
 - 2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.
- J. Resubmittals: When Architect requires that a submittal be resubmitted, comply with requirements of this section.
- 1. Identify changes made since the previous submittal.
- K. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

- L. Electronic Files: At Contractor's written request, copies of Architect's electronic files will be provided to Contractor for Contractor's use in connection with Project, subject to the following conditions:
 - 1. Execute Electronic File Transfer Agreement provided by the Architect to obtain files.
 - 2. The electronic files are provided for the Contractor's convenience and their use will be at the Contractors risk.
 - a. There are no assurances that the information in the electronic files is current. All dimensions must be field-verified.

1.04 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
- B. Product Data
 - 1. Submit only pages which are pertinent.
 - a. Mark each copy of standard printed data to identify pertinent products, referenced to Specification Section and Article number.
 - b. Show reference standards, performance characteristics, and capacities; wiring and piping diagrams and controls; component parts; finishes; dimensions; and required clearances.
 - 2. Modify manufacturer's standard schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the work. Delete information not applicable.
 - 3. Stamp and sign each set of manufacturer's product data before submitting to Architect to certify compliance with Contract Documents.
 - 4. Number of Copies Required: Submit two paper copies of Product Data, and in portable data file (.pdf) format, unless otherwise indicated. When submitting for Concurrent Consultant Review, submit two copies to Consultant and one copy to Architect. Architect will return one copy. Mark up and retain returned copy as a Project Record Document.
 - a. Reproduction and cost of reproduction of processed Product Data for distribution to concerned parties is Contractor's responsibility.
- C. Shop Drawings
 - 1. Reproduction of any portion of the Contract Documents for use as submittals for Shop Drawings is not acceptable.
 - 2. Submit Shop Drawings in a clear and thorough manner.
 - a. Title each drawing with Project name.
 - b. Identify each element of drawings by reference to sheet number and detail, schedule, or room number of Contract Documents.
 - 3. Identify the following:
 - a. Requirements of the individual section of Project Manual.
 - b. Field measurements.

- c. Field construction criteria.
 - d. Relation to adjacent or critical features of the Work or products.
 - e. Conformance of submittal with requirements of Contract Documents.
 - 4. Each sheet of Shop Drawings shall be stamped and signed by Contractor before submitting to Architect. Certify compliance with requirements of Contract Documents.
 - 5. Review by the Architect shall not relieve Contractor from his responsibility in preparing and submitting proper Shop Drawings in accordance with his current obligations.
 - 6. All submissions which, in the opinion of the Architect are incomplete, contain errors or have not been checked or only superficially checked, will be returned unchecked by the Architect for resubmission.
 - 7. Fabrication of products or start of work before required Shop Drawings are approved by Architect and returned to Contractor shall be at Contractor's risk.
 - 8. Number of Copies Required: Submit two paper copies of each submittal, and in portable data file (.pdf) format, unless indicated otherwise. When submitting for Concurrent Consultant Review, submit two copies to Consultant and one copy to Architect. Architect will return one copy. Mark up and retain one returned copy as a Project Record Drawing.
 - a. Reproduction and cost of reproduction of processed Shop Drawings for distribution to concerned parties is Contractor's responsibility.
 - b. This procedure is to be followed for each submission of a drawing or group of drawings until they are finally approved by the Architect.
- D. Office Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
- 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 - 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of appropriate Specification Section.
 - 3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

4. Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected.
Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples Required: Submit two sets of Samples. Architect will retain one Sample set; the other will be returned.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least two sets of paired units that show approximate limits of variations.

E. Mock-Up Samples: Where samples are specified in the individual specification sections for use in constructing mock-ups, comply with requirements for "Office Samples", and process transmittal forms for mock-ups to provide a record of activity.

F. Submittals Schedule: See Section 01 32 16, Construction Schedules.

G. Schedule of Values and Application for Payment: See Section 01 29 00, Payment Procedures.

1.05 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.

1. Number of Copies: Submit one copy of each submittal, unless otherwise indicated. Architect will not return copy.
2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
3. Test and Inspection Reports: See Section 01 45 29, Testing Laboratory services.

B. Coordination Drawings: See Section 01 31 21, Coordination Drawings.

- C. Contractor's Construction Schedule: See Section 01 32 16, Construction Schedules.
- D. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- H. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- I. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- J. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- K. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- L. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - 1. Name of evaluation organization.
 - 2. Date of evaluation.
 - 3. Time period when report is in effect.
 - 4. Product and manufacturers' names.
 - 5. Description of product.
 - 6. Test procedures and results.
 - 7. Limitations of use.

- M. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- N. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- O. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- P. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. See Section 01 78 23, Operation and Maintenance Data.
- Q. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- R. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
 - 1. Preparation of substrates.
 - 2. Required substrate tolerances.
 - 3. Sequence of installation or erection.
 - 4. Required installation tolerances.
 - 5. Required adjustments.
 - 6. Recommendations for cleaning and protection.
- S. Manufacturer's Field Reports: Prepare written information documenting factory authorized service representative's tests and inspections. Include the following, as applicable:
 - 1. Name, address, and telephone number of factory-authorized service representative making report.
 - 2. Statement on condition of substrates and their acceptability for installation of product.
 - 3. Statement that products at Project site comply with requirements.

4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- T. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
- U. Material Safety Data Sheets (MSDSs): Submit information directly to Owner; do not submit to Architect, except as required in "Action Submittals" Article. Retain copies at jobsite.
- 1.06 DELEGATED DESIGN
- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit two copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional. When submitting for Concurrent Consultant Review, submit two copies to Consultant and one copy to Architect.
1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

3.01 CONTRACTOR'S REVIEW

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

3.02 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Reference the General Conditions for Architect's review responsibilities. Approval of a specific item does not indicate approval of an assembly of which the item is a component. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
 - 1. REVIEWED
 - 2. APPROVED
 - 3. APPROVED AS CORRECTED
 - 4. REVISE AND RESUBMIT
 - 4. REJECTED.
- C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION

SECTION 01 35 13

SPECIAL PROJECT PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

- A. All construction is to occur in unoccupied **empty** units. Tenants will be permanently relocated from the units in a multi-phased path during the duration of construction. Tenants' furniture & belongings will be moved prior to work in any unit. Contractor is responsible for phasing construction in coordination with owner. All units are to be made "rent ready" at the end of construction."

1.02 PROCEDURES IN OPERATIONAL BUILDING

- A. Occupancy of Building
 - 1. The existing building complex will be occupied throughout the entire course of construction. As such, contractors and their personnel are restricted to assigned construction areas of the building only.
 - 2. Access to areas within the work area of the project which must occur through occupied areas or over occupied areas must be coordinated with the Owner's Representative and the Architect so as to allow spaces to be vacated in time for the work to be accomplished, approximately 48 hours advance notice is required.
 - a. Where the Owner vacates to allow work in an area, services and utilities may be cut as long as the continuity of that service does not affect other areas. Access must be maintained to all other areas in a safe and sanitary manner.
 - b. Perform work with cooperation and consideration toward occupants and caution toward existing finishes. Clean-up of work areas in occupied spaces shall be performed at the end of each work day. Debris will not be permitted to accumulate.
 - 3. Operations which are particularly noisy or hazardous to building occupants must be scheduled during weekends or at night. Access to the building will be coordinated with the Owner's Representative and Architect who will generally allow work as required by the construction schedule throughout the normal work day, at night and on weekends as required.
 - a. The cost of work performed at times other than the "normal" working areas established for the project will be borne by the Contractor(s) involved. No additional payment will be due Contractors whose operations result in "premium" hour work.
- B. Conduct: Contractor and workmen under his/her control are to be quiet and non-offensive. Radios are prohibited.

C. Dress Code

1. Required Apparel: Shirt, long pants, shoes with laces; all suitably clean.
2. Not Permitted: Offensive graphics or messages on clothing, short pants, tank tops, sandals, open toed shoes, bare torso, bare feet.

D. Areas under construction shall be separated from occupied areas by suitable barriers. See Section 01 50 00 for additional requirements.

E. No utilities or services may be interrupted without full consent of and prior scheduling with the Owner's representative. All functions of existing building must be maintained at all times unless specific written permission is obtained from the Owner. Critical functions include, but are not limited to:

1. Exits
2. Utilities

1.03 UTILITY SHUT-DOWN

A. Advance notice required: Contractor to request, a minimum 14 days in advance, Owner's permission to shut down electric power, gases or systems to occupied portions of the building. Request to be in writing and indicate the area(s) affected, time and date shut-down requested to commence, and anticipated duration of shut-down. Approved time and date may not be as requested, will be at times least disruptive to Owner, and may be during non-normal working hours.

1. Disclaimer: No additional payments will be allowed due to Contractor's difficulties due to being held to the above restrictions.

1.04 NOISE AND SAFETY

A. Prohibited Methods: Prohibited methods and materials include, but are not limited to, the following:

1. Use of explosives.
2. Use of jack hammers or similar equipment which can cause structure-borne vibration detrimental to the use of the occupied facilities.

B. Construction noise limited to Normal Working Hours.

1.05 EXISTING FACILITIES

A. Do not use existing telephone, vending machines, cafeteria, or other facilities.

1.06 NO SMOKING POLICY

A. Smoking inside buildings is not permitted.

1.07 SITE AND BUILDING ACCESS

- A. Existing driveways and entrances which serve the premises must be maintained. They must be available to the Owner and public at all times. Do not use these areas for parking or storage of materials.
1. Do not unreasonably encumber the site with materials or equipment. Confine stock piling of materials and location of storage trailers to the areas indicated on the drawings or as directed by the Architect.
 2. Architect will administer available space equitably among other prime contractors.
 3. Schedule deliveries so as to minimize space and time requirements for storage of materials and equipment on the site.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 PROJECT CONDITIONS

- A. This Section is not intended to limit types and amounts of temporary construction facilities and controls required. Omission from this Section will not be accepted as an application that such temporary activity is not required for successful completion of the work and compliance with requirements of the Contract Documents.
- B. Provide and maintain each temporary construction facility and control when required for proper performance of the work. Terminate and remove when no longer needed or when permanent facilities, with proper authorization, are available for use.
- C. Obtain and pay for all required applications, fees, permits and inspections required for temporary construction facilities and controls.
- D. Install, operate, maintain and protect temporary construction facilities and controls in a manner and at locations which are safe, non-hazardous, sanitary and adequately protect project work, workmen and the public.

1.02 COST OF CONSUMED UTILITIES

- A. Water Service Use Charges: Water consumed during construction from the Owner's existing system is to be used without metering and without payment of use charges.
- B. Electric Power Service Use Charge: Electric power consumed during construction from the Owner's existing system is to be used without metering and without payment of use charges.

1.03 REQUIREMENTS OF REGULATORY AGENCIES

- A. Provide and maintain all temporary facilities in compliance with governing rules, regulations, codes, ordinances and laws of agencies and utility companies having jurisdiction over work involved in project.
- B. Be responsible for all temporary work provided, and obtain any necessary permits and inspections for such work.
- C. Contractors shall confine equipment, storage of materials, and operation of workmen to the limits indicated or directed and shall abide by law, ordinances,

conditions stated in permits and directions of the Architect.

- D. Do not interfere with normal use of roads in vicinity of project site except as indicated or as absolutely necessary to execute required work, and then only after proper arrangements have been made with authorities having jurisdiction, including traffic control as applicable.

1.04 SPECIAL PRECAUTIONS AND REQUIREMENTS

- A. Do not interfere with normal use of occupied areas in existing buildings, existing driveway access to existing building and existing building utility services, except as absolutely necessary to execute required work involving such facilities, and then only after proper arrangements have been made through the Owner with persons in charge of existing facilities.
- B. Do not block required exits from existing buildings.

1.05 TEMPORARY FIELD OFFICES, TRAILERS AND TELEPHONE

- A. General: Provide and maintain clean field office area for his use, his Subcontractor's Agents and the Architect, at which location he/she or his/her authorized agent shall be present, or to which either may be readily called at all times while the work is in progress. Located where directed by the Architect.
- B. Copies of permits, approved shop drawings, plans and specifications marked up-to-date with all revisions and all addenda shall be kept at said offices areas ready for use at all times.
- C. All expenses in connection with Contractor's field offices, including the installation cost and use of telephones, shall be borne by the Contractor.
- D. Maintain field office areas until final acceptance and then remove, unless the Architect orders or approves earlier removal.
- E. Pay all costs, including utility installation costs to the field office.
- F. Provide and maintain such additional storage trailers on the project as required. Located where directed by the Architect.
- G. Contractor may be required to relocate their offices, as directed by Architect, during construction as work progresses.

1.06 TEMPORARY SANITARY FACILITIES

- A. Provide temporary portable toilets, acceptable to public health authorities, as required to service the project. Maintain in a clean, sanitary condition. Locate as directed by Architect.

1.07 TEMPORARY LIGHT AND POWER

- A. Provide necessary temporary electrical service and temporary wiring and outlets as required to meet project needs for temporary lighting and power at the start of the project, as work progresses and until acceptance by the Owner, excluding power to individual contractor's trailers.

1.08 CONSTRUCTION AIDS

- A. Shoring and Bracing: Provide all shoring and bracing required for safety and proper execution of their work. Remove these items when the work is completed.

1.09 WATCHMAN SERVICE

- A. If Contractor considers watchman services necessary or desirable for protection of his/her own interest, such services may be employed at his/her own complete expense.

1.10 SAFETY

- A. Safety requirements shall be in accordance with the General Conditions.
- B. Provide and maintain guard lights at all barricades, railings, obstructions in the roadways or sidewalks and at all trenches or pits adjacent to walks or roadways.
- C. Strict attention and full adherence must be given the Williams-Steiger Occupational Safety and Health Act of 1970, U.S. Department of Labor.

1.11 SECURITY CONDITIONS

- A. Security of building must be maintained during "non-standard" working hours (premium time). This includes, but is not necessarily limited to, verifying all entrance doors and windows are secured.
- B. Contractor shall be responsible for all infractions of rules and regulations by his workers.
- C. Loitering or wandering through not connected with the project or into other buildings on site will not be permitted.

1.12 DUST CONTROL

- A. Control dust originating within project limits using water or a dust palliative acceptable to the Architect. When conditions create blowing dust and dirt that is considered higher than that normally encountered, Contractor shall cooperate with Architect in determining methods to help minimize blowing. This may involve, as a minimum, more frequent applications of dust palliative. Calcium chloride may not be used.

1.13 PARKING

- A. Employees of Contractors and subcontractors must park vehicles in areas assigned to them. Parking on streets or in restricted areas is prohibited.

END OF SECTION

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

- A. Requirements of this Section apply to the Work of all other Sections.
- B. Section Includes:
 - 1. Transportation and Handling.
 - 2. Storage and Protection.
 - 3. Standards.
 - 4. Manufacturers and Types.
 - 5. Fabrications.
 - 6. Shop Priming.
 - 7. Prohibited Materials and Methods.

1.02 RELATED SECTIONS

- A. Quality Requirements: Section 01 40 00.
- B. Cutting and Patching: Section 01 73 29.
- C. Shop Drawings, Product Data and Samples: Section 01 33 23.
- D. Execution Requirements: Section 01 73 00.

1.03 STANDARDS

- A. Standards, codes and regulations published by Manufacturer's Associations, governmental agencies and other regulatory authorities form a part of these Specifications as minimum requirements. Such references include the latest issue and all amendments up to 30 days prior to the Bid Date.
- B. "Governing Authority" means all federal, state and local laws and regulations.
- C. Where differences occur between the Contract Documents and such standards, the most restrictive requirement shall apply.
- D. Supply all materials and perform all work in accordance with the Manufacturer's Specifications and installation procedures, and in conformance with published trade and manufacturer's association standards, unless specifically noted otherwise herein.

1.04 TRANSPORTATION AND HANDLING

- A. Arrange deliveries of products in accordance with construction schedules and installation, coordinate to avoid conflict with work and conditions at the site.
 - 1. Transport products by methods to avoid product damage.
 - 2. Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.
 - 3. Immediately on delivery, inspect shipments to assure compliance with requirements of Contract Documents and accepted submittals, and that products are properly protected and undamaged.
- B. Provide equipment and personnel to handle products by methods to prevent soiling or damage.

1.05 DELIVERY, HANDLING, STORAGE AND PROTECTION

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling
 - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected. Reject damaged and defective items.
- B. Storage products in accordance with manufacturer's instructions.
 - 1. Store products with seals and labels intact and legible.
 - 2. Store products to allow for inspection and measurement of quantity or counting of units.
 - 3. Store products subject to damage by the elements in weathertight enclosures.
 - 4. Maintain temperature and humidity within the ranges required by manufacturer's instructions.
 - 5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.

C. Exterior Storage

1. Store fabricated products above the ground, on blocking or skids, to prevent soiling or staining. Cover products which are subject to deterioration with impervious coverings. Provide adequate ventilation to avoid condensation.

D. Arrange storage in a manner to provide access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage.

E. Protection After Installation: Provide coverings as necessary to protect installed products from damage from traffic and subsequent construction operations. Remove when no longer needed.

PART 2 PRODUCTS

2.01 GENERAL PRODUCT REQUIREMENTS

A. Products include materials, equipment and systems.

B. Products incorporated into the work:

1. Comply with specifications and referenced standards as minimum requirements.
2. Undamaged.
2. Manufactured and fabricated products:
 - a. Design, fabricate and assemble in accordance with the best engineering and shop practices.
 - b. Manufacture like parts of duplicate units to standard sizes and gages, to be interchangeable.
 - c. Two or more items of the same kind shall be identical, by the same manufacturer.
 - d. Products shall be suitable for service conditions.
 - e. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing by the Architect.
4. Do not use material or equipment for any purpose other than that for which it is designed or is specified.
5. New and unused at time of installation, except as otherwise indicated.
6. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
7. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.

2.02 MANUFACTURER AND PRODUCT SELECTION PROCEDURES

- A. Specified Product: Where specifications name a single manufacturer and product or refer to a single manufacturer and product indicated on the drawings, provide the named product. Comparable products or substitutions for Contractor's convenience will not be considered.
- B. Specified Manufacturer: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
- C. Multiple Specified Products: Where more than one manufacturer and specific product is listed, provide one of the products named. No substitutions will be permitted after signing the contract. Comparable products or substitutions for Contractor's convenience will not be considered
- D. Multiple Manufacturers: Where specifications include a list of manufacturers names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
- E. Basis of Design: Where specifications name a Basis of Design or refer to a Basis of Design product indicated on the drawings, the design is based on the product listed. Subject to compliance with requirements, provide the specified product or a product manufactured by one of the other manufacturers listed.
 - 1. The characteristics of the Basis-of-Design Product establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.
 - 2. Equipment or materials from these manufacturers will be acceptable contingent upon their meeting the design, appearance and functional standards established by the specified items. If equipment or a material of an acceptable manufacturer requires changes; electrically, mechanically, structurally, from what is indicated on the drawings, it shall be the responsibility of the Contractor requiring such change, to pay all costs involved with no additional costs to the Owner.
 - 3. Submit evaluations as follows:
 - a. Submit proposed comparable products for evaluation by the Architect at least two weeks prior to awarding contract to the manufacturer of a comparable product.
 - b. Obtain samples of Basis-of-Design product.
 - c. Select comparable products that comply with the characteristics specified. Submit evidence demonstrating compliance.
 - d. Submit samples of comparable products displayed side-by-side with samples of Basis-of-Design products.

Architect will determine whether the proposed comparable product is acceptable. Architect is not obligated to prove non-equivalence of proposed comparable products.

- F. Where a performance is specified and no manufacturer is listed, submit through the Shop Drawing procedure the name of the manufacturer, the product proposed, and detailed information showing its characteristics. Such proposal shall meet or exceed the specification, line item by line item, or be rejected.
- G. Equivalent components (articles, devices, materials, forms of construction, fixtures, etc.) may be submitted to the Architect for approval prior to bidding regardless of listed manufacturers.
- H. Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.03 FABRICATION

- A. Fabricate all items in the shop insofar as practicable. Where items cannot be completely shop fabricated and assembled for shipment, assemble and fit in shop, disassemble and ship. Identify parts for field assembly.
- B. Fabricate items to be straight, square, in proper alignment, and with hairline joints where joints are necessary and permitted. Pre-plan field joints to be as inconspicuous as possible; coordinate locations with Architect.

2.04 SHOP PRIMING

- A. Shop prime or seal surfaces of all products to receive paint materials in accordance with the requirements of Section 09 91 00.
- B. Apply a primer or sealer compatible with the specified paint materials.
- C. In the event such a primer is determined to be incompatible with the specified finish paint system, provide a barrier coat or remove the primer and reprime as directed, at no additional cost to the Owner.

2.05 PROHIBITED MATERIALS AND METHODS

- A. The following items are expressly prohibited:
 - 1. Attachment Related Items
 - a. Powder Fasteners: Powder fasteners are defined as anchors which are driven into place by any device which produces an impact force by use of a powder charge, compressed air, gas or any other propellant. Powder fasteners are prohibited.
 - b. Plug anchorage by use of wood, lead or plastic.

- c. Perforated steel strap iron for pipe or other support or anchorage.
- d. Suspension systems that are not independently supported.
 - 1) Ceiling grid systems shall not be supported from ductwork, electrical conduit, heating or plumbing lines, and vice versa.
 - 2) Each utility system and the ceiling system shall be a separate installation, each independently supported from the building structure.
 - 3) Where interference occurs, provide trapeze type hangers or other suitable supports for each system.
 - 4) Locate hangers and supports where they will not interfere with access to mixing boxes, fire dampers, valves, and other appurtenances requiring servicing.
- 2. Methods Related Items
 - a. The penetration of floors and walls by pipes, ducts, or other penetrations unless openings are appropriately fire stopped by fire doors or fire dampers, and voids around pipes, ducts, conduits, etc. are sealed with fireproof materials.
 - b. The use of ink marking pens on surfaces of any kind of materials receiving paint or other finish in exposed location.
- 3. Materials Related Items
 - a. Asbestos or asbestos containing materials.
 - b. Barbed wire in construction fencing.
 - c. Water soluble treatment of insulation jackets or facings, to impede or retard smoke or flames.

PART 3 EXECUTION

Not Applicable

END OF SECTION

SECTION 01 73 00

EXECUTION REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

- A. Requirements of this Section apply to the Work of all other Sections.
- B. Section Includes:
 - 1. Examination of Substrate.
 - 2. Preparation.
 - 3. Installation.
 - 4. Workmanship.
 - 5. Protection.
 - 6. Overhead Attachments.
 - 7. Prohibited Methods.

1.02 RELATED SECTIONS

- A. Quality Control: Section 01 45 00.
- B. Cutting and Patching: Section 01 73 29.
- C. Shop Drawings, Product Data and Samples: Section 01 33 23.
- D. Product Requirements: Section 01 60 00.

1.03 STANDARDS

- A. Standards, codes and regulations published by Manufacturer's Associations, governmental agencies and other regulatory authorities form a part of these Specifications as minimum requirements. Such references include the latest issue and all amendments up to 30 days prior to the Bid Date.
- B. "Governing Authority" means all federal, state and local laws and regulations.
- C. Where differences occur between the Contract Documents and such standards, the most restrictive requirement shall apply.
- D. Supply all materials and perform all work in accordance with the Manufacturer's Specifications and installation procedures, and in conformance with published trade and manufacturer's association standards, unless specifically noted otherwise herein.

1.05 NON-CONFORMING WORK

- A. Faulty work or work not in conformance with the Contract Documents will not be permitted by the Architect.
 - 1. It is the responsibility of the Contractor to propose a remedy by means of detailed drawings and written documentation and submit such documentation to the Architect for comments.
 - 2. All costs for the removal and reconstruction of such work, as well as additional services of the Architect, shall be paid for by the Contractor.

PART 2 PRODUCTS - NOT APPLICABLE

PART 3 EXECUTION

3.01 EXAMINATION OF SUBSTRATE

- A. Examine the substrates or structure to which a product is to be applied or installed. Do not proceed until unsatisfactory conditions have been corrected. Starting the work indicates acceptance of conditions and the installer assumes full responsibility for results.
- B. Check the substrate or structure for proper tolerances and clearances. Tolerances are listed under individual specification Sections.

3.02 PREPARATION

- A. Substrate: Where the products are applied to a substrate, prepare the substrate as recommended by the product manufacturer. That generally includes the following:
 - 1. Bringing substrate to a uniform surface by smoothing uneven surfaces and filling holes, cracks and depressions with recommended filler or compatible type material.
 - 2. Depressed Slabs: Bring to required elevation to receive finished materials where finished materials cannot completely fill depression. Use approved cementitious filler or compatible type material. Coordinate depressed slab locations with finish material locations.
 - 3. Remove substances such as dust, oils and other foreign matter, not compatible with the product.
 - 4. Surfaces shall be dry, unless moisture content or wetting requirement is specified or recommended.
- B. Concrete Slabs: Provide steel shot abrasive cleaning of concrete slabs receiving designated finish flooring materials.
 - 1. Designated Finish Flooring Materials
 - a. Cementitious or cementitious set materials.

- b. Sheet flooring materials.
 - c. Waterproofing materials.
 - d. Paint materials.
 - e. Polymer or epoxy type seamless flooring.
2. Equipment: Electric powered portable unit with self-contained dust collection system. Size(s) of unit(s) and shot media suitable for conditions and proposed finish materials. WHEELABRATOR CORP. "Blastrac" or similar type system by SASE COMPANY INC., BW MANUFACTURING or INNOVATECH.
3. Cleaning: Remove concrete surfaces to sufficient depth to remove bond breakers and contaminants such as curing compounds, oils, and other foreign matter which may be detrimental to the completed flooring installation.
 - a. Work smoothly and evenly over entire surface; avoid creating dips, ridges, or other imperfections which would show or telegraph in the completed installation.
 - b. Small transitions for different flooring materials may be obtained by multiple passes if carefully executed to create smooth even slope of not more than 1/8" in 2 feet.
4. Clean floor as near as possible to flooring installation to avoid contamination from work of other trades. Protect clean floor from soiling with suitable sheet materials. Reclean soiled areas.

C. Inserts and Anchorages

1. Anchorages where not detailed are the responsibility of the installer to design a suitable connection, structurally sound, and aesthetically acceptable to the Architect. Furnish calculations, drawings and product data when requested by the Architect. Such information may or may not be returned as indicated in Section 01 33 23.
2. It is the responsibility of the installer to furnish built-in fastening devices for his/her product to the proper trade for installation as the work proceeds.
3. In the event such devices are not furnished in time to be built-in, it is the installer's responsibility to provide other methods for attaching their product. Submit drawings and other required data to the Architect.

D. Templates: Provide templates, diagrams and other coordinating documents to the proper Contractor, manufacturer or supplier of related items affecting the Work.

E. Dimensions

1. If the exact location of an item is not indicated by dimension on the Drawings or noted in the Specifications, the Architect reserves the right to determine such location in the field prior to roughing-in.
2. If the exact dimensions of a product are not indicated, the Architect reserves the right to determine dimensions prior to the ordering or fabrication of a product.
3. Such dimensional changes shall not be a basis for changes in the Contract Sum.

4. Where miscellaneous devices, such as thermostats, switches, controls, grilles, pipes, or outlets of any nature are not specifically located by the Contract Documents, request such location or obtain approval of the location prior to installation. If approval has not been obtained, the Architect may direct the relocation of such devices at the expense of the installer.

3.03 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 1. Make vertical work plumb and make horizontal work level.
 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
 - a. Where pipes occur in partitions, furred-out spaces and chases, determine exact location and size and fit entirely concealed into allotted space. Report conflicts to Architect prior to installation.
 - b. Where two or more pipes are to be installed in parallel, or parallel to the piping of other trades, the piping shall be installed with sufficient space between the pipes to allow for the proper application of pipe covering, painting, and servicing.
 - c. Furnish advance information on locations and sizes of frames, boxes, sleeves and openings needed for the Work to installers.
 4. Install work to allow for installation of future work identified on drawings.
 5. Maintain minimum headroom clearance of 8 feet in spaces without a suspended ceiling.
- B. Install products in accordance with manufacturer's recommendations or the requirements of trade associations, listed standards, Shop Drawings and Contract Documents.
- C. If a conflict exists between these references, the most strict requirements govern. If printed instructions are not available, consult with the manufacturer or the manufacturer's field representative, where applicable.
- D. Provide hangers, auxiliary framing, and other means for installing ceiling suspension systems, lighting fixtures, diffusers, and other equipment in ceilings to avoid ductwork, piping, etc.
 1. Suspend from structural members (i.e. joists, beams, etc.), and not from ductwork or piping.
 2. Provide supplemental framing members (i.e. angles, tubes, light gage steel framing, etc.) to span between structural members where required to support items of this paragraph C.
- E. Install work that will not interfere with the proper installation of the Work of other

trades.

- F. Install work in a manner to facilitate operating, servicing and repairing.
- G. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.
- H. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Architect for final decision.

3.04 SPACE PREFERENCE

- A. Carefully check and coordinate the location and level of all Work to avoid conflicts between all contractors. Where conflicts occur, the following preferences shall generally govern:
 - 1. Recessed electrical light fixtures
 - 2. High and medium pressure ductwork
 - 3. Low pressure ductwork
 - 4. Soil, waste, vent and storm piping
 - 5. Sprinkler piping
 - 6. Liquid heat transfer and refrigerant piping
 - 7. Domestic water piping
 - 8. Electrical conduits from branch circuits
- B. However, no ductwork or liquid heat transfer main shall have preference over plumbing piping below plumbing fixtures, nor over electrical conduits above or below electrical switchgear and panels. No piping conveying liquids shall be installed directly over electrical or elevator equipment. No piping shall be installed in electrical or elevator equipment rooms.
- C. Where headroom or space conditions resulting from application of these preferences appear inadequate, notify the Architect prior to installing the Work.
- D. Coordinate the mounting heights of busways, electrical equipment and raceways to clear the opening heights of doors, the height of vehicles and the heights of equipment which needs to be routinely removed, and out of paths required for maintenance.

3.05 WORKMANSHIP

- A. Install products straight, plumb, level and in line. Securely attach items to the substrate, using recommended adhesives, mechanical fasteners or other devices. Where holes are provided for attachment, do not field drill or cut new holes without the approval of the Architect.

- B. Where applicable, match finished work to the approved samples or mock-ups.
- C. Conceal fasteners wherever possible, unless exposed fasteners are permitted or specified.
- D. Weld in accordance with AWS standards; comply with AWS for qualifications of operators and for workmanship.
- E. Visual Effects: Provide uniform joint widths in exposed work. Arrange joints in exposed work to obtain the best visual effect. Refer questionable choices to the Architect for final decision.
- F. Recheck measurements and dimensions, before starting each installation.

3.06 PROTECTION

- A. Protect finished surfaces of product being installed and surrounding products from damage during installation. Provide protective devices as required and as recommended by the manufacturer. Cover work subject to damage at the end of each day's work.
- B. Coat concealed surfaces of metal products with a bituminous or other approved coating to prevent contact between dissimilar metals or other material which can cause deterioration.
- C. Correct damage by repairing or replacing as directed by the Architect. Repairing will be permitted only where the repair is undetectable and does not cause structural damage or interfere with proper functioning of the part.
- D. Protect finish of installed products until Substantial Completion of the Project by use of wrappings, covers or other approved protective devices. Remove such protection immediately prior to final cleaning.
- E. Limiting Exposures: Coordinate and supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Maintain exposures within the manufacturers recommended limits. Where applicable, such exposures include, but are not limited to, the following:
 - 1. Excessive static or dynamic loading
 - 2. Excessive internal or external pressure
 - 3. Excessive high or low temperatures
 - 4. Thermal shock
 - 5. Excessively high or low humidity
 - 6. Air contamination or pollution
 - 7. Water or ice
 - 8. Solvents
 - 9. Chemicals
 - 10. Light

11. Radiation
12. Puncture
13. Abrasion
14. Heavy traffic
15. Soiling, staining and corrosion
16. Bacteria
17. Rodent and insect infestation
18. Combustion
19. Electrical current
20. High speed operation
21. Improper lubrication
22. Unusual wear or other misuse
23. Contact between incompatible materials
24. Destructive testing
25. Misalignment
26. Excessive weathering
27. Unprotected storage
28. Improper shipping
29. Theft
30. Vandalism

- F. Take precautions to protect existing concrete and asphalt pavement from damage due to vehicle loads, parking, and storage.
1. Schedule loading to minimize pavement material consolidation during hot weather. Distribute wheel loads to the greatest extent possible.

3.07 OVERHEAD ATTACHMENTS

- A. Where overhead hangers are required, and not indicated on the drawings, provide one or more of the following as required:
1. Concrete inserts prior to placement of concrete or drilled type inserts after concrete is placed.
 2. Trapeze from adjacent structure with suitable steel framing.
 3. Connections to Structure: Suitable anchorage devices with a minimum load carrying capacity of 250 pounds plus safety factor of 4:1 for the applied load.
 - a. Concrete: Steel expansion anchors. See Prohibited Material and Methods specified in Section 01 60 00.
 - b. Steel: Bolted or welded connections to steel structure.
- B. Where metal deck is furnished with hanger tabs or similar devices, applied total load, including work of other trades, not to exceed 75 pounds for each device. Loads in excess of permitted limit to be supported by trapeze framing as specified above.
- C. Verify support requirements of heavy or unusual loads not specifically shown on drawings with Architect.

3.08 OPERATION AND MAINTENANCE

- A. Contractor shall maintain all systems and equipment operated during construction. The contractor responsible for the installation of the system shall operate and maintain it. Make all repairs and perform all maintenance to assure Work is turned-over to Owner in first class condition.
- B. Maintenance work includes:
 - 1. Lubrication
 - 2. Adjustments
 - 3. Filter replacements
 - 4. Chemical treatment.

END OF SECTION

SECTION 01 73 29

CUTTING AND PATCHING

PART 1 GENERAL

1.01 DESCRIPTION

- A. Execute cutting, fitting or patching of Work, required to:
 - 1. Make several parts fit properly.
 - 2. Uncover Work to provide for installation of ill-timed Work.
 - 3. Remove and replace defective Work.
 - 4. Remove and replace Work not conforming to requirements of Contract Documents.
 - 5. Remove samples of installed Work as specified for testing.
 - 6. Install specified Work in existing construction.
- B. In addition to contract requirements, upon written instructions of Architect:
 - 1. Uncover Work to provide for Architect's observation of covered Work.
 - 2. Remove samples of installed materials for testing.
 - 3. Remove Work to provide for alteration of existing Work.
- C. Do not endanger any Work by cutting or altering Work or any part of it.
- D. Do not cut or alter Work of another Contractor without written consent of Architect.

1.02 SUBMITTALS

- A. Prior to cutting which affects structural safety of Project, submit written notice to Architect, requesting consent to proceed with cutting, including:
 - 1. Identification of Project.
 - 2. Description of Affected Work.
 - 3. Necessity for cutting.
 - 4. Affect on other Work, on structural integrity of Project.
 - 5. Description of proposed Work. Designate:
 - a. Scope of cutting and patching.
 - b. Contractor and trades to execute work.
 - c. Products proposed to be used.
 - d. Extent of refinishing.
 - 6. Alternative to cutting and patching.
- B. Should conditions of Work, or schedule indicate change of materials or methods, submit written recommendation to Architect, including:

1. Conditions indicating change.
 2. Recommendations for alternative materials or methods.
 3. Submittals as required for Substitutions.
- C. Submit written notice to Architect, designating time Work will be uncovered, to provide observation.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Patching of materials and surfaces shall be in accordance with the requirements of the Contract Documents. Where not otherwise defined, patching shall match adjacent surfaces and proper materials shall be provided accordingly.

PART 3 EXECUTION

3.01 INSPECTION

- A. Inspect existing conditions of Work, including elements subject to movement or damage during cutting and patching.
- B. After uncovering Work, inspect conditions affecting installation of new products.

3.02 PREPARATION PRIOR TO CUTTING

- A. Provide shoring, bracing and support as required to maintain structural integrity of Project.
- B. Provide protection for other portions of the Project, including all Contractors' personnel.

3.03 PERFORMANCE

- A. Execute fitting and adjustment of products to provide finished installation to comply with specified tolerances, finishes.
- B. Execute cutting and demolition by method which will prevent damage to other Work, and will provide surface to receive installation of repairs and new Work.
1. No cutting shall be performed which will, in any way, reduce the structural strength of the building. Should such cutting be necessary, consult Architect and do not proceed with such operation unless written approval is given.
 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.

- C. Restore Work which has been cut or removed; install new products to provide completed Work in accord with requirements of Contract Documents.
- D. Patching of materials and surfaces shall be in accordance with the requirements of the Contract Documents. Where not otherwise defined, patching shall match existing or adjacent surfaces and proper materials shall be provided accordingly.
 - 1. Wherever existing walls, floors, ceilings, etc., are cut, the exposed surfaces must be neatly finished by patching, painting, wall covering, etc., as required to blend patched areas into adjacent existing surfaces. Patched areas shall not be visible when viewing entire wall surface.
 - a. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - 2. Where painting or finishing of patched surfaces or application of wall or floor covering is required, finish the entire plane of surface in which patched area occurs.
 - 3. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 - 4. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

3.04 SLEEVES AND OPENINGS

- A. Where pipes, conduits, ductwork or other materials pass through new walls, partitions, floors, roof or ceilings, provide suitable sleeves in these elements or provide openings where sleeves are not practical.
- B. Close sleeves and openings to prevent passage of smoke or fire using approved methods and materials to maintain the fire rating of the construction being penetrated. See Section 07 84 00.
 - [1. Unless otherwise indicated, extend floor sleeves 2" above finished floor.]
- C. Where pipes, conduit, ductwork etc., pass through, behind, or above existing construction, provide all cutting, patching, and refinishing for doing this work as specified herein.
- D. Lintels: Provide steel or precast concrete lintels to span openings in masonry walls sized in accordance with schedule shown or as detailed on structural drawings. In general, lintels are not required for openings less than the width of masonry unit in which wall is being constructed. Penetrations under beams or other concentrated loads require approval of Architect.

3.05 CLEANING

- A. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

SECTION 01 74 00

CLEANING

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Refer to General Conditions for additional requirements.
- B. Execute cleaning, during progress of the work and at completion of the work, as required by Contract Documents.

1.02 RELATED SECTIONS

- A. Cutting and Patching: Section 01 73 29.
- B. Cleaning for Specific Products or Work: Specification section for the work.

1.03 CLEANING AND DISPOSAL REQUIREMENTS

- A. Standards: Maintain project in accord with the following safety and insurance standards:
 - 1. Applicable Federal and State Requirements.
 - 2. National Fire Protection Association.
- B. Hazards Control: Each Prime Contractor shall comply with the following requirements:
 - 1. Store volatile wastes in covered metal containers, and remove from premises daily.
 - 2. Prevent accumulation of wastes which create hazardous conditions.
 - 3. Provide adequate ventilation during use of volatile or noxious substances.
- C. 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 project site.
 - 2. Do not dispose of volatile wastes such as mineral spirits, oil or paint thinner in storm or sanitary sewers.
 - 3. Do not dispose of waste into streams or waterways.
 - 4. Wet down dry materials and rubbish to prevent dust.
- D. Clean streets, highways, and private properties of all mud, earth, rubbish, rocks, refuse or other debris of any kind resulting from such work or related transportation to and from the work site.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Select and use cleaning materials and equipment with care to avoid scratching, marring, defacing, staining or discoloring surfaces cleaned.
- B. Use only cleaning materials recommended by manufacturer of surfaces to be cleaned.
 - 1. Use cleaning products that meet Green Seal GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.
- C. Use cleaning materials only on surfaces recommended by the cleaning material manufacturer.

PART 3 EXECUTION

3.01 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
- B. Provide, maintain and empty 55 gallon metal and dumpster type containers for collection of waste materials, debris and rubbish. Locate containers as directed by Architect.
 - 1. Provide containers with adequate capacity to accommodate anticipated needs. If containers do not have adequate capacity, increase intervals of waste removal or capacity of containers until adequate capacity is provided.
- C. At reasonable intervals during progress of Work, but in no case less than once a week, dispose of waste materials, debris and rubbish.
- D. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- E. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

- F. Clean interior surfaces before start of finish painting and continue cleaning on an as-needed basis until painting is finished.
- G. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly-coated surfaces.
- H. Handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights.
- I. Vacuum interior building areas where work is performed prior to painting and other finish work. Continue vacuum cleaning on an as needed basis until building is ready for occupancy.
- J. Protect interior of ductwork during construction from accumulation of dirt, dust or debris.
- K. Clean trash from all chases and concealed spaces before final enclosure.

3.01 PROGRESS CLEANING

- A. Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
- B. General Contractor
 - 1. Provide, maintain and empty 55 gallon metal and dumpster type containers for collection of waste materials, debris and rubbish. Locate containers as directed in General Conditions. These containers will be utilized by all Prime Contractors and their subcontractors.
 - a. Provide containers with adequate capacity to accommodate anticipated needs. If containers do not have adequate capacity, increase intervals of waste removal or capacity of containers until adequate capacity is provided.
 - 2. At reasonable intervals during progress of Work, but in no case less than once a week, dispose of waste materials, debris and rubbish.
 - 3. Direct Special Attention To:
 - a. Provide non-staining layout lines and other markings on masonry and concrete. Use chalk lines wherever possible and remove when no longer needed.
 - b. Remove all stains from concrete surfaces, including floors.
 - c. Shop marks shall not appear on exposed surfaces of any item.
 - d. Remove concrete, mortar and paint spatters.
 - e. Clean both brick and concrete unit masonry.
 - f. Protect aluminum frames during construction and thoroughly clean upon completion of the installation.
 - 4. Clean interior surfaces before start of finish painting and continue cleaning on an as-needed basis until painting is finished.
 - 5. Vacuum interior building areas where work is performed prior to painting

and other finish work. Continue vacuum cleaning on an as needed basis until building is ready for occupancy.

- B. Protect interior of ductwork during construction from accumulation of dirt, dust or debris.

3.02 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

- 1. Leave Project clean and ready for occupancy.

- B. Employ experienced workmen, or professional cleaners for final cleaning.

- C. At the completion of the work, remove all surplus material, false work, temporary structures, including foundations thereof, plants of any description and debris of every nature resulting from their operations and put the site in a neat and orderly condition.

- D. Clean exposed interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition.

- E. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.

- F. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.

- G. Remove grease, dust, dirt, stains, labels, fingerprints and other foreign materials from sight-exposed interior and exterior surfaces, including light fixtures and lenses; polish surfaces so designated to a shine finish.

- 1. Clean finishes free of dust, stains, films and other foreign substances.
 - 2. Clean transparent and glossy materials to a polished condition; remove foreign substances. Polish reflective surfaces to a clear shine.

- H. Remove temporary protection and labels not required to remain

- I. Clean surfaces of equipment; remove excess lubrication.

- J. Remove debris, rubbish, dirt, etc. from open concealed spaces, chases and above ceilings.

- K. Repair, patch and touch-up marred surfaces to specified finish, to match adjacent

surfaces.

- L. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces, and of concealed spaces.
- M. Remove waste, foreign matter, and debris from roofs, gutters, areaways, and drainage systems.
- N. Clean plumbing fixtures to a sanitary condition.
- O. Clean light fixtures and lamps; polish lenses.

3.02 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
 - 1. Leave Project clean and ready for occupancy.
- B. Contractor Requirements
 - 1. Conform to requirements of General Conditions.
 - 2. Employ experienced workmen, or professional cleaners for final cleaning.
 - 3. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces, and of concealed spaces.
 - 4. Clean exposed interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition.
 - 5. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - 6. Sweep concrete floors broom clean in unoccupied spaces.
 - 7. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - 8. Remove grease, dust, dirt, stains, labels, fingerprints and other foreign materials from sight-exposed interior and exterior surfaces, including light fixtures and lenses; polish surfaces so designated to a shine finish.
 - 9. Clean finishes free of dust, stains, films and other foreign substances.
 - 10. Clean transparent and glossy materials to a polished condition; remove foreign substances. Polish reflective surfaces to a clear shine.
 - 11. Remove temporary protection and labels not required to remain
 - 12. Clean surfaces of equipment; remove excess lubrication.
 - 13. Remove debris, rubbish, dirt, etc. from open concealed spaces, chases and above ceilings.
 - 14. Repair, patch and touch-up marred surfaces to specified finish, to match

- adjacent surfaces.
 - 15. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces, and of concealed spaces.
 - 16. Remove waste, foreign matter, and debris from roofs, gutters, areaways, and drainage systems.
 - 17. Clean plumbing fixtures to a sanitary condition.
- C. Prior to Final Completion, or Owner occupancy, Contractor shall conduct an inspection of sight exposed interior and exterior surfaces, and all work areas, to verify that the entire work is clean.

END OF SECTION



2020 ENTERPRISE GREEN COMMUNITIES CRITERIA CHECKLIST

CRITERIA CHECKLIST

This checklist provides an overview of the technical requirements within the Enterprise Green Communities Criteria.

To achieve Enterprise Green Communities Certification, all projects must achieve compliance with the Criteria mandatory measures applicable to that construction type. **New Construction projects must also achieve at least 40 optional points, and Substantial and Moderate Rehab projects must also achieve at least 35 optional points.**

These projects that also comply with Criterion 5.2b or Criterion 5.4 will be recognized with Enterprise Green Communities Certification Plus.

Project:	The Meadows
Address:	4855 Pintail Creek Drive, Columbus, OH
Location Type:	Urban/Suburban
Building Type:	Multifamily Lowrise

Yes	Maybe	1. INTEGRATIVE DESIGN	Notes
☒	☐	M 1.1 Integrative Design: Project Priorities Survey Complete the Project Priorities Survey, which can be found in the Appendix.	
☒	☐	M 1.2 Integrative Design: Charrettes and Coordination Meetings Develop an integrative design process that moves the outputs of the Project Priorities Survey into action through a series of collaborative meetings. Prioritize multi-benefit strategies. Assign responsibility within your design and development teams for accountability.	
☒	☐	M 1.3 Integrative Design: Documentation Include Enterprise Green Communities Criteria information in your contract documents and construction specifications (Division 1 Section 01 81 13 Sustainable Design Requirements) as necessary for the construction team to understand the requirements and how they will be verified. Ensure, and indicate, that the drawings and specifications have been generated to be compliant and meet the certification goals.	
☒	☐	M 1.4 Integrative Design: Construction Management Create, implement, and document your contractor/subcontractor education plan to ensure that all persons working on-site fully understand their role in achieving the project objectives. Include a summary of the Project Priorities Survey (Criterion 1.1), the sustainability goals, and anticipated roles of each party in regards to the performance expected of the project. Attach and reference this training plan to Division 1 Section 01 81 13 Sustainable Design Requirements. Include timeline estimates for performance testing and verification schedules in the overall construction schedule. As relevant, review requirements for Criteria 8.1, 8.2, and 8.3, and begin populating these documents with relevant information from design and construction.	
☐	☐	12 or 15 1.5 Design for Health and Well-Being: Health Action Plan Follow Steps 1-6 of the Health Action Plan framework per the full criterion. <i>[12 points with extra 3 points for Step 7]</i> This includes: 1) Commit to embedding health into the project lifecycle; 2) Partner with a project health professional; 3) Collect and analyze community health data; 4) Engage with community stakeholders to prioritize health data and strategies; 5) Identify strategies to address those health issues; 6) Create an implementation plan; and 7) Create a monitoring plan.	
☐	☐	10 1.6 Resilient Communities: Multi-Hazard Risk/Vulnerability Assessment Conduct a four-part assessment (social, physical, functional, strategy) to identify critical risk factors of your property and implement at least two sets of strategies to enable the project to adapt to, and mitigate, climate related or seismic risks. See full criterion for more guidance.	

		8	1.7 Resilient Communities: Strengthening Cultural Resilience Integrate community and resident participation in the development processes so that the built environment honors cultural identities, resident voices, and community histories. Option 1: Complete a Cultural Resilience Assessment OR Option 2: Convene a Cultural Advisory Group	
0	0		1. INTEGRATIVE DESIGN SUBTOTAL	
Yes	Maybe		2. LOCATION + NEIGHBORHOOD FABRIC	Notes
		M	2.1 Sensitive Site Protection All projects must: 1. Protect floodplain functions (e.g., storage, habitat, water quality) by limiting new development within the 100-year floodplain of all types of watercourses. 2. Conserve and protect aquatic ecosystems, including wetlands and deepwater habitats, that provide critical ecosystem functions for fish, other wildlife, and people. 3. Protect ecosystem function by avoiding the development of areas that contain habitat for plant and animal species identified as threatened or endangered. 4. Conserve the most productive agricultural soils by protecting prime farmland, unique farmland, and farmland of statewide or local importance. If your site contains any of these ecologically sensitive features, follow the specific Requirements under that subheading.	
		M	2.2 Connections to Existing Development and Infrastructure <i>(Mandatory for New Construction projects that do not qualify as Rural/Tribal/Small Town)</i> Locate the project on a site with access to existing roads, water, sewers, and other infrastructure and within or contiguous to (having at least 25% of the perimeter bordering) existing development. Connect the project to the existing pedestrian network. For sites over 5 acres, provide connections to the adjacent street network at least every 800 feet. Tie all planned bike paths to existing bike paths.	
		M	2.3 Compact Development <i>(Mandatory for New Construction)</i> At a minimum, build to the residential density (dwelling units/acre) of the census block group where the project is located. In Rural/Tribal/Small Town locations that do not have zoning requirements: Build to a minimum net density of 5 units per acre for single-family houses; 10 units per acre for multifamily buildings, single and two-story; and 15 units per acre for multifamily buildings greater than two-stories.	
		5 or 7	2.4 Increased Compact Development Exceed the residential density (dwelling units/acre) of the census block group in which your project is located. Exceed by 2x for [5 points] ; exceed by 3x for [7 points] . In Rural/Tribal/Small Towns that do not have zoning requirements, build to a minimum net density of 7.5 units per acre for single-family houses; 12 units per acre for multifamily buildings, single and two-story; and 20 units per acre for multifamily buildings greater than two stories. [5 points]	
		M	2.5 Proximity to Services and Community Resources <i>(Mandatory for New Construction)</i> Locate the project within a 0.5-mile walk distance of at least four, or a 1-mile walk distance of at least seven, of the listed services. For projects that qualify as Rural/Tribal/Small Town, locate the project within 5 miles of at least four of the listed services.	

N/A	M	2.6 Preservation of and Access to Open Space for Rural/Tribal/Small Town <i>(Mandatory for New Construction Rural/Tribal/Small Town)</i> Option 1: Locate the project within a 0.25-mile walk distance of dedicated public open space that is a minimum of 0.75 acres; at least 80% of which unpaved. OR Option 2: Set aside a minimum of 10% (minimum of 0.25 acres) of the total project acreage as open and accessible to all residents; at least 80% of which unpaved.	
4	6 max	2.7 Preservation of and Access to Open Space Option 1: Locate the project within a 0.25-mile walk distance of dedicated open space that is a minimum of 0.75 acres; at least 80% of which unpaved. <i>[4 points]</i> OR Option 2: Set aside a percentage of permanent open space for use by all residents; at least 80% of which unpaved. 25% <i>[2 points]</i> ; 35% <i>[4 points]</i> ; 45% + written statement of preservation/conservation policy <i>[6 points]</i> .	Option 2
N/A	M	2.8 Access to Transit <i>(Mandatory for New Construction projects that do not qualify as Rural/Tribal/Small Town; Optional for all other project types)</i> Mandatory: New Construction, not Rural/Tribal/Small Town Locate projects within a 0.5-mile walk distance of transit services (bus, rail and/or ferry), constituting at least 45 or more transit rides per weekday, with some type of weekend service. Optional: New Construction, not Rural/Tribal/Small Town Locate the project along dedicated bike trails or lanes (Class I, II, or IV) that lead to high-quality transit services (100 trips per day) within 3 miles. <i>[2 points]</i> Optional: Rehabilitation, not Rural/Tribal/Small Town Locate projects within a 0.5-mile walk distance of public transit services (bus, rail and/or ferry), constituting at least 45 or more transit rides per weekday, with some type of weekend service. <i>[6 points]</i> Locate the project along dedicated bike trails or lanes (Class I, II, or IV) that lead to high-quality transit services (100 trips per day) within 3 miles. <i>[2 points]</i> Optional: New Construction and Rehabilitation, Rural/Tribal/Small Town Locate the project within 0.5 mile walk distance of public transit services with at least 45 rides per weekday and some weekend service. OR, Install at least two charging stations for electric vehicles. OR, Locate the project with 5 miles of one of the following transit options: 1) vehicle share program; 2) dial-a-ride program; 3) employer vanpool; 4) park-and-ride; 5) public/private regional transportation.	
	2-8	2.9 Improving Connectivity to the Community Improve access to community amenities through at least one of the options incentivizing biking mobility or improving access to transit.	
	5 max	2.10 Passive Solar Heating/Cooling Design and build with passive solar design, orientation, and shading that meet the guidelines specified.	
	6	2.11 Adaptive Reuse of Buildings Rehabilitate and adapt an existing structure that was not previously used as housing. Design the project to adapt, renovate, or reuse at least 50% of the existing structure and envelope.	
	6	2.12 Access to Fresh, Local Foods Provide residents and staff with access to fresh, local foods through one of the following options: Option 1: Neighborhood Farms and Gardens Option 2: Community-Supported Agriculture Option 3: Proximity to Farmers Market	

8		8	2.13 Advanced Certification: Site Planning, Design and Management Locate building(s) within a community that is certified in LEED for Neighborhood Development, LEED for Cities and Communities, Living Community Challenge, or SITES.	
2		6 max	2.14 Local Economic Development and Community Wealth Creation Demonstrate that local preference for construction employment and subcontractor hiring was part of your bidding process, and how it functioned during construction. <i>[2 points]</i> OR Demonstrate that you achieved at least 20% local employment. <i>[3 points]</i> OR Provide physical space for small business, nonprofits, and/or skills and workforce education. <i>[3 points]</i>	
N/A		M	2.15a Access to Broadband: Broadband Ready <i>(Mandatory for New Construction and Substantial Rehab Projects in Rural/Tribal/Small Town Locations)</i> Incorporate broadband infrastructure so that when broadband service comes to a community, the property can be easily connected. Include a network of mini-ducts or conduit throughout the building, extending from the expected communications access point to each network termination point in the building.	
	6	6	2.15b Access to Broadband: Connectivity Ensure all units and common spaces in the property have broadband internet access with at least a speed of 25/3 mbs.	
14	6		2. LOCATION + NEIGHBORHOOD FABRIC SUBTOTAL	
Yes	Maybe		3. SITE IMPROVEMENT	Notes
Yes		M	3.1 Environmental Remediation Determine whether there are any hazardous materials present on the site through one of the four methods listed. Mitigate any contaminants found.	
Yes		M	3.2 Minimization of Disturbance during Staging and Construction For sites >1 acre, implement EPA's National Pollutant Discharge Elimination System Stormwater Discharges from Construction Activities guidance, or local requirements, whichever is more stringent. For sites with an area <= 1, follow guidance in full criterion.	
Yes		M	3.3 Ecosystem Services/Landscape <i>(Mandatory, if providing landscaping)</i> If providing plantings, all must be native or climate-appropriate (adapted) to the region and appropriate to the site's soil and microclimate. Do not introduce any invasive plant species. Plant, seed, or xeriscape all disturbed areas.	
N/A		M	3.4 Surface Stormwater Management <i>(Mandatory for New Construction; Mandatory for Substantial and Moderate Rehab projects if land disturbed is >= 5,000 sq.ft.)</i> Treat or retain on-site precipitation equivalent to the 60th percentile precipitation event. Where not feasible due to geotechnical issues, soil conditions, or the size of the site, treat or retain the maximum volume possible.	
		10 max	3.5 Surface Stormwater Management Through on-site infiltration, evapotranspiration, and rainwater harvesting, retain precipitation volume from 70% precipitation event <i>[6 points]</i> , 80% precipitation event <i>[8 points]</i> , or 90% precipitation event <i>[10 points]</i> .	

N/A		M	3.6 Efficient Irrigation and Water Reuse (Mandatory, if permanent irrigation is utilized) If irrigation is utilized, install an efficient irrigation system per the requirements listed.	
		4 or 6	3.7 Efficient Irrigation and Water Reuse (Optional, if irrigation is utilized) Meet the requirements of Criterion 3.6 AND: Option 1: Install an efficient irrigation system equipped with a WaterSense labeled weather-based irrigation controller (WBIC) OR Option 2: At least 50% of the site's irrigation satisfied by water use from the sources listed.	
0	0	3. SITE IMPROVEMENT SUBTOTAL		
Yes Maybe		4. WATER		Notes
Yes		M	4.1 Water-Conserving Fixtures Reduce total indoor water consumption by at least 20% compared to baseline indoor water consumption chart. Any new toilet, showerhead, and/or lavatory faucet must be WaterSense certified. For all single-family homes and all dwelling units in buildings three stories or fewer, the supply pressure may not exceed 60 psi.	Proposed flow rates: Toilets: 1.28 gpf Showerheads: 1.75 gpm Kitchen faucets: 1.5 gpm Lav faucets: 1.2 gpm
3		6 max	4.2 Advanced Water Conservation Reduce total indoor water consumption by at least 30% compared to baseline indoor water consumption chart. Any new toilet, showerhead, and/or lavatory faucet must be WaterSense certified.	
N/A		M, 3 M 8	4.3 Water Quality Mandatory/Optional: Mandatory for Substantial Rehabs of buildings built before 1986; Optional for all other building types: Replace lead service lines [3 points] Mandatory: For multifamily buildings with either a cooling tower, a centralized hot water system, or 10+ stories: Develop a Legionella water management program Optional: Test and remediate as indicated for lead, nitrates, arsenic, and coliform bacteria	
		4	4.4 Monitoring Water Consumption and Leaks Conduct pressure-loss tests and visual inspections to determine if there are leaks; fix leaks. AND Install an advanced water monitoring and leak detection system capable of identifying and shutting water off during anomalous water events. OR Install a device to separately monitor water consumption of each cold branch off the apartment line riser for each dwelling unit or each cold water riser and the domestic hot water cold water feed for each building or each toilet that allows remote monitor readings; common laundry facilities; boiler makeup water; outdoor water consumption; and water consumption in any non-residential space.	
		4	4.5 Efficient Plumbing Layout and Design Store no more than 0.5 gallon of water in any piping/manifold between the fixture and the water heating source or recirculation line. No more than 0.6 gallon of water shall be collected from the fixture before a 10-degree Fahrenheit rise in temperature is observed. Recirculation systems must be demand-initiated.	

☐	☐	6 max	4.6 Non-Potable Water Reuse Harvest, treat, and reuse rainwater and/or greywater to meet a portion of the project's non-potable water needs: 10% reuse [3 points]; 20% reuse [4 points]; 30% reuse [5 points]; 40% reuse [6 points].	
☐	☐	8	4.7 Access to Potable Water During Emergencies Provide residents with ready access to potable water in the event of an emergency that disrupts normal access to potable water, including disruptions related to power outages that prevent pumping water to upper floors of multifamily buildings or pumping of water from on-site wells, per one of the three options listed.	
3	0		4. WATER SUBTOTAL	
Yes	Maybe		5. OPERATING ENERGY	Notes
N/A		M	5.1a Building Performance Standard <i>(Mandatory for New Construction)</i> Certify all buildings with residential units in the project through either ENERGY STAR Multifamily New Construction, ENERGY STAR Manufactured Homes, and/or ENERGY STAR Certified Homes as relevant. AND Provide projected operating energy use intensity and projected operating building emissions intensity.	
Yes		M	5.1b Building Performance Standard <i>(Mandatory for Rehab)</i> Provide projected operating energy use intensity and projected operating building emissions intensity. AND Conduct commissioning for compartmentalization, insulation installation, and HVAC systems as indicated. AND one of the following options: - ERI Option: <= HERS 80 for each dwelling unit. Exception for some Rehabs built before 1980. - ASHRAE Option: Energy performance of the completed building equivalent to, or better than, ASHRAE 90.1-2013 using an energy model created by a qualified energy services provider according to Appendix G 90.1-2016.	HERS 80 target
☐	5	12 max	5.2a Moving to Zero Energy: Additional Reductions in Energy Use <i>(Not available for projects using prescriptive path for Criterion 5.1a or for projects following Criterion 5.2b or 5.4.)</i> Projects in CZ 1-4A following this criterion must also comply with Criterion 7.8. Design and construct a building that is projected to be more efficient than what is required by Criteria 5.1a/b. Achieve HERS score of 5 lower than required by 5.1a/b if following ERI path for compliance OR 5% greater efficiency than required if following ASHRAE path for 5.1a/b compliance [5 points]. Additional 1 point for each additional 2-point decrease in HERS score required by Criteria 5.1a/b if following ERI path for compliance OR for 1% greater efficiency if following ASHRAE path for Criteria 5.1a/b, up to a maximum of 12 optional points.	
☐	☐	12-15	5.2b Moving to Zero Energy: Near Zero Certification [Mandatory for Enterprise Green Communities Certification Plus] <i>(Not available for projects following Criterion 5.2a or 5.4.)</i> Projects in CZ 1-4A following this criterion must also comply with Criterion 7.8. Certify the project in a program that requires advanced levels of building envelope performance such as DOE ZERH [12 points] and/or PHI Classic or PHIUS+ [15 points].	

☐	☐	3-6	5.3a Moving to Zero Energy: Photovoltaic/Solar Hot Water Ready <i>(Not available for projects following Criterion 5.3b or 5.4.)</i> Orient, design, engineer, wire, and/or plumb the development through the Photovoltaic Ready pathway or Solar Hot Water Ready Pathway to accommodate installation of photovoltaic (PV) or solar hot water system in the future.	
☐	☐	8 max	5.3b Moving to Zero Energy: Renewable Energy <i>(Not available for projects following Criterion 5.3a or 5.4.)</i> Install renewable energy source to provide a specified percentage of the project's estimated source energy demand. See full criterion for allowable sources.	
		4-8	Option 1: For percentage of total project energy consumption provided by renewable energy. OR	
		1-5	Option 2: For percentage of common area meter energy consumption provided by renewable energy.	
☐	☐	24	5.4 Achieving Zero Energy [Automatic Qualification for Enterprise Green Communities Certification Plus] <i>(Not available for projects following Criterion 5.2a, 5.2b, 5.3a, or 5.3b.)</i> Projects in CZ 1-4A following this criterion must also comply with Criterion 7.8. Achieve Zero Energy performance through one of the following options: Option 1: Certify each building in the project to DOE Zero Energy Ready Home program or PHI Plus AND Either install renewables and/or procure renewable energy, which in sum will produce as much, or more, energy in a given year than the project is modeled to consume. OR Option 2: Certify each building in the project in a program that requires zero energy performance such as PHIUS+ Source Zero, PHI Plus, PHI Premium, ILFI's Zero Energy Petal, Zero Carbon Petal, or Living Building Certification.	
☐	☐	5 max	5.5a Moving to Zero Carbon: All-Electric Ready <i>(Not available for projects following Criterion 5.5b)</i> Ensure the project has adequate electric service and has been designed and wired to allow for a seamless switch to electricity as a fuel source in the future for the following uses: space heating [1 point], space cooling [1 point], water heating (DHW) [1 point], clothes dryers [1 point], equipment for cooking [1 point].	
☐	☐	15	5.5b Moving to Zero Carbon: All Electric <i>(Not available for projects following Criterion 5.5a)</i> No combustion equipment used as part of the building project; the project is all-electric.	
☐ Yes		M	5.6 Sizing of Heating and Cooling Equipment <i>(Mandatory for Substantial and Moderate Rehabs that include replacement of heating and cooling equipment. Not relevant for projects following 5.1a, 5.2b, or 5.4.)</i> Size and select heating and cooling equipment in accordance with ACCA manuals J and S OR in accordance with the ASHRAE Handbook of Fundamentals	
☐ Yes		M	5.7 ENERGY STAR Appliances <i>(Mandatory for Substantial and Moderate Rehabs providing appliances. Not relevant for projects following 5.1a, 5.2b, or 5.4.)</i> Install ENERGY STAR clothes washers, dishwashers, and refrigerators. If appliances will not be installed or replaced at this time, specify that at the time of installation or replacement, ENERGY STAR models must be used via Criterion 8.1 and Criterion 8.4.	

☐ Yes		M	5.8 Lighting <i>(Mandatory for all lighting within New Construction and Substantial Rehab projects. Mandatory for new lighting in Moderate Rehab projects.)</i> Follow the guidance for high-efficacy permanently installed lighting and other characteristics for recessed light fixtures, lighting controls, lighting power density, and exterior lighting.	
☐	☐	8	5.9 Resilient Energy Systems: Floodproofing <i>(Not relevant for Rehab projects in Special Flood Hazard Areas)</i> Conduct floodproofing of lower floors, including perimeter floodproofing (barriers/shields). Design and install building systems as specified by the full criterion so that the operation of those systems will not be grossly affected in case of a flood.	
☐	☐	8	5.10 Resilient Energy Systems: Critical Loads Loads Provide emergency power to serve at least three critical energy loads as described by the full criterion. Option 1: Islandable PV system OR Option 2: Efficient generator	
0	5		5. OPERATING ENERGY SUBTOTAL	
Yes	Maybe		6. MATERIALS	Notes
☐	☐	8 max	6.1 Ingredient Transparency for Material Health Install products that have publicly disclosed inventories characterized and screened to 1,000 ppm or better: • 1 point per 5 installed Declare or HPD products from at least three different product categories • 1 point per 2 installed Declare or HPD products in any of these categories: adhesives, sealants, windows • 1 point per each product with third-party verified HPD or third-party verified Declare label • 2 points per each product with third-party verified HPD or third-party verified Declare label in any of these categories: adhesives, sealants, windows	
☐	☐	3 max	6.2 Recycled Content and Ingredient Transparency Use building products that feature, and disclose, their recycled content. The building product must make up 75% by weight or cost of a project category for the project and be composed of at least 25% post-consumer recycled content.	
☐	☐	8 max	6.3 Chemical Hazard Optimization Install products that have third-party verification of optimization to 100 ppm or better per the options listed within the full criterion.	
☐ Yes		M	6.4 Healthier Material Selection	no carpet
3	☐	15 max	Select all interior paints, coatings, primers, and wallpaper; interior adhesives and sealants; flooring; insulation; and composite wood as specified. Optional points also available.	
☐	☐	12 max	6.5 Environmentally Responsible Material Selection Select concrete, steel, or insulation with a publicly disclosed EPD [3 points] , Install a green or cool roof [3 points] , use reflective paving [3 points] , and/or use FSC certified wood [3 points] . Refer to criterion for specifics.	

Yes	M	6.6 Bath, Kitchen, Laundry Surfaces <i>(Mandatory for New Construction and Substantial Rehab. Moderate Rehabs that do not include work in the shower and tub areas are exempt from the shower and tub enclosure requirement.)</i> Use materials that have durable, cleanable surfaces throughout bathrooms, kitchens, and laundry rooms. Use moisture-resistant backing materials per ASTM # D 6329 or 3273 behind tub/shower enclosures, apart from one-piece fiberglass enclosures which are exempt.	three-piece, will be paperless drywall
	4 max	6.7 Regional Materials Use products that were extracted, processed, and manufactured within 500 miles of the project for a minimum of 90%, based on weight or on cost, of the amount of the product category installed. Select any or all of these options (every two compliant materials can qualify for 1 point): • Framing Cladding (e.g. siding, masonry, roofing) • Flooring Concrete/cement and aggregate • Drywall/interior sheathing	
N/A	M	6.8 Managing Moisture: Foundations <i>(Mandatory for all New Construction projects and all Rehab projects with either basement and/or crawl space foundations)</i> Install capillary breaks and vapor retarders that meet specified criteria appropriate for the foundation type.	
Yes	M	6.9 Managing Moisture: Roofing and Wall Systems <i>(Mandatory for all Rehab projects that include deficiencies in or include replacing particular assemblies called out below. New Construction projects are considered compliant per Criterion 5.1.)</i> Provide water drainage away from walls, window, and roofs by implementing the list of techniques.	
Yes	M	6.10 Construction Waste Management Develop and implement a waste management plan that reduces non-hazardous construction and demolition waste through recycling, salvaging, or diversion strategies through one of the three options. Achieve optional points by going above and beyond the requirement.	100% of 3 waste streams: Asphalt, lumber (cabinets), metal include both for specs
	2	6.11 Recycling Storage For projects with municipal recycling infrastructure and/or haulers, provide separate bins for the collection of trash and recycling for each dwelling unit and all shared community rooms. OR For projects without that infrastructure, advocate to the local waste hauler or municipality for regular collection of recyclables.	
3	0	6. MATERIALS SUBTOTAL	
Yes	Maybe	7. HEALTHY LIVING ENVIRONMENT	
N/A	M	7.1 Radon Mitigation <i>(Mandatory for New Construction and Substantial Rehab)</i> For New Construction in EPA Zone 1 areas, install passive radon-resistant features below the slab and a vertical vent pipe with junction box within 10 feet of an electrical outlet in case an active system should prove necessary in the future. For Substantial Rehab projects in EPA Zone 1, test before and after the retrofit and mitigate per the specified protocols.	
N/A	M	7.2 Reduce Lead Hazards in Pre-1978 Buildings <i>(Mandatory for Substantial Rehab of Buildings Constructed Before 1978)</i> Conduct lead risk assessment or inspection to identify lead hazards. Control identified lead hazards using lead abatement or interim controls, using lead-safe work practices that minimize and contain dust.	

Yes	M	7.3 Combustion Equipment For New Construction and Rehab projects: Specify power-vented or direct-vent equipment when installing any new combustion appliance for space or water heating that will be located within the conditioned space. If there are any combustion appliances within the conditioned space, install one hard-wired carbon monoxide (CO) alarm with battery backup function for each sleeping zone, placed per National Fire Protection Association (NFPA) 72. For Rehabs: If there is any combustion equipment located within the conditioned space for space or water heating that is not power-vented or direct-vent and that is not scheduled for replacement, conduct combustion safety testing prior to and after the retrofit; remediate as indicated.	
Yes	M	7.4 Garage Isolation • Provide a continuous air barrier between the conditioned space and any garage space to prevent the migration of any contaminants into the living space. Visually inspect common walls and ceilings between attached garages and living spaces to ensure that they are air-sealed before insulation is installed. • Do not install ductwork or air handling equipment for the conditioned space in a garage. • Fix all connecting doors between conditioned space and garage with gaskets or make airtight. • Install one hard-wired CO alarm with battery backup function for each sleeping zone of the project, placed per NFPA 72 unless the garage is mechanically ventilated or an open parking structure.	
Yes	M	7.5 Integrated Pest Management Seal all wall, floor, and joint penetrations with low-VOC caulking or other appropriate nontoxic sealing methods to prevent pest entry.	
Yes	M	7.6 Smoke-Free Policy Mandatory: Implement and enforce a smoke-free policy in all common areas and within a 25-foot perimeter around the exterior of all residential buildings. Lease language must prohibit smoking in these locations and provide a graduated enforcement policy. Make the smoke-free policy readily available.	
10		10 Optional: Expand the policy above to include all indoor spaces in the property.	
3	3	7.7 Ventilation <i>(Mandatory for New Construction and Substantial Rehab; Optional for Moderate Rehab)</i> For each dwelling unit in full accordance with ASHRAE 62.2-2010, install: • A local mechanical exhaust system in each bathroom <i>[3 points if Moderate Rehab]</i> • A local mechanical exhaust system in each kitchen <i>[3 points if Moderate Rehab]</i> • A whole-house mechanical ventilation system <i>[3 points if Moderate Rehab]</i> Verify these flow rates are either within +/- 15 CFM or +/- 15% of design value. For each multifamily building of four or more stories, in full accordance with ASHRAE-†62.1-2010, install: • A mechanical ventilation system for all hallways and common spaces <i>[3 points if Moderate Rehab]</i> For all project types, in addition to the above requirements: • All systems and ductwork must be installed per manufacturer's recommendations • All bathroom fans must be ENERGY STAR-labeled and wired for adequate run-time. • If using central ventilation systems with rooftop fans, each fan must be direct-drive and variable-speed with speed controller mounted near the fan. Fans with design CFM 300-2000 must also have an ECM motor.	

N/A		M, 5	7.8 Dehumidification <i>(Mandatory for properties in Climate Zones 1A, 2A, 3A, and 4A following Criterion 5.2a, 5.2b, or 5.4. Optional for all other properties.)</i> Option 1: Design, select, and install supplemental dehumidification equipment to keep relative humidity OR Option 2: Equip all dwelling units with dedicated space, drain, and electrical hook-ups for permanent supplemental dehumidification systems to be installed if needed and install interior RH monitoring equipment as described.	
3		3	7.9 Construction Pollution Management Option 1: Earn the EPA Indoor airPlus label OR Option 2: In all dwelling units, seal all heating, cooling, and ventilation return and supply floor ducts and returns throughout construction to prevent construction debris from entering. Flush all dwelling units after completion of construction and prior to occupancy for either 48 hours or with at least 14,000 ft3 per ft2 of floor area, then replace all air handling equipment filters.	
		3	7.10 Noise Reduction Option 1: Test and demonstrate that noise levels in bedrooms meet 30 dB LAeq (continuous) and 45 dB LMax, (single sound). OR Option 2: Provide a noise abatement plan specific to the site covering general noise mitigation techniques in accordance with 24 CFR 51B. OR Option 3: Ensure all exterior wall and party wall penetrations are sealed with acoustical sealant, all party walls and floor/ceiling assemblies have an STC rating of at least 55, and exterior windows and doors in projects near a significant exterior noise source have an STC rating of at least 35	
Yes		8	7.11 Active Design: Promoting Physical Activity <i>(All projects must comply with at least one of either Criterion 7.11, 7.12, or 7.13. Points are not available for that criterion, but, are available for projects that meet two or three of these criteria.)</i> Option 1: Encouraging Everyday Stair Usage (buildings that include stairs as the only means to travel from one floor to another are not eligible for this option.) Provide a staircase that is accessible and visible from the main lobby and is visible within a 25-foot walking distance from any point in the lobby per the specifications listed. Place point-of-decision signage. OR Option 2: Activity Spaces. Provide on-site dedicated recreation space with exercise or play opportunities for adults and/or children that is open and accessible to all residents; see criterion for specifics.	Option 2: Playground
	8	8	7.12 Beyond ADA: Universal Design <i>(All projects must comply with at least one of either Criterion 7.11, 7.12, or 7.13. Points are not available for that criterion, but, are available for projects that meet two or three of these criteria.)</i> Select and implement at least one of the Options with at least three different strategies in at least 75% units. Option 1: Create welcoming and accessible spaces that encourage equitable use and social connections. Option 2: Create spaces that are easy and intuitive to use and navigate. Option 3: Promote safety and create spaces that allow for human error. Option 4: Create spaces that can be accessed and used with minimal physical effort. Option 5: Create spaces with the appropriate size and space to allow for use, whatever the user's form of mobility, size, or posture.	Option 2

☐	☐	8	7.13 Healing-Centered Design <i>(All projects must comply with at least one of either Criterion 7.11, 7.12, or 7.13. Points are not available for that criterion, but, are available for projects that meet two or three of these criteria.)</i> Select and implement at least two of the Options with at least two different strategies listed in at least 75% units. Option 1: Provide an environment that promotes feelings of real and perceived safety. Option 2: Create flexible spaces that allow for personalization and/or manipulation to meet individual and community needs. Option 3: Connect residents and staff to a living landscape and the natural environment. Option 4: Utilize art and culture in project design and programming and promote social connectedness.	
16	11		7. HEALTHY LIVING ENVIRONMENT SUBTOTAL	
Yes	Maybe		8. OPERATIONS, MAINTENANCE + RESIDENT ENGAGEMENT	Notes
☐		M	8.1 Building Operations & Maintenance Manual and Plan <i>(For all Multifamily projects)</i> Develop a manual with thorough building operations and maintenance (O&M) guidance and a complementary plan. The manual and plan should be developed over the course of the project design, development, and construction stages, and should include sections/chapters addressing the list of topics.	
☐		M	8.2 Emergency Management Manual <i>(For all Multifamily projects)</i> Provide a manual on emergency operations targeted toward operations and maintenance staff and other building-level personnel. The manual should address responses to various types of emergencies, leading with those that have the greatest probability of negatively affecting the project. The manual should provide guidance as to how to sustain the delivery of adequate housing throughout an emergency and cover a range of topics, including but not limited to: • communication plans for staff and residents • useful contact information for public utility and other service providers • infrastructure and building, "shutdown" procedures • plan for regular testing of backup energy systems, if these exist	
☐		M	8.3 Resident Manual Provide a guide for homeowners and renters that explains the intent, benefits, use, and maintenance of their home's green features and practices. The Resident Manual should encourage green and healthy activities per the list of topics.	
☐		M	8.4 Walk-Throughs and Orientations to Property Operation Provide a comprehensive walk-through and orientation for all residents, property manager(s), and buildings operations staff.	
☐		M	8.5 Energy and Water Data Collection and Monitoring For rental properties, upload project energy and water performance data in an online utility benchmarking platform annually for at least five years from time of construction completion per one of the four methods provided; grant Enterprise view access for that period. For owner-occupied units, collect and monitor utility data in a manner that allows for easy access and review.	
0	0		8. OPERATIONS, MAINTENANCE + RESIDENT ENGAGEMENT SUBTOTAL	
36	22		TOTAL	

SECTION 018113

SUSTAINABILITY DESIGN REQUIREMENTS

The Meadows

PART 1 GENERAL

GENERAL CONDITIONS

- A. The General Conditions, Modifications to General Conditions, Supplementary or Special Conditions and any Instructions to Bidders shall apply to all Divisions of work.
- B. The requirements of State, Local or appropriate codes applicable to the work, whichever is the most stringent is a requirement of all Divisions of work.

WORK OF THIS SECTION

- A. Section includes:
 - 1. Sustainable Project Goals
 - 2. Enterprise Green Communities Certification requirements
- B. The intent of this project is to achieve an Enterprise Green Communities 2020 certification.
- C. Contractor shall coordinate work and requirements with Owner Contracted Green Rater/Verifier for Green certifications. Pertinent to green certifications the role of the Green Rater/Verifier is to guide the construction team with certification process; review documentation, verify green requirements are met; and to perform third-party testing.

REFERENCES

- A. American Society of Heating, Refrigerating and Air-Conditioning Engineers:
 - 1. ASHRAE 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size.
 - 2. ASHRAE 62 - Ventilation for Acceptable Indoor Air Quality.
 - 3. ASHRAE 90.1 - Energy Efficient Design of New Buildings except Low-Rise Residential Buildings.
 - 4. ASHRAE 129 - Measuring Air-Change Effectiveness.
- B. ASTM International:
 - 1. ASTM E408 - Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques.
 - 2. ASTM E903 - Standard Test Method for Solar Absorption, Reflectance, and Transmittance of Materials Using Integrating Spheres.
- C. Forest Stewardship Council: FSC Guidelines- Forest Stewardship Council Guidelines.
- D. Sheet Metal and Air Conditioning Contractors: SMACNA IAQ - IAQ Guidelines for Occupied Buildings under Construction.
- E. South Coast Air Quality Management District: SCAQMD Rule 1168 - Adhesive and Sealant Applications.
- F. South Coast Air Quality Management District: SCAQMD Rule 1113 – Interior paints, coatings, and primers.
- G. SCS Global Services Recycled Content Certification
- H. California Department of Public Health (CDPH) emission standard, formerly California 01350 – VOC emission limits
- I. CARB Phase 2 – composite wood formaldehyde emissions testing standard
- J. American National Standards Institute (ANSI) / American Water Works Association (AWWA) C810-17 Standard
- K. National Pollutant Discharge Elimination System (NPDES)'s Stormwater Discharges from Construction Activities guidance
- L. U.S. Environmental Protection Agency:
 - 1. EPA Baseline IAQ - Testing for Indoor Air Quality, Baseline IAQ, and Materials Section 01445.
 - 2. EPA 402-K-01-002 – A Step-by-Step Guide on how to Build Radon-Resistant Homes

M. Enterprise Green Communities:

1. Green Communities Checklist 2020
2. Green Communities Criteria 2020

N. ENERGY STAR Qualified Homes Program Requirements

1. https://www.energystar.gov/partner_resources/residential_new/homes_prog_reqs/national_page

SUBMITTALS

- A. The contractor shall submit the following items directly to the Green Rater/Verifier.
- B. Construction Waste Diversion Rate (Calculation and/or Waste Tickets)
- C. The contractor shall submit cut-sheets of products intended to comply with Environmentally Preferable Products (EPP). See Green Communities Checklist Section 6 for list of products intended to meet this requirement. EPP criteria are as follows:
 1. Ingredient Transparency for Material Health Requirement – Publicly disclosed where content is characterized and screened using health hazard lists or restricted substances lists to 1,000 ppm
 2. Recycled Content and Ingredient Transparency Requirement – Minimum 25% post-consumer
 3. Chemical Hazard Optimization Requirement – Third-party verification of optimization to 100 ppm.
 4. Healthier Materials Selection Requirement – see specific requirements for low-emission paints, coatings, primers, wallpaper, adhesives, sealants, flooring, insulation, and composite wood under criterion 6.4.
 5. Environmentally Responsible Material Requirement – see specific requirements for embodied emissions for concrete, steel, insulation, roofing, paving, and non-composite wood under criterion 6.5
 6. Regional Materials Requirement – Extracted, manufactured, and fabricated (all processes) within 500-mile crow-fly distance of site.

QUALITY ASSURANCE

- A. Perform work in accordance with the Enterprise Green Communities Criteria for prerequisites and credits pertinent to this project listed in Green Communities worksheet included at the end of this section.
- B. Maintain one copy of Green Communities Criteria on site. Criteria is available for download at https://www.greencommunitiesonline.org/sites/default/files/egc_2020_criteria_manual.pdf
- C. Thoroughly review any requests for substitution for products that are related to Enterprise Green Communities prerequisites and credits. Any substitutions may jeopardize projects' ability to obtain certification.
- D. Perform storm water management and erosion control Work in accordance with EPA Best Management Practices or local erosion and sedimentation control standards whichever is more stringent.
- E. Perform Work to meet or exceed minimum energy efficiency and performance in accordance with Energy Star requirements. Energy Star Checklist is enclosed at end of this section.
- F. Perform Work without use of CFC based refrigerants in HVAC building systems.
- G. Perform ventilation Work in accordance with ASHRAE 62.
- H. Develop and implement construction indoor air quality management plan including the following:
 1. Comply with minimum requirements of SMACNA IAQ.
 2. Protect stored and installed absorptive materials from moisture damage.
 - a. Store materials on elevated platforms under cover, and in dry location.
 - b. When materials are not stored in enclosed location, cover tops and sides of material with secured waterproof sheeting.
 3. Protect HVAC equipment during construction.
 - a. Shut down return side of HVAC system whenever possible during heavy construction or demolition.
 - b. When HVAC systems are operated during heavy construction, furnish disposable temporary filters.

PART 2 PRODUCTS

PRODUCT SUBSTITUTION

- A. Thoroughly review any requests for substitution for products that are related to Green Communities prerequisites and credits. Any substitutions may jeopardize the project's ability to obtain certification.

PART 3 EXECUTION

EGC 1.4 Integrative Design: Construction Management (mandatory)

1. At the onset of construction organize an Enterprise Green Communities trades training moderated by Green Verifier.
2. Following trades to attend - GC Project Manager, GC Site Superintendent, Mechanical-Electrical-Plumbing, Insulation, Framing, Drywall, Air-Infiltration Package.
3. Provide a minimum of 2-week notice to Green Verifier prior to training date.

EGC 2.1 Site Selection (mandatory)

This project does not have any ecologically sensitive features.

If ecologically sensitive features are identified in the Ecological Resource Protection Zone (ERPZ) meet the following:

1. Protect floodplain functions
 - a. Projects built on land that is within the Special Flood Hazard Area (SPHA) as identified by FEMA, must be designed to meet the ASCE 24 Flood Resistant Design and Construction standard.
 - a. Ensure that any development or redevelopment activities within the floodplain will mitigate and improve existing floodplain conditions (maintain or increase existing floodplain storage, improve water quality, implement flood-resilient design).
 - b. Do not raise topographical elevations in flood zones.
2. Protect aquatic ecosystems
 - a. .
Rehabilitation.
 - b. Do not extend the building, built structures, roads, or parking areas into wetlands or deepwater habitats, as identified in the ERPZ, beyond where they already exist.
 - c. Develop restoration plans for wetland and deepwater habitats within the ERPZ.
3. Conserve habitat for any species on federal or state threatened or endangered lists
 - a. Do not extend the building, built structures, roads, or parking areas into habitats for threatened and endangered plant and animal species on the site, as identified in the ERPZ.
 - b. Minimize disturbances within the ERPZ during construction. If construction activities permanently disrupt the habitat of threatened or endangered animal habitats, follow the guidance of responsible state (or local) agencies on how to best address.

EGC 2.14 Local Economic Development and Community Wealth Creation

1. Contractor shall demonstrate that local preference for construction employment and subcontractor hiring was part of bidding process.

EGC 3.1 Environmental Remediation (mandatory)

1. Submit Phase 1 Environmental Site Assessment report to Green Verifier/Verifier
If an environmental site assessment reveals any hazardous materials, mitigate these before proceeding with development.

EGC 3.2 Erosion and Sedimentation Control (mandatory)

Applies only when any site-work or excavation is in scope:

Contractor shall implement EPA's National Pollutant Discharge Elimination System (NPDES)' Stormwater Discharges from Construction Activities guidance, or local requirements, whichever is more stringent. If excavation and site work is part of scope:

1. Stockpile and protect disturbed topsoil for reuse.
2. Control the path and velocity of runoff with silt fencing or equivalent.
3. Protect sewer inlets, streams, and lakes on site during construction with silt fencing, silt sacks or comparable measures.
4. Provide swales to divert surface water from hillsides.
5. Identify and protect significant, high value trees during construction with fencing outside the critical root zone.
6. If soil is disturbed during construction on sloped areas, use tiers, erosion blankets, compost blankets, etc. to stabilize soil.

EGC 3.3 Ecosystem Services/ Landscape (mandatory)

When new landscaping is provided, or existing landscaping is modified:

1. All new landscaping (trees, shrubs, and groundcover, including grasses) should be native or adapted to the region. All new plants must be appropriate to the site's soil and microclimate, and none should be invasive species.
2. All disturbed existing landscape areas should be reseeded with native groundcover or plans and mulch.

EGC 3.4 Surface Stormwater Management (mandatory)

Applicable to New Construction or Rehab disturbing greater than 5,000 square feet

1. Treat or retain, on site, the precipitation volume from the 60th precipitation event as defined by the U.S. EPA in the Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act.

EGC 4.1 & 4.2 Water-Conserving Fixtures (mandatory)

1. Service pressure in each unit must not exceed 60 psi. Provide documentation of municipal water pressure. Green verifier will test water pressure at units.
2. Following flow rates are required to reduce total indoor water consumption by **30%**:
3. Toilets must be **WaterSense certified** and **1.28** gallons per flush or less, including dual-flush and pressure-assisted models.
4. Urinals must be **WaterSense certified** and **0.5** gallons per flush or less.
5. Showerheads must be **WaterSense-labeled** and **1.75** gallons per minute or less.
6. Kitchen faucets must be **1.5** gallons per minute or less.
7. Lavatory faucets must be **WaterSense certified** and **1.2** gallons per minute or less.

EGC 5.1b Building Performance Standard (mandatory)

ERI Option

Demonstrate energy performance equivalent to a HERS Index of **80**: Energy Analysis conducted by Green Verifier confirms that the project is below HERS **80** target. On-site power generation may not be used to satisfy the minimum energy performance. Meeting energy performance standards further requires mandatory inspection and testing conducted by Owner Contracted Green Rater/Verifier for Green certifications.

Conduct compartmentalization of dwelling units via air infiltration no greater than 0.40 CFM50 for Moderate Rehab per square feet of dwelling unit enclosure area or a 20% improvement of CFM50/sf compared to pre-retrofit conditions, following procedures in ANSI/RESNET/ICC Std. 380.

Insulation installed as part of the rehab must achieve the following:

1. Grade I installation per ANSI/RESNET/ICC Std. 301.
2. Grade II installation for assemblies that contain a layer of continuous, air impermeable insulation ($\geq$ R-3 in Climate Zones 1 to 4, $\geq$ R-5 in Climate Zones 5 to 8).

3. Grade II batt insulation floors if they fill the full width and depth of the floor cavity, even when compression occurs due to excess insulation.

HVAC systems repaired or installed during rehab must complete testing via the National HVAC Functional Testing Checklist, ENERGY STAR Multifamily New Construction Version 1.1 (or most recent checklist version available at time of permit).

Mandatory Mid-Construction Pre-Drywall Thermal Bypass Inspection:

1. EGC Certification will require visual inspection of thermal envelope per enclosed Energy Star Rater Field Checklist at mid-construction. Coordinate inspection with Green Verifier with a minimum of 3-week notice. (Only applicable-scope items will be inspected for renovations.)

Final Verification and Inspection Testing

1. Upon substantial completion and prior to occupancy, the Green Verifier will conduct a visual Final Inspection to verify green requirements incorporated in the project. The contractor shall notify the Green Rater at least four (4) weeks prior to the anticipated date for such inspection. Contractor shall provide access to each unit and cooperate with conducting of the test. Additional inspections necessary due to incomplete work shall be back-charged to the Contractor.
2. Testing - Third-party Testing is to be scheduled and conducted in conjunction with the final inspection. The contractor shall notify the Green Verifier at least four (4) weeks prior to the anticipated date for such inspection. Contractor shall provide access to each unit and cooperate with conducting of the test.
3. Preconstruction Pretest – A pre-construction pretest was conducted to identify areas to envelope, demising unit enclosures. Recommended areas for sealing include:
 - a. Joints between duct boots and drywall and floor finishes.
 - b. Gaps at plumbing penetrations to drywall and floor finishes.
 - c. Plumbing and attic access panels.
 - d. Seal all visible gaps and cracks where interstitial cavities (wall, joist, ceiling, and stair) are used as return ducts.
4. Air Infiltration Test (Blower door Test) – Mandatory – Measures air leakage through unit enclosure such as exterior walls, demising walls, ceilings, chases, etc. Minimum envelope leakage where applicable. Following areas of building envelope and demising walls shall be sealed, caulked, gasketed, or weather-stripped to minimize envelope leakage:
 - a. Joints around exterior doors and windows.
 - b. Joints between walls and foundation; between conditioned spaces and attics, demising walls, crawl spaces and garage.
 - c. All mechanical, plumbing, and electrical penetrations in exterior and demising walls. Mechanical chase shall be sealed at crawl space ceiling.
 - d. Exterior sheathing and house wrap.
 - e. Minimize entry of air from outside, attic, garage, and crawl space into exterior wall and interior wall cavities to ensure passing of air infiltration test. Also minimize air transfer from unit to unit, and unit to corridor.
 - f. Batt insulation shall be stapled to face of stud to ensure full contact of insulation with face of drywall. Cut insulation around all mechanical, plumbing, and electrical work.
 - g. Gasket attic access panels. Seal drywall to frame of access panel.
5. Distribution Loss Test (Duct Blaster Test) – Mandatory – Measures leakage through the mechanical distribution system and minimize duct leakage. Following areas HVAC distribution system shall be sealed:
 - a. Clean entire distribution system to decipher areas for sealing and minimizing duct leakage.
 - b. Joints and seams of existing ductwork shall be sealed where visible.
 - c. Provide new metal lining for returns in visible areas where wall and floor cavities are used for returns.
 - d. Seal all duct boots in floors to subfloors and seal all duct boots in walls to drywall.
 - e. Seal gaps between drywall and all duct penetrations in ceilings, including exhaust fans.

EGC 5.7 Energy Star Appliances (mandatory)

1. If replacing or installing new appliances provide Energy Star-labeled refrigerators, dishwashers, and clothes washers.

EGC 5.8 Lighting (mandatory)

When replacing or installing new light fixtures

1. All permanently installed fixtures shall be high-efficiency that is capable of meeting recommended light levels in the Illuminating Engineering Society Handbook, 10th edition.
2. Recessed light fixtures installed as part of air barrier shall be Insulation Contact Air-Tight (ICAT)
3. Common space lighting or Non-apartment building spaces must be controlled by occupancy sensors or automatic bi-level lighting controls, except 24-hour lighting required by code.
4. Lighting power density in dwelling units shall be 1.1 W/SF or less.
5. All exterior lighting shall have motion sensor controls, integrative PV cells, photosensors, or astronomic time-clock operation.
6. Exterior fixtures shall meet the following:
 - a. Luminaires shall be fully shielded emitting no light above 90 degrees. The luminaire's mounting hardware shall not permit mounting in any configuration other than those maintaining full shielding. Non-residential luminaires shall have an uplight rating of U0.
 - b. Fixtures shall have no sag or drop lenses, side light panels or uplight panels.
 - c. Fixtures shall employ warm-toned (3000k or lower) white light sources or may employ amber light sources or filtered LED light sources.

EGC 6.4 Healthier Material Selection (mandatory)

1. Use products that comply with the following requirements.

PRODUCT CATEGORY	MANDATORY	ADDITIONAL POINTS	REFERENCE
All interior paints, coatings, primers and wallpaper	VOC content less than or equal to the thresholds provided by the most recent version of SCAQMD 1113 available at time of product specification for all interior paints, coatings and primers. VOC emissions verified as compliant with CDPH Standard Method for all wall finish paints. All wallpaper, phthalate free		For wall finish paints compliant with the mandatory CDPH specification, seek those certified to Master Painters Institute (MPI) X-Green, Green Wise Gold, GREENGUARD Gold, SCS Indoor Advantage Gold, and Berkeley Analytical ClearChem. GS-11 paints comply with the optional APE-free criterion, as do Red List-free products.
All interior adhesives and sealants	VOC content less than or equal to the thresholds provided by the most recent version of SCAQMD 1168 available at time of product specification for all interior adhesives and sealants.		Orthophthalate plasticizers are common in polyurethane and modified polymer sealants. While not common, they may also be found in some acrylic latex or siliconized acrylic sealants. Verify that specified sealants are phthalate-free. Minimize the need for adhesives when possible. For instance, finger-joints and mechanical fasteners do not contain chemicals of concern.

Flooring	All flooring products (whether carpet or hard surface) must comply with CDPH emission requirements. No flexible PVC with phthalates may be installed, whether the phthalates were intentionally added or added via recycled content. No carpet in the project may be installed in building entryways, laundry rooms, bathrooms, kitchens/kitchenettes, or utility rooms. Fluid applied finish floors may only be installed in non-occupied spaces, such as mechanical rooms.	The project complies with the following options: Absence of carpet throughout the project	Common flooring product labels that meet or exceed the mandatory CDPH emission requirement include FloorScore, GREEN-GUARD Gold, SCS Indoor Advantage Gold, Berkeley Analytical ClearChem, and Carpet Rug Institute Green Label Plus (CRI+). In place of vinyl or other PVC-based resilient flooring, consider salvaged hardwoods, natural linoleum, rubber, cork, other PVC-free resilient flooring, ceramic or stone tile, sealed concrete, or pre-finished solid wood flooring. Pre-finished products, compared to those finished on site, keep potential exposures lower through a more controlled environment during finishing. If possible, use a floor system that can feature mechanical attachments (e.g., nails, floating wood flooring) instead of glues. This approach makes flooring easier to recycle in the future.
Insulation	If fiberglass or mineral wool batts are used, these must be formaldehyde-free.		Alternative insulation products include recycled cotton, cellulose, wool, and blown fiberglass. All major U.S. manufacturers of residential fiberglass batt insulation have transitioned to formaldehyde-free products. Some formaldehyde-free mineral wool batts are also available
Composite wood	Formaldehyde emissions less than or equal to the thresholds provided by CARB Phase 2 and/or TSCA Title IV for plywood, particleboard, MDF, and these materials within other products like cabinets and doors. For any other composite wood products not covered by CARB/TSCA requirements, but used in interior spaces, these must at minimum be NAUF (have no added urea formaldehyde).		While finish products (including plywood, MDF, particleboard, and cabinet and door components) comply by law with this mandatory requirement, ensure that all products installed in the project that are exposed to the conditioned space meet these standards or at a minimum do not include added urea formaldehyde. No-added formaldehyde (NAF) products qualify as ULEF and will be eligible for optional points. However, be aware that the alternative binders utilized in these products may include regrettable substitutions. For instance, the most common alternative binder for composite wood is PMDI, which is made with isocyanates. PMDI is expected to be a lower hazard during use than formaldehyde, but more information is needed. Preferable alternatives would be more than half bio-based (e.g., binders that are at least 50% soy) with full content disclosure, so they can be vetted for health hazards.

EGC 6.6 Bath, Kitchen, Laundry Surfaces (mandatory)

1. Use materials that have durable, cleanable surfaces through bathrooms, kitchens, and laundry rooms. Materials should not be prone to deterioration due to moisture intrusion or encourage the growth of mold.
2. Use moisture-resistant backing materials such as cement board, fiber cement board, or equivalent per ASTM #D 6329 or ASTM #D 3273 behind tub/shower enclosures. Projects using a one-piece fiberglass enclosure are exempt from this requirement.

EGC 6.9 Managing Moisture: Roofing and Wall Systems (mandatory)

Applicable only when wall or roof systems are replaced.

Walls

1. Provide a continuous housewrap /weather-resistive barrier with sheets lapped shingle-style to prevent bulk water that penetrates the finished exterior cladding system from entering the wall assembly or being introduced through window or door openings or through other penetrations. Alternatively, install a fluid applied weather-resistive barrier in accordance with manufacturer's instructions.
2. Flashings at roof /wall intersections and wall penetrations (i.e., plumbing, electrical, vents, HVAC refrigerant lines and the like in addition to windows and doors) must be integrated with the weather-resistive barrier and drainage plane prior to any exterior finish being installed to prevent bulk water from entering the exterior wall assembly.
3. Flashing installed at bottom of exterior walls with weep holes included for masonry veneer and weep screen for stucco cladding systems or equivalent drainage system.

Roof

1. Install drip edge at entire perimeter of roof.
2. At wall /roof intersections, maintain ≥ 2 " clearance between wall cladding and roofing materials, install flashing along the intersection, and use kick-out flashing.

EGC 6.10 Construction Waste Management (mandatory)

Contractor to investigate local options for diversion of all construction waste and develop a plan for tracking waste diversion either through a contracted company or by tracking and sorting following components of construction waste.

Option 1

1. Recycle a minimum of **75%** of total construction waste

OR

Option 2

1. Select at least two of the following waste streams and recycle 100% of those waste streams:
 - a. Cardboard
 - b. Wood
 - c. Metal
 - d. Drywall
 - e. Concrete, brick and/or asphalt
 - f. Insulation, foam, and plastics
 - g. Carpet

EGC 7.3 Combustion Equipment (mandatory)

Applicable only when combustion equipment is provided **anywhere in the building**:

1. Provide at least one hard-wired carbon monoxide detector with battery backup for each sleeping area, minimum one on each floor.
2. Any combustion equipment installed must be power-vented or closed-combustion.
3. For Substantial and Moderate Rehabs with combustion equipment that is not power-vented or direct-vent, Owner AND/OR Contractor to confirm pre-construction combustion safety test was conducted. The test must be conducted for central systems and for 10% of individual dwelling units systems per RESNET Guidelines for Combustion Safety and Developing Work Orders or BPI Combustion Safety Test Procedures for Vented Appliances.

EGC 7.4 Garage Isolation (mandatory)

Applicable only when attached garage is in scope.

1. Provide a continuous air barrier between the conditioned space and any garage space to prevent the migration of contaminants into the living space.
2. Visually inspect common walls and ceilings between attached garages and living spaces to ensure that they are air-sealed before insulation is installed.
3. Do not install ductwork or air handling equipment for the conditioned space in a garage.
4. Fix all connecting doors between conditioned space and garage with gaskets, or otherwise make substantially airtight with weather stripping.
5. Install one hard-wired carbon monoxide (CO) alarm with battery backup function for each sleeping zone of the project, placed per National Fire Protection Association (NFPA) 72, unless the garage is mechanically ventilated, or an open parking structure as defined by code

EGC 7.5 Integrated Pest Management (mandatory)

1. Seal all wall, floor and joint penetrations with low-VOC caulking or other appropriate nontoxic sealing method.
2. Install corrosion-proof metal pest screens for all openings greater than ¼ inch.
3. Seal off entry points under kitchen and bathroom sinks.

EGC 7.7 Ventilation

1. For each dwelling unit, in full accordance with ASHRAE 62.2-2010, install a local mechanical exhaust system in each bathroom. Use ENERGY STAR-labeled bathroom exhaust fans in all bathrooms. Provide a minimum intermittent flow rate of 50 cfm and be wired to turn on with a light switch, equipped with a humidistat sensor, ventilation timer, occupancy sensor, delay off switch.
2. Green Verifier/Energy Rater to conduct testing to verify ventilation system flow rates are within 15 CFM or 15% of the design value.

EGC 7.9 Construction Pollution Management

Option 1

1. Certify the project under EPA Indoor airPLUS.

Option 2

1. After construction ends and before occupancy, flush the home with fresh air, according to the following guidelines:
 - a. Remove any dust and debris from ducts.
 - b. Flush the entire home for 48 hours, keeping all windows and interior doors open; the 48 hours may be nonconsecutive if necessary.
 - c. Keep all windows and interior doors open and run all HVAC fans continuously.

EGC 7.12 Beyond ADA: Universal Design (mandatory)

Select one option below to implement. Implement three strategies in that option. For all selected strategies affecting dwelling units, implement that strategy for 75% of the project's dwelling units.

Option 2

1. Create approachable building entries that are welcoming, are easy to identify, promote feelings of safety, and are accessible without the use of stairs. Include a covered entryway with seating, greenery, and lighting. Include exterior signage that is prominent, visible from sidewalk, access road, or parking lot.
2. Avoid strong patterns on floor finishes. Use carpets and flooring that have subtle neutral patterns.
3. Install light switches and power outlets that contrast in color and value with wall surfaces and have an indicator light when turned off. Mount light switches at 52 inches and power outlets at 20 inches above the finished floor.

EGC 8.1 Building Maintenance Manual (mandatory)

1. General Contractor to provide Maintenance manual that addresses HVAC operations and maintenance, appliance guidance, lighting equipment, green cleaning products, and pest control. Refer to EGC 2020 criteria handbook for details.

EGC 8.2 Emergency Management Manual (mandatory)

1. General Contractor to provide Emergency Management Manual targeted toward operations and maintenance staff and other building level personnel. The manual should address responses to various types of emergencies, leading with those that have the greatest probability of negatively affecting the project. The manual should provide guidance as to how to sustain the delivery of adequate housing throughout an emergency and cover a range of topics including but not limited to:
 - a. Communication plans for staff and residents to use in the event of an emergency.
 - b. Useful contact information for public utility and other service providers
 - c. Infrastructure and building “shutdown” procedures

EGC 8.4 Walk-throughs and Orientations to Property Operations (mandatory)

1. General Contractor to provide a comprehensive walk-through and orientation for property manager(s) and building operations staff within 90 days of initial occupancy. Use the appropriate manuals (8.1 & 8.2) as the base of the curriculum, and review the project’s green features, operations and maintenance procedures, and emergency protocols.

ENCLOSURES

1. Enterprise Green Communities Checklist
2. Energy Star National Rater Field Checklist

END OF SECTION 018113



2020 ENTERPRISE GREEN COMMUNITIES CRITERIA CHECKLIST

CRITERIA CHECKLIST

This checklist provides an overview of the technical requirements within the Enterprise Green Communities Criteria.

To achieve Enterprise Green Communities Certification, all projects must achieve compliance with the Criteria mandatory measures applicable to that construction type. **New Construction projects must also achieve at least 40 optional points, and Substantial and Moderate Rehab projects must also achieve at least 35 optional points.**

These projects that also comply with Criterion 5.2b or Criterion 5.4 will be recognized with Enterprise Green Communities Certification Plus.

Project:	The Meadows
Address:	4855 Pintail Creek Drive, Columbus, OH
Location Type:	Urban/Suburban
Building Type:	Multifamily Lowrise

Yes	Maybe	1. INTEGRATIVE DESIGN	Notes
☒	☐	M 1.1 Integrative Design: Project Priorities Survey Complete the Project Priorities Survey, which can be found in the Appendix.	
☒	☐	M 1.2 Integrative Design: Charrettes and Coordination Meetings Develop an integrative design process that moves the outputs of the Project Priorities Survey into action through a series of collaborative meetings. Prioritize multi-benefit strategies. Assign responsibility within your design and development teams for accountability.	
☒	☐	M 1.3 Integrative Design: Documentation Include Enterprise Green Communities Criteria information in your contract documents and construction specifications (Division 1 Section 01 81 13 Sustainable Design Requirements) as necessary for the construction team to understand the requirements and how they will be verified. Ensure, and indicate, that the drawings and specifications have been generated to be compliant and meet the certification goals.	
☒	☐	M 1.4 Integrative Design: Construction Management Create, implement, and document your contractor/subcontractor education plan to ensure that all persons working on-site fully understand their role in achieving the project objectives. Include a summary of the Project Priorities Survey (Criterion 1.1), the sustainability goals, and anticipated roles of each party in regards to the performance expected of the project. Attach and reference this training plan to Division 1 Section 01 81 13 Sustainable Design Requirements. Include timeline estimates for performance testing and verification schedules in the overall construction schedule. As relevant, review requirements for Criteria 8.1, 8.2, and 8.3, and begin populating these documents with relevant information from design and construction.	
☐	☐	12 or 15 1.5 Design for Health and Well-Being: Health Action Plan Follow Steps 1-6 of the Health Action Plan framework per the full criterion. <i>[12 points with extra 3 points for Step 7]</i> This includes: 1) Commit to embedding health into the project lifecycle; 2) Partner with a project health professional; 3) Collect and analyze community health data; 4) Engage with community stakeholders to prioritize health data and strategies; 5) Identify strategies to address those health issues; 6) Create an implementation plan; and 7) Create a monitoring plan.	
☐	☐	10 1.6 Resilient Communities: Multi-Hazard Risk/Vulnerability Assessment Conduct a four-part assessment (social, physical, functional, strategy) to identify critical risk factors of your property and implement at least two sets of strategies to enable the project to adapt to, and mitigate, climate related or seismic risks. See full criterion for more guidance.	

		8	1.7 Resilient Communities: Strengthening Cultural Resilience Integrate community and resident participation in the development processes so that the built environment honors cultural identities, resident voices, and community histories. Option 1: Complete a Cultural Resilience Assessment OR Option 2: Convene a Cultural Advisory Group	
0	0		1. INTEGRATIVE DESIGN SUBTOTAL	
Yes	Maybe		2. LOCATION + NEIGHBORHOOD FABRIC	Notes
		M	2.1 Sensitive Site Protection All projects must: 1. Protect floodplain functions (e.g., storage, habitat, water quality) by limiting new development within the 100-year floodplain of all types of watercourses. 2. Conserve and protect aquatic ecosystems, including wetlands and deepwater habitats, that provide critical ecosystem functions for fish, other wildlife, and people. 3. Protect ecosystem function by avoiding the development of areas that contain habitat for plant and animal species identified as threatened or endangered. 4. Conserve the most productive agricultural soils by protecting prime farmland, unique farmland, and farmland of statewide or local importance. If your site contains any of these ecologically sensitive features, follow the specific Requirements under that subheading.	
		M	2.2 Connections to Existing Development and Infrastructure <i>(Mandatory for New Construction projects that do not qualify as Rural/Tribal/Small Town)</i> Locate the project on a site with access to existing roads, water, sewers, and other infrastructure and within or contiguous to (having at least 25% of the perimeter bordering) existing development. Connect the project to the existing pedestrian network. For sites over 5 acres, provide connections to the adjacent street network at least every 800 feet. Tie all planned bike paths to existing bike paths.	
		M	2.3 Compact Development <i>(Mandatory for New Construction)</i> At a minimum, build to the residential density (dwelling units/acre) of the census block group where the project is located. In Rural/Tribal/Small Town locations that do not have zoning requirements: Build to a minimum net density of 5 units per acre for single-family houses; 10 units per acre for multifamily buildings, single and two-story; and 15 units per acre for multifamily buildings greater than two-stories.	
		5 or 7	2.4 Increased Compact Development Exceed the residential density (dwelling units/acre) of the census block group in which your project is located. Exceed by 2x for [5 points] ; exceed by 3x for [7 points] . In Rural/Tribal/Small Towns that do not have zoning requirements, build to a minimum net density of 7.5 units per acre for single-family houses; 12 units per acre for multifamily buildings, single and two-story; and 20 units per acre for multifamily buildings greater than two stories. [5 points]	
		M	2.5 Proximity to Services and Community Resources <i>(Mandatory for New Construction)</i> Locate the project within a 0.5-mile walk distance of at least four, or a 1-mile walk distance of at least seven, of the listed services. For projects that qualify as Rural/Tribal/Small Town, locate the project within 5 miles of at least four of the listed services.	

N/A	M	2.6 Preservation of and Access to Open Space for Rural/Tribal/Small Town <i>(Mandatory for New Construction Rural/Tribal/Small Town)</i> Option 1: Locate the project within a 0.25-mile walk distance of dedicated public open space that is a minimum of 0.75 acres; at least 80% of which unpaved. OR Option 2: Set aside a minimum of 10% (minimum of 0.25 acres) of the total project acreage as open and accessible to all residents; at least 80% of which unpaved.	
4	6 max	2.7 Preservation of and Access to Open Space Option 1: Locate the project within a 0.25-mile walk distance of dedicated open space that is a minimum of 0.75 acres; at least 80% of which unpaved. <i>[4 points]</i> OR Option 2: Set aside a percentage of permanent open space for use by all residents; at least 80% of which unpaved. 25% <i>[2 points]</i> ; 35% <i>[4 points]</i> ; 45% + written statement of preservation/conservation policy <i>[6 points]</i> .	Option 2
N/A	M	2.8 Access to Transit <i>(Mandatory for New Construction projects that do not qualify as Rural/Tribal/Small Town; Optional for all other project types)</i> Mandatory: New Construction, not Rural/Tribal/Small Town Locate projects within a 0.5-mile walk distance of transit services (bus, rail and/or ferry), constituting at least 45 or more transit rides per weekday, with some type of weekend service. Optional: New Construction, not Rural/Tribal/Small Town Locate the project along dedicated bike trails or lanes (Class I, II, or IV) that lead to high-quality transit services (100 trips per day) within 3 miles. <i>[2 points]</i> Optional: Rehabilitation, not Rural/Tribal/Small Town Locate projects within a 0.5-mile walk distance of public transit services (bus, rail and/or ferry), constituting at least 45 or more transit rides per weekday, with some type of weekend service. <i>[6 points]</i> Locate the project along dedicated bike trails or lanes (Class I, II, or IV) that lead to high-quality transit services (100 trips per day) within 3 miles. <i>[2 points]</i> Optional: New Construction and Rehabilitation, Rural/Tribal/Small Town Locate the project within 0.5 mile walk distance of public transit services with at least 45 rides per weekday and some weekend service. OR, Install at least two charging stations for electric vehicles. OR, Locate the project with 5 miles of one of the following transit options: 1) vehicle share program; 2) dial-a-ride program; 3) employer vanpool; 4) park-and-ride; 5) public/private regional transportation.	
	2-8	2.9 Improving Connectivity to the Community Improve access to community amenities through at least one of the options incentivizing biking mobility or improving access to transit.	
	5 max	2.10 Passive Solar Heating/Cooling Design and build with passive solar design, orientation, and shading that meet the guidelines specified.	
	6	2.11 Adaptive Reuse of Buildings Rehabilitate and adapt an existing structure that was not previously used as housing. Design the project to adapt, renovate, or reuse at least 50% of the existing structure and envelope.	
	6	2.12 Access to Fresh, Local Foods Provide residents and staff with access to fresh, local foods through one of the following options: Option 1: Neighborhood Farms and Gardens Option 2: Community-Supported Agriculture Option 3: Proximity to Farmers Market	

8		8	2.13 Advanced Certification: Site Planning, Design and Management Locate building(s) within a community that is certified in LEED for Neighborhood Development, LEED for Cities and Communities, Living Community Challenge, or SITES.	
2		6 max	2.14 Local Economic Development and Community Wealth Creation Demonstrate that local preference for construction employment and subcontractor hiring was part of your bidding process, and how it functioned during construction. <i>[2 points]</i> OR Demonstrate that you achieved at least 20% local employment. <i>[3 points]</i> OR Provide physical space for small business, nonprofits, and/or skills and workforce education. <i>[3 points]</i>	
N/A		M	2.15a Access to Broadband: Broadband Ready <i>(Mandatory for New Construction and Substantial Rehab Projects in Rural/Tribal/Small Town Locations)</i> Incorporate broadband infrastructure so that when broadband service comes to a community, the property can be easily connected. Include a network of mini-ducts or conduit throughout the building, extending from the expected communications access point to each network termination point in the building.	
	6	6	2.15b Access to Broadband: Connectivity Ensure all units and common spaces in the property have broadband internet access with at least a speed of 25/3 mbs.	
14	6		2. LOCATION + NEIGHBORHOOD FABRIC SUBTOTAL	
Yes	Maybe		3. SITE IMPROVEMENT	Notes
Yes		M	3.1 Environmental Remediation Determine whether there are any hazardous materials present on the site through one of the four methods listed. Mitigate any contaminants found.	
Yes		M	3.2 Minimization of Disturbance during Staging and Construction For sites >1 acre, implement EPA's National Pollutant Discharge Elimination System Stormwater Discharges from Construction Activities guidance, or local requirements, whichever is more stringent. For sites with an area <= 1, follow guidance in full criterion.	
Yes		M	3.3 Ecosystem Services/Landscape <i>(Mandatory, if providing landscaping)</i> If providing plantings, all must be native or climate-appropriate (adapted) to the region and appropriate to the site's soil and microclimate. Do not introduce any invasive plant species. Plant, seed, or xeriscape all disturbed areas.	
N/A		M	3.4 Surface Stormwater Management <i>(Mandatory for New Construction; Mandatory for Substantial and Moderate Rehab projects if land disturbed is >= 5,000 sq.ft.)</i> Treat or retain on-site precipitation equivalent to the 60th percentile precipitation event. Where not feasible due to geotechnical issues, soil conditions, or the size of the site, treat or retain the maximum volume possible.	
		10 max	3.5 Surface Stormwater Management Through on-site infiltration, evapotranspiration, and rainwater harvesting, retain precipitation volume from 70% precipitation event <i>[6 points]</i> , 80% precipitation event <i>[8 points]</i> , or 90% precipitation event <i>[10 points]</i> .	

N/A		M	3.6 Efficient Irrigation and Water Reuse (Mandatory, if permanent irrigation is utilized) If irrigation is utilized, install an efficient irrigation system per the requirements listed.	
		4 or 6	3.7 Efficient Irrigation and Water Reuse (Optional, if irrigation is utilized) Meet the requirements of Criterion 3.6 AND: Option 1: Install an efficient irrigation system equipped with a WaterSense labeled weather-based irrigation controller (WBIC) OR Option 2: At least 50% of the site's irrigation satisfied by water use from the sources listed.	
0	0	3. SITE IMPROVEMENT SUBTOTAL		
Yes Maybe			4. WATER	Notes
Yes		M	4.1 Water-Conserving Fixtures Reduce total indoor water consumption by at least 20% compared to baseline indoor water consumption chart. Any new toilet, showerhead, and/or lavatory faucet must be WaterSense certified. For all single-family homes and all dwelling units in buildings three stories or fewer, the supply pressure may not exceed 60 psi.	Proposed flow rates: Toilets: 1.28 gpf Showerheads: 1.75 gpm Kitchen faucets: 1.5 gpm Lav faucets: 1.2 gpm
3		6 max	4.2 Advanced Water Conservation Reduce total indoor water consumption by at least 30% compared to baseline indoor water consumption chart. Any new toilet, showerhead, and/or lavatory faucet must be WaterSense certified.	
N/A		M, 3 M 8	4.3 Water Quality Mandatory/Optional: Mandatory for Substantial Rehabs of buildings built before 1986; Optional for all other building types: Replace lead service lines [3 points] Mandatory: For multifamily buildings with either a cooling tower, a centralized hot water system, or 10+ stories: Develop a Legionella water management program Optional: Test and remediate as indicated for lead, nitrates, arsenic, and coliform bacteria	
		4	4.4 Monitoring Water Consumption and Leaks Conduct pressure-loss tests and visual inspections to determine if there are leaks; fix leaks. AND Install an advanced water monitoring and leak detection system capable of identifying and shutting water off during anomalous water events. OR Install a device to separately monitor water consumption of each cold branch off the apartment line riser for each dwelling unit or each cold water riser and the domestic hot water cold water feed for each building or each toilet that allows remote monitor readings; common laundry facilities; boiler makeup water; outdoor water consumption; and water consumption in any non-residential space.	
		4	4.5 Efficient Plumbing Layout and Design Store no more than 0.5 gallon of water in any piping/manifold between the fixture and the water heating source or recirculation line. No more than 0.6 gallon of water shall be collected from the fixture before a 10-degree Fahrenheit rise in temperature is observed. Recirculation systems must be demand-initiated.	

☐	☐	6 max	4.6 Non-Potable Water Reuse Harvest, treat, and reuse rainwater and/or greywater to meet a portion of the project's non-potable water needs: 10% reuse [3 points]; 20% reuse [4 points]; 30% reuse [5 points]; 40% reuse [6 points].	
☐	☐	8	4.7 Access to Potable Water During Emergencies Provide residents with ready access to potable water in the event of an emergency that disrupts normal access to potable water, including disruptions related to power outages that prevent pumping water to upper floors of multifamily buildings or pumping of water from on-site wells, per one of the three options listed.	
3	0		4. WATER SUBTOTAL	
Yes	Maybe		5. OPERATING ENERGY	Notes
N/A		M	5.1a Building Performance Standard <i>(Mandatory for New Construction)</i> Certify all buildings with residential units in the project through either ENERGY STAR Multifamily New Construction, ENERGY STAR Manufactured Homes, and/or ENERGY STAR Certified Homes as relevant. AND Provide projected operating energy use intensity and projected operating building emissions intensity.	
Yes		M	5.1b Building Performance Standard <i>(Mandatory for Rehab)</i> Provide projected operating energy use intensity and projected operating building emissions intensity. AND Conduct commissioning for compartmentalization, insulation installation, and HVAC systems as indicated. AND one of the following options: - ERI Option: <= HERS 80 for each dwelling unit. Exception for some Rehabs built before 1980. - ASHRAE Option: Energy performance of the completed building equivalent to, or better than, ASHRAE 90.1-2013 using an energy model created by a qualified energy services provider according to Appendix G 90.1-2016.	HERS 80 target
☐	5	12 max	5.2a Moving to Zero Energy: Additional Reductions in Energy Use <i>(Not available for projects using prescriptive path for Criterion 5.1a or for projects following Criterion 5.2b or 5.4.)</i> Projects in CZ 1-4A following this criterion must also comply with Criterion 7.8. Design and construct a building that is projected to be more efficient than what is required by Criteria 5.1a/b. Achieve HERS score of 5 lower than required by 5.1a/b if following ERI path for compliance OR 5% greater efficiency than required if following ASHRAE path for 5.1a/b compliance [5 points]. Additional 1 point for each additional 2-point decrease in HERS score required by Criteria 5.1a/b if following ERI path for compliance OR for 1% greater efficiency if following ASHRAE path for Criteria 5.1a/b, up to a maximum of 12 optional points.	
☐	☐	12-15	5.2b Moving to Zero Energy: Near Zero Certification [Mandatory for Enterprise Green Communities Certification Plus] <i>(Not available for projects following Criterion 5.2a or 5.4.)</i> Projects in CZ 1-4A following this criterion must also comply with Criterion 7.8. Certify the project in a program that requires advanced levels of building envelope performance such as DOE ZERH [12 points] and/or PHI Classic or PHIUS+ [15 points].	

☐	☐	3-6	5.3a Moving to Zero Energy: Photovoltaic/Solar Hot Water Ready <i>(Not available for projects following Criterion 5.3b or 5.4.)</i> Orient, design, engineer, wire, and/or plumb the development through the Photovoltaic Ready pathway or Solar Hot Water Ready Pathway to accommodate installation of photovoltaic (PV) or solar hot water system in the future.	
☐	☐	8 max	5.3b Moving to Zero Energy: Renewable Energy <i>(Not available for projects following Criterion 5.3a or 5.4.)</i> Install renewable energy source to provide a specified percentage of the project's estimated source energy demand. See full criterion for allowable sources.	
		4-8	Option 1: For percentage of total project energy consumption provided by renewable energy. OR	
		1-5	Option 2: For percentage of common area meter energy consumption provided by renewable energy.	
☐	☐	24	5.4 Achieving Zero Energy [Automatic Qualification for Enterprise Green Communities Certification Plus] <i>(Not available for projects following Criterion 5.2a, 5.2b, 5.3a, or 5.3b.)</i> Projects in CZ 1-4A following this criterion must also comply with Criterion 7.8. Achieve Zero Energy performance through one of the following options: Option 1: Certify each building in the project to DOE Zero Energy Ready Home program or PHI Plus AND Either install renewables and/or procure renewable energy, which in sum will produce as much, or more, energy in a given year than the project is modeled to consume. OR Option 2: Certify each building in the project in a program that requires zero energy performance such as PHIUS+ Source Zero, PHI Plus, PHI Premium, ILFI's Zero Energy Petal, Zero Carbon Petal, or Living Building Certification.	
☐	☐	5 max	5.5a Moving to Zero Carbon: All-Electric Ready <i>(Not available for projects following Criterion 5.5b)</i> Ensure the project has adequate electric service and has been designed and wired to allow for a seamless switch to electricity as a fuel source in the future for the following uses: space heating [1 point], space cooling [1 point], water heating (DHW) [1 point], clothes dryers [1 point], equipment for cooking [1 point].	
☐	☐	15	5.5b Moving to Zero Carbon: All Electric <i>(Not available for projects following Criterion 5.5a)</i> No combustion equipment used as part of the building project; the project is all-electric.	
☐ Yes		M	5.6 Sizing of Heating and Cooling Equipment <i>(Mandatory for Substantial and Moderate Rehabs that include replacement of heating and cooling equipment. Not relevant for projects following 5.1a, 5.2b, or 5.4.)</i> Size and select heating and cooling equipment in accordance with ACCA manuals J and S OR in accordance with the ASHRAE Handbook of Fundamentals	
☐ Yes		M	5.7 ENERGY STAR Appliances <i>(Mandatory for Substantial and Moderate Rehabs providing appliances. Not relevant for projects following 5.1a, 5.2b, or 5.4.)</i> Install ENERGY STAR clothes washers, dishwashers, and refrigerators. If appliances will not be installed or replaced at this time, specify that at the time of installation or replacement, ENERGY STAR models must be used via Criterion 8.1 and Criterion 8.4.	

☐ Yes		M	5.8 Lighting <i>(Mandatory for all lighting within New Construction and Substantial Rehab projects. Mandatory for new lighting in Moderate Rehab projects.)</i> Follow the guidance for high-efficacy permanently installed lighting and other characteristics for recessed light fixtures, lighting controls, lighting power density, and exterior lighting.	
☐	☐	8	5.9 Resilient Energy Systems: Floodproofing <i>(Not relevant for Rehab projects in Special Flood Hazard Areas)</i> Conduct floodproofing of lower floors, including perimeter floodproofing (barriers/shields). Design and install building systems as specified by the full criterion so that the operation of those systems will not be grossly affected in case of a flood.	
☐	☐	8	5.10 Resilient Energy Systems: Critical Loads Loads Provide emergency power to serve at least three critical energy loads as described by the full criterion. Option 1: Islandable PV system OR Option 2: Efficient generator	
0	5		5. OPERATING ENERGY SUBTOTAL	
Yes	Maybe		6. MATERIALS	Notes
☐	☐	8 max	6.1 Ingredient Transparency for Material Health Install products that have publicly disclosed inventories characterized and screened to 1,000 ppm or better: • 1 point per 5 installed Declare or HPD products from at least three different product categories • 1 point per 2 installed Declare or HPD products in any of these categories: adhesives, sealants, windows • 1 point per each product with third-party verified HPD or third-party verified Declare label • 2 points per each product with third-party verified HPD or third-party verified Declare label in any of these categories: adhesives, sealants, windows	
☐	☐	3 max	6.2 Recycled Content and Ingredient Transparency Use building products that feature, and disclose, their recycled content. The building product must make up 75% by weight or cost of a project category for the project and be composed of at least 25% post-consumer recycled content.	
☐	☐	8 max	6.3 Chemical Hazard Optimization Install products that have third-party verification of optimization to 100 ppm or better per the options listed within the full criterion.	
☐ Yes		M	6.4 Healthier Material Selection	no carpet
3	☐	15 max	Select all interior paints, coatings, primers, and wallpaper; interior adhesives and sealants; flooring; insulation; and composite wood as specified. Optional points also available.	
☐	☐	12 max	6.5 Environmentally Responsible Material Selection Select concrete, steel, or insulation with a publicly disclosed EPD [3 points] , Install a green or cool roof [3 points] , use reflective paving [3 points] , and/or use FSC certified wood [3 points] . Refer to criterion for specifics.	

Yes	M	6.6 Bath, Kitchen, Laundry Surfaces <i>(Mandatory for New Construction and Substantial Rehab. Moderate Rehabs that do not include work in the shower and tub areas are exempt from the shower and tub enclosure requirement.)</i> Use materials that have durable, cleanable surfaces throughout bathrooms, kitchens, and laundry rooms. Use moisture-resistant backing materials per ASTM # D 6329 or 3273 behind tub/shower enclosures, apart from one-piece fiberglass enclosures which are exempt.	three-piece, will be paperless drywall
	4 max	6.7 Regional Materials Use products that were extracted, processed, and manufactured within 500 miles of the project for a minimum of 90%, based on weight or on cost, of the amount of the product category installed. Select any or all of these options (every two compliant materials can qualify for 1 point): • Framing Cladding (e.g. siding, masonry, roofing) • Flooring Concrete/cement and aggregate • Drywall/interior sheathing	
N/A	M	6.8 Managing Moisture: Foundations <i>(Mandatory for all New Construction projects and all Rehab projects with either basement and/or crawl space foundations)</i> Install capillary breaks and vapor retarders that meet specified criteria appropriate for the foundation type.	
Yes	M	6.9 Managing Moisture: Roofing and Wall Systems <i>(Mandatory for all Rehab projects that include deficiencies in or include replacing particular assemblies called out below. New Construction projects are considered compliant per Criterion 5.1.)</i> Provide water drainage away from walls, window, and roofs by implementing the list of techniques.	
Yes	M	6.10 Construction Waste Management Develop and implement a waste management plan that reduces non-hazardous construction and demolition waste through recycling, salvaging, or diversion strategies through one of the three options. Achieve optional points by going above and beyond the requirement.	100% of 3 waste streams: Asphalt, lumber (cabinets), metal include both for specs
	2	6.11 Recycling Storage For projects with municipal recycling infrastructure and/or haulers, provide separate bins for the collection of trash and recycling for each dwelling unit and all shared community rooms. OR For projects without that infrastructure, advocate to the local waste hauler or municipality for regular collection of recyclables.	
3	0	6. MATERIALS SUBTOTAL	
Yes	Maybe	7. HEALTHY LIVING ENVIRONMENT	
N/A	M	7.1 Radon Mitigation <i>(Mandatory for New Construction and Substantial Rehab)</i> For New Construction in EPA Zone 1 areas, install passive radon-resistant features below the slab and a vertical vent pipe with junction box within 10 feet of an electrical outlet in case an active system should prove necessary in the future. For Substantial Rehab projects in EPA Zone 1, test before and after the retrofit and mitigate per the specified protocols.	
N/A	M	7.2 Reduce Lead Hazards in Pre-1978 Buildings <i>(Mandatory for Substantial Rehab of Buildings Constructed Before 1978)</i> Conduct lead risk assessment or inspection to identify lead hazards. Control identified lead hazards using lead abatement or interim controls, using lead-safe work practices that minimize and contain dust.	

Yes	M	7.3 Combustion Equipment For New Construction and Rehab projects: Specify power-vented or direct-vent equipment when installing any new combustion appliance for space or water heating that will be located within the conditioned space. If there are any combustion appliances within the conditioned space, install one hard-wired carbon monoxide (CO) alarm with battery backup function for each sleeping zone, placed per National Fire Protection Association (NFPA) 72. For Rehabs: If there is any combustion equipment located within the conditioned space for space or water heating that is not power-vented or direct-vent and that is not scheduled for replacement, conduct combustion safety testing prior to and after the retrofit; remediate as indicated.	
Yes	M	7.4 Garage Isolation • Provide a continuous air barrier between the conditioned space and any garage space to prevent the migration of any contaminants into the living space. Visually inspect common walls and ceilings between attached garages and living spaces to ensure that they are air-sealed before insulation is installed. • Do not install ductwork or air handling equipment for the conditioned space in a garage. • Fix all connecting doors between conditioned space and garage with gaskets or make airtight. • Install one hard-wired CO alarm with battery backup function for each sleeping zone of the project, placed per NFPA 72 unless the garage is mechanically ventilated or an open parking structure.	
Yes	M	7.5 Integrated Pest Management Seal all wall, floor, and joint penetrations with low-VOC caulking or other appropriate nontoxic sealing methods to prevent pest entry.	
Yes	M	7.6 Smoke-Free Policy Mandatory: Implement and enforce a smoke-free policy in all common areas and within a 25-foot perimeter around the exterior of all residential buildings. Lease language must prohibit smoking in these locations and provide a graduated enforcement policy. Make the smoke-free policy readily available.	
10	10	Optional: Expand the policy above to include all indoor spaces in the property.	
3	M 12 max	7.7 Ventilation <i>(Mandatory for New Construction and Substantial Rehab; Optional for Moderate Rehab)</i> For each dwelling unit in full accordance with ASHRAE 62.2-2010, install: • A local mechanical exhaust system in each bathroom <i>[3 points if Moderate Rehab]</i> • A local mechanical exhaust system in each kitchen <i>[3 points if Moderate Rehab]</i> • A whole-house mechanical ventilation system <i>[3 points if Moderate Rehab]</i> Verify these flow rates are either within +/- 15 CFM or +/- 15% of design value. For each multifamily building of four or more stories, in full accordance with ASHRAE-†62.1-2010, install: • A mechanical ventilation system for all hallways and common spaces <i>[3 points if Moderate Rehab]</i> For all project types, in addition to the above requirements: • All systems and ductwork must be installed per manufacturer's recommendations • All bathroom fans must be ENERGY STAR-labeled and wired for adequate run-time. • If using central ventilation systems with rooftop fans, each fan must be direct-drive and variable-speed with speed controller mounted near the fan. Fans with design CFM 300-2000 must also have an ECM motor.	

N/A		M, 5	7.8 Dehumidification <i>(Mandatory for properties in Climate Zones 1A, 2A, 3A, and 4A following Criterion 5.2a, 5.2b, or 5.4. Optional for all other properties.)</i> Option 1: Design, select, and install supplemental dehumidification equipment to keep relative humidity OR Option 2: Equip all dwelling units with dedicated space, drain, and electrical hook-ups for permanent supplemental dehumidification systems to be installed if needed and install interior RH monitoring equipment as described.	
3		3	7.9 Construction Pollution Management Option 1: Earn the EPA Indoor airPlus label OR Option 2: In all dwelling units, seal all heating, cooling, and ventilation return and supply floor ducts and returns throughout construction to prevent construction debris from entering. Flush all dwelling units after completion of construction and prior to occupancy for either 48 hours or with at least 14,000 ft3 per ft2 of floor area, then replace all air handling equipment filters.	
		3	7.10 Noise Reduction Option 1: Test and demonstrate that noise levels in bedrooms meet 30 dB LAeq (continuous) and 45 dB LMax, (single sound). OR Option 2: Provide a noise abatement plan specific to the site covering general noise mitigation techniques in accordance with 24 CFR 51B. OR Option 3: Ensure all exterior wall and party wall penetrations are sealed with acoustical sealant, all party walls and floor/ceiling assemblies have an STC rating of at least 55, and exterior windows and doors in projects near a significant exterior noise source have an STC rating of at least 35	
Yes		8	7.11 Active Design: Promoting Physical Activity <i>(All projects must comply with at least one of either Criterion 7.11, 7.12, or 7.13. Points are not available for that criterion, but, are available for projects that meet two or three of these criteria.)</i> Option 1: Encouraging Everyday Stair Usage (buildings that include stairs as the only means to travel from one floor to another are not eligible for this option.) Provide a staircase that is accessible and visible from the main lobby and is visible within a 25-foot walking distance from any point in the lobby per the specifications listed. Place point-of-decision signage. OR Option 2: Activity Spaces. Provide on-site dedicated recreation space with exercise or play opportunities for adults and/or children that is open and accessible to all residents; see criterion for specifics.	Option 2: Playground
	8	8	7.12 Beyond ADA: Universal Design <i>(All projects must comply with at least one of either Criterion 7.11, 7.12, or 7.13. Points are not available for that criterion, but, are available for projects that meet two or three of these criteria.)</i> Select and implement at least one of the Options with at least three different strategies in at least 75% units. Option 1: Create welcoming and accessible spaces that encourage equitable use and social connections. Option 2: Create spaces that are easy and intuitive to use and navigate. Option 3: Promote safety and create spaces that allow for human error. Option 4: Create spaces that can be accessed and used with minimal physical effort. Option 5: Create spaces with the appropriate size and space to allow for use, whatever the user's form of mobility, size, or posture.	Option 2

☐	☐	8	7.13 Healing-Centered Design <i>(All projects must comply with at least one of either Criterion 7.11, 7.12, or 7.13. Points are not available for that criterion, but, are available for projects that meet two or three of these criteria.)</i> Select and implement at least two of the Options with at least two different strategies listed in at least 75% units. Option 1: Provide an environment that promotes feelings of real and perceived safety. Option 2: Create flexible spaces that allow for personalization and/or manipulation to meet individual and community needs. Option 3: Connect residents and staff to a living landscape and the natural environment. Option 4: Utilize art and culture in project design and programming and promote social connectedness.	
16	11		7. HEALTHY LIVING ENVIRONMENT SUBTOTAL	
Yes	Maybe		8. OPERATIONS, MAINTENANCE + RESIDENT ENGAGEMENT	Notes
☐		M	8.1 Building Operations & Maintenance Manual and Plan <i>(For all Multifamily projects)</i> Develop a manual with thorough building operations and maintenance (O&M) guidance and a complementary plan. The manual and plan should be developed over the course of the project design, development, and construction stages, and should include sections/chapters addressing the list of topics.	
☐		M	8.2 Emergency Management Manual <i>(For all Multifamily projects)</i> Provide a manual on emergency operations targeted toward operations and maintenance staff and other building-level personnel. The manual should address responses to various types of emergencies, leading with those that have the greatest probability of negatively affecting the project. The manual should provide guidance as to how to sustain the delivery of adequate housing throughout an emergency and cover a range of topics, including but not limited to: • communication plans for staff and residents • useful contact information for public utility and other service providers • infrastructure and building, "shutdown" procedures • plan for regular testing of backup energy systems, if these exist	
☐		M	8.3 Resident Manual Provide a guide for homeowners and renters that explains the intent, benefits, use, and maintenance of their home's green features and practices. The Resident Manual should encourage green and healthy activities per the list of topics.	
☐		M	8.4 Walk-Throughs and Orientations to Property Operation Provide a comprehensive walk-through and orientation for all residents, property manager(s), and buildings operations staff.	
☐		M	8.5 Energy and Water Data Collection and Monitoring For rental properties, upload project energy and water performance data in an online utility benchmarking platform annually for at least five years from time of construction completion per one of the four methods provided; grant Enterprise view access for that period. For owner-occupied units, collect and monitor utility data in a manner that allows for easy access and review.	
0	0		8. OPERATIONS, MAINTENANCE + RESIDENT ENGAGEMENT SUBTOTAL	
36	22		TOTAL	



BID 5/1/2020

ENERGY STAR Single-Family New Homes

National Rater Field Checklist, Version 3 / 3.1 / 3.2 (Rev. 13)

Home Address: _____		City: _____		State: _____		Permit Date: _____			
Thermal Enclosure System						Must Correct	Builder Verified¹	Rater Verified²	N/A³
1. High-Performance Fenestration & Insulation									
1.1 Fenestration meets or exceeds specification in Item 2.1 of the National Rater Design Review Checklist.						☐	☐	☐	-
1.2 Insulation meets or exceeds specification in Item 3.1 of the National Rater Design Review Checklist.						☐	Up to 10% ☐	☐	-
1.3 All insulation achieves Grade I install. per ANSI / RESNET / ICC 301. Alternatives in Footnote 4. ^{4,5}						☐	Up to 10% ☐	☐	-
2. Fully-Aligned Air Barriers⁶ - At each insulated location below, a complete air barrier is provided that is fully aligned as follows:									
Ceilings: At interior or exterior horizontal surface of ceiling insulation in Climate Zones 1-3; at interior horizontal surface of ceiling insulation in Climate Zones 4-8. Also, at exterior vertical surface of ceiling insulation in all climate zones (e.g., using a wind baffle that extends to the full height of the insulation in every bay or a tabbed baffle in each bay with a soffit vent that prevents wind washing in adjacent bays). ^{7,8}									
2.1 Dropped ceilings / soffits below unconditioned attics, and all other ceilings.						☐	☐	☐	☐
Walls: At exterior vertical surface of wall insulation in all climate zones; also at interior vertical surface of wall insulation in Climate Zones 4-8. ^{8,9}									
2.2 Walls behind showers, tubs, staircases, and fireplaces.						☐	☐	☐	☐
2.3 Attic knee walls and skylight shaft walls. ¹⁰						☐	☐	☐	☐
2.4 Walls adjoining porch roofs or garages.						☐	☐	☐	☐
2.5 Double-walls and all other exterior walls.						☐	☐	☐	-
Floors: At exterior vertical surface of floor insulation in all climate zones and, if over unconditioned space, also at interior horizontal surface including supports to ensure alignment. Alternatives in Footnotes 12 & 13. ^{11,12,13}									
2.6 Floors above garages, floors above unconditioned basements or crawlspaces, and cantilevered floors.						☐	☐	☐	☐
2.7 All other floors adjoining unconditioned space (e.g., rim / band joists at exterior wall or at porch roof).						☐	☐	☐	☐
3. Reduced Thermal Bridging									
3.1 For insulated ceilings with attic space above (i.e., non-cathedralized), Grade I insulation extends to the inside face of the exterior wall below and is $\geq R-21$ in CZ 1-5; $\geq R-30$ in CZ 6-8. ^{8,14}						☐	☐	☐	☐
3.2 For slabs on grade in CZ 4-8, 100% of slab edge insulated to $\geq R-5$ at the depth specified by the 2009 IECC and aligned with the thermal boundary of the walls. ^{8,15,16}						☐	☐	☐	☐
3.3 Insulation beneath attic platforms (e.g., HVAC platforms, walkways) $\geq R-21$ in CZ 1-5; $\geq R-30$ in CZ 6-8. ⁸						☐	☐	☐	☐
3.4 At above-grade walls separating conditioned from unconditioned space, one of the following options used (rim / band joists exempted): ¹⁷									
3.4.1 Continuous rigid insulation, insulated siding, or combination of the two is: $\geq R-3$ in CZ 1-4; $\geq R-5$ in CZ 5-8 ^{8,18,19,20} , OR ;						☐	☐	☐	☐
3.4.2 Structural Insulated Panels OR ; Insulated Concrete Forms OR ; Double-wall framing OR ; ^{18,21}						☐	☐	☐	☐
3.4.3 Advanced framing, including all of the Items below: ²²									
3.4.3a Corners insulated $\geq R-6$ to edge ²³ , AND ;						☐	☐	☐	☐
3.4.3b Headers above windows & doors insulated $\geq R-3$ for 2x4 framing or equivalent cavity width, and $\geq R-5$ for all other assemblies (e.g., with 2x6 framing) ²⁴ , AND ;						☐	☐	☐	☐
3.4.3c Framing limited at all windows & doors to one pair of king studs, plus one pair of jack studs per window opening to support the header and sill, AND ;						☐	☐	☐	☐
3.4.3d Interior / exterior wall intersections insulated to same R-value as rest of exterior wall, ²⁵ AND ;						☐	☐	☐	☐
3.4.3e Minimum stud spacing of 16 in. o.c. for 2x4 framing in all Climate Zones and, in CZ 6-8, 24 in. o.c. for 2x6 framing. ^{8,26}						☐	☐	☐	☐
4. Air Sealing (Unless otherwise noted below, "sealed" indicates the use of caulk, foam, or equivalent material)									
4.1 Ducts, flues, shafts, plumbing, piping, wiring, exhaust fans, & other penetrations to unconditioned space sealed, with blocking / flashing as needed.						☐	☐	☐	-
4.2 Recessed lighting fixtures adjacent to unconditioned space ICAT labeled and gasketed. Also, if in insulated ceiling without attic above, exterior surface of fixture insulated to $\geq R-10$ in CZ 4-8. ⁸						☐	☐	☐	☐
4.3 Above-grade sill plates adjacent to conditioned space sealed to foundation or sub-floor. Gasket also placed beneath above-grade sill plate if resting atop concrete / masonry & adjacent to cond. space. ^{27,28}						☐	☐	☐	☐
4.4 Continuous top plate or blocking is at top of walls adjoining unconditioned space, and sealed.						☐	☐	☐	☐
4.5 Drywall sealed to top plate at all unconditioned attic / wall interfaces using caulk, foam, drywall adhesive (but not other construction adhesives), or equivalent material. Either apply sealant directly between drywall and top plate or to the seam between the two from the attic above.						☐	☐	☐	☐
4.6 Rough opening around windows & exterior doors sealed. ²⁹						☐	☐	☐	-
4.7 Walls that separate attached garages from occupiable space sealed and, also, an air barrier installed and sealed at floor cavities aligned with these walls.						☐	☐	☐	☐
4.8 In multifamily buildings, the gap between the common wall (e.g., the drywall shaft wall) and the structural framing between units sealed at all exterior boundaries.						☐	☐	☐	☐
4.9 Doors adjacent to unconditioned space (e.g., attics, garages, basements) or ambient conditions made substantially air-tight with weatherstripping or equivalent gasket.						☐	☐	☐	☐
4.10 Attic access panels, drop-down stairs, & whole-house fans equipped with durable $\geq R-10$ cover that is gasketed (i.e., not caulked). Fan covers either installed on house side or mechanically operated. ³⁰						☐	☐	☐	☐

HVAC System ³¹				Must Correct	Rater Verified ²	N/A ³
5. Heating & Cooling Equipment - Complete Track A - HVAC Grading ³² or Track B - HVAC Credential ³³						
Track A	5a.1 Blower fan volumetric airflow is Grade I or II per ANSI / RESNET / ACCA / ICC 310.			☐	☐	☐
	5a.2 Blower fan watt draw is Grade I or II per ANSI / RESNET / ACCA / ICC 310.			☐	☐	☐
	5a.3 Refrigerant charge is Grade I per ANSI / RESNET / ACCA / ICC 310. See Footnote 34 for exemptions. ³⁴			☐	☐	☐
Track B	5b.1 HVAC manufacturer & model number on installed equipment matches either of the following (check box): ³⁵ ☐ National HVAC Design Report ☐ Written approval received from designer			☐	☐	☐
	5b.2 External static pressure measured by Rater at contractor-provided test locations and documented below: ³⁶ Return-Side External Static Pressure: _____ IWC Supply-Side External Static Pressure: _____ IWC			☐	☐	☐
	5b.3 Permitted, but not required: National HVAC Commissioning Checklist collected, with no items left blank.			☐	☐	☐
6. Duct Quality Installation (Applies to Heating, Cooling, Ventilation, Exhaust, & Pressure Balancing Ducts, Unless Noted in Footnote)						
6.1 Ductwork installed without kinks, sharp bends, compressions, or excessive coiled flexible ductwork. ³⁷				☐	☐	☐
6.2 Bedrooms pressure-balanced (e.g., using transfer grilles, jump ducts, dedicated return ducts, undercut doors) to achieve a Rater-measured pressure differential ≥ -3 Pa and $\leq +3$ Pa with respect to the main body of the house when all air handlers are operating. Test configuration and an alternative compliance option in Footnote 38. ³⁸				☐	☐	-
6.3 All supply and return ducts in unconditioned space, including connections to trunk ducts, are insulated to $\geq R-6$ ³⁹				☐	☐	☐
6.4 Rater-measured total duct leakage meets one of the following two options. Alternative in Footnote 41: ^{40, 41, 42}						
6.4.1 <u>Rough-in</u> : The greater of ≤ 4 CFM25 per 100 sq. ft. of CFA or ≤ 40 CFM25, with air handler & all ducts, building cavities used as ducts, & duct boots installed. All duct boots sealed to finished surface, Rater-verified at final. ⁴³				☐	☐	☐
6.4.2 <u>Final</u> : The greater of ≤ 8 CFM25 per 100 sq. ft. of CFA or ≤ 80 CFM25, with the air handler & all ducts, building cavities used as ducts, duct boots, & register grilles atop the finished surface (e.g., drywall, floor) installed. ⁴⁴				☐	☐	☐
6.5 Rater-measured duct leakage to outdoors the greater of ≤ 4 CFM25 per 100 sq. ft. of CFA or ≤ 40 CFM25. ^{40, 45}				☐	☐	☐
7. Dwelling Unit Mechanical Ventilation Systems ("Vent System") ⁴⁶ & Inlets in Return Duct ⁴⁷						
7.1 Rater-measured ventilation rate is within either ± 15 CFM or $\pm 15\%$ of design report value. ⁴⁸				☐	☐	-
7.2 A readily-accessible ventilation override control installed and also labeled if its function is not obvious (e.g., a label is required for a toggle wall switch, but not for a switch that's on the ventilation equipment). ⁴⁹				☐	☐	-
7.3 For any outdoor air inlet connected to a ducted return of the HVAC system (Complete if present; otherwise check "N/A"): ⁴⁷						☐
7.3.1 Controls automatically restrict airflow using a motorized damper during vent. off-cycle and occupant override. ⁵⁰				☐	☐	-
7.3.2 Rater-measured vent. rate is ≤ 15 CFM or 15% above design value at highest HVAC fan speed. Alt. in Fn. 51. ⁵¹				☐	☐	-
7.4 System fan rated ≤ 3 sones if intermittent and ≤ 1 sone if continuous, or exempted. ⁵²				☐	☐	-
7.5 If Vent System controller operates the HVAC fan, then HVAC fan operation is intermittent and either the fan type is ECM / ICM or the controls will reduce the run-time by accounting for HVAC system heating or cooling hours. ⁵³				☐	☐	☐
7.6 Bathroom fans are ENERGY STAR certified if used as part of the Vent System. ⁵⁴				☐	☐	☐
7.7 Air inlet location (Complete if ventilation air inlet location was specified on design report; otherwise check "N/A"): ^{55, 56}						☐
7.7.1 Inlet pulls ventilation air directly from outdoors and not from attic, crawlspace, garage, or adjacent dwelling unit.				☐	☐	-
7.7.2 Inlet is ≥ 2 ft. above grade or roof deck; ≥ 10 ft. of stretched-string distance from known contamination sources not exiting the roof, and ≥ 3 ft. distance from dryer exhausts and sources exiting the roof. ⁵⁷				☐	☐	-
7.7.3 Inlet is provided with rodent / insect screen with ≤ 0.5 inch mesh.				☐	☐	-
8. Local Mechanical Exhaust – In each kitchen and bathroom, a system is installed that exhausts directly to the outdoors and meets one of the following Rater-measured airflow and manufacturer-rated sound level standards: ^{48, 58}						
Location		Continuous Rate	Intermittent Rate ⁵⁹			
8.1 Kitchen	Airflow	≥ 5 ACH, based on kitchen volume ^{60, 61}	≥ 100 CFM and, if not integrated with range, also ≥ 5 ACH based on kitchen volume ^{60, 61, 62}	☐	☐	-
	Sound	Recommended: ≤ 1 sone	Recommended: ≤ 3 sones			
8.2 Bathroom	Airflow	≥ 20 CFM	≥ 50 CFM	☐	☐	-
	Sound	Required: ≤ 1 sone	Recommended: ≤ 3 sones			
9. Filtration						
9.1 MERV 6+ filter(s) installed in each ducted mech. system, designed so all return and mechanically supplied outdoor air passes through filter(s) prior to conditioning, and located to facilitate occupant access & regular service. ⁶³				☐	☐	☐
9.2 Filter access panel includes gasket and fits snugly against exposed edge of filter when closed to prevent bypass. ⁶⁴				☐	☐	☐
10. Combustion Appliances						
10.1 Furnaces, boilers, & water heaters are mechanically drafted or direct-vented. Alternatives in Footnote 67. ^{65, 66, 67}				☐	☐	☐
10.2 Fireplaces are mechanically drafted or direct-vented. Alternatives in Footnote 68. ^{65, 66, 68}				☐	☐	☐
10.3 No unvented combustion appliances other than cooking ranges or ovens are located inside the home's pressure boundary. Alternative in Footnote 70. ^{65, 69, 70}				☐	☐	☐
Rater Name: _____		Rater Pre-Drywall Inspection Date ⁷¹ : _____		Rater Initials: _____		
Rater Name: _____		Rater Final Inspection Date ⁷² : _____		Rater Initials: _____		
Builder Employee: _____		Builder Inspection Date: _____		Builder Initials: _____		

Footnotes

1. At the discretion of the Rater, the builder may verify up to eight items in Sections 1-4 of this Checklist. When this allowance is used for Item 1.2 or 1.3, a maximum of 10% of the total surface area of the non-adiabatic insulated assemblies are permitted to be builder-verified; the remainder must be verified by the Rater. When exercised, the builder's responsibility will be formally acknowledged by the builder signing off on the checklist for the item(s) that they verified. However, if a quality assurance review indicates that Items have not been successfully completed, the Rater will be responsible for facilitating corrective action.
2. All items shall be verified for each certified home and sampling protocols shall not be used. The term 'Rater' refers to the person(s) completing the third-party verification required for certification. The person(s) shall: a) be a Certified Rater or Approved Inspector, as defined by ANSI / RESNET / ICC 301, or an equivalent designation as determined by a Home Certification Organization (HCO); and, b) have attended and successfully completed an EPA-recognized training class. See www.energystar.gov/newhomestraining.
3. The column titled "N/A," which denotes items that are "not applicable," should be used when the checklist Item is not present in the home or conflicts with local requirements.
4. Two alternatives are provided: a) Grade II cavity insulation is permitted to be used for assemblies that contain a layer of continuous, air impermeable insulation $\geq R-3$ in Climate Zones 1 to 4, $\geq R-5$ in Climate Zones 5 to 8; ⁸ b) Grade II batts are permitted to be used in floors if they fill the full width and depth of the floor cavity, even when compression occurs due to excess insulation, as long as the R-value of the batts has been appropriately assessed based on manufacturer guidance and the only defect preventing the insulation from achieving Grade I is the compression caused by the excess insulation.
5. Ensure compliance with this requirement using ANSI / RESNET / ICC 301 including all Addenda and Normative Appendices, with new versions and Addenda implemented according to the schedule defined by the HCO that the home is being certified under, with approved exceptions listed at www.energystar.gov/ERIEExceptions.
6. For purposes of this Checklist, an air barrier is defined as any durable solid material that blocks air flow between conditioned space and unconditioned space, including necessary sealing to block excessive air flow at edges and seams and adequate support to resist positive and negative pressures without displacement or damage. EPA recommends, but does not require, rigid air barriers.
Open-cell or closed-cell foam shall have a finished thickness ≥ 5.5 in. or 1.5 in., respectively, to qualify as an air barrier unless the manufacturer indicates otherwise.
If flexible air barriers such as house wrap are used, they shall be fully sealed at all seams and edges and supported using fasteners with caps or heads ≥ 1 in. diameter unless otherwise indicated by the manufacturer. Flexible air barriers shall not be made of kraft paper, paper-based products, or other materials that are easily torn. If polyethylene is used, its thickness shall be ≥ 6 mil.
7. All insulated ceiling surfaces, regardless of slope (e.g., cathedral ceilings, tray ceilings, conditioned attic roof decks, flat ceilings, sloped ceilings), must meet the requirements for ceilings.
8. For all Versions except National v3.2, the 2009 IECC Climate Zone designations are applicable, as defined and illustrated in [Section R301](#) of the code. For National Version 3.2, the 2021 IECC Climate Zone designations are applicable, as defined and illustrated in [Section R301](#) of the code. Note that some locations have shifted to a different Climate Zone in the 2021 IECC compared to prior editions.
9. All insulated vertical surfaces are considered walls (e.g., above and below grade exterior walls, knee walls) and must meet the air barrier requirements for walls. The following exceptions apply: air barriers recommended, but not required, in adiabatic walls in multifamily dwellings; and, in Climate Zones 4 through 8, an air barrier at the interior vertical surface of insulation is recommended but not required in basement walls or crawlspace walls.⁸ For the purpose of these exceptions, a basement or crawlspace is a space for which $\geq 40\%$ of the total gross wall area is below-grade.
10. Exterior air barriers are not required for attic knee walls that are ≤ 24 in. in height if an interior air barrier is provided and insulation extends in all directions from the top of this interior air barrier into unconditioned space at the following levels: CZ 1-5: $\geq R-21$; CZ 6-8: $\geq R-30$.⁸
11. EPA highly recommends, but does not require, an air barrier at the interior vertical surface of floor insulation in Climate Zones 4-8.⁸
12. Examples of supports necessary for permanent contact include staves for batt insulation or netting for blown-in insulation. Alternatively, supports are not required if batts fill the full depth of the floor cavity, even when compression occurs due to excess insulation, as long as the R-value of the batts has been appropriately assessed based on manufacturer guidance and the only defect preventing the insulation from achieving the required installation grade is the compression caused by the excess insulation.
13. Alternatively, an air barrier is permitted to be installed at the exterior horizontal surface of the floor insulation if the insulation is installed in contact with this air barrier, the exterior vertical surfaces of the floor cavity are also insulated, and air barriers are included at the exterior vertical surfaces of this insulation.
14. The minimum designated R-values must be achieved regardless of the trade-offs determined using an equivalent U-factor or UA alternative calculation. Note that if the minimum designated values are used, then higher insulation values may be needed elsewhere to meet Item 1.2. Also, note that these requirements can be met by using any available strategy, such as a raised-heel truss, alternate framing that provides adequate space, and / or high-density insulation.
15. Slab edge insulation is only required for slab-on-grade floors with a floor surface less than 12 inches below grade. Slab insulation shall extend to the top of the slab to provide a complete thermal break. If the top edge of the insulation is installed between the exterior wall and the edge of an interior, or exterior, slab, it shall be permitted to be cut at a 45-degree angle away from the exterior wall. The following alternatives apply:
 - a. Slab assemblies with an F-Factor equivalent to that of the insulation required in Item 3.2 may be used. F-Factors shall be determined using Table A6.3.1-1 from ASHRAE 90.1-2022 Appendix A. See www.energystar.gov/F-Factor for more details.
 - b. The thermal break is permitted to be created using $\geq R-3$ rigid insulation on top of the slab. In such cases, up to 10% of the slab surface is permitted to not be insulated (e.g., for sleepers, for sill plates). Insulation installed on top of slab shall be covered by a durable floor surface (e.g., hardwood, tile, carpet).
16. Where an insulated wall separates a garage, patio, porch, or other unconditioned space from the conditioned space of the house, slab insulation shall also be installed at this interface to provide a thermal break between the conditioned and unconditioned slab. Where specific details cannot

meet this requirement, partners shall provide the detail to EPA to request an exemption prior to the home's certification. EPA will compile exempted details and work with industry to develop feasible details for use in future revisions to the program. A list of currently exempted details is available at: energystar.gov/slabeledge.

17. Mass walls utilized as the thermal mass component of a passive solar design (e.g., a Trombe wall) are exempt from this Item. To be eligible for this exemption, the passive solar design shall be comprised of the following five components: an aperture or collector, an absorber, thermal mass, a distribution system, and a control system. For more information, see: energy.gov/sites/prod/files/guide_to_passive_solar_home_design.pdf.

Mass walls that are not part of a passive solar design (e.g., CMU block or log home enclosure) shall either utilize the strategies outlined in Item 3.4 or the pathway in the assembly with the least thermal resistance, as determined using a method consistent with the 2013 ASHRAE Handbook of Fundamentals, shall provide $\geq 50\%$ of the applicable assembly resistance, defined as the reciprocal of the mass wall equivalent U-factor in the 2009 IECC Table 402.1.3. Documentation identifying the pathway with the least thermal resistance and its resistance value shall be collected by the Rater and any Builder Verified or Rater Verified box under Item 3.4 shall be checked.

18. Up to 10% of the total exterior wall surface area is exempted from the reduced thermal bridging requirements to accommodate intentional designed details (e.g., architectural details such as thermal fins, wing walls, or masonry fireplaces; structural details, such as steel columns). It shall be apparent to the Rater that the exempted areas are intentional designed details or the exempted area shall be documented in a plan provided by the builder, architect, or engineer. The Rater need not evaluate the necessity of the designed detail to certify the home.
19. If used, insulated siding shall be attached directly over a water-resistive barrier and sheathing. In addition, it shall provide the required R-value as demonstrated through either testing in accordance with ASTM C 1363 or by attaining the required R-value at its minimum thickness. Insulated sheathing rated for water protection can be used as a water resistant barrier if all seams are taped and sealed. If non-insulated structural sheathing is used at corners, the advanced framing details listed in Item 3.4.3 shall be met for those wall sections.
20. Steel framing shall meet the reduced thermal bridging requirements by complying with Item 3.4.1 of the Checklist.
21. Double-wall framing is defined as any framing method that ensures a continuous layer of insulation covering the studs to at least the R-value required in Item 3.4.1 of the Checklist, such as offset double-stud walls, aligned double-stud walls with continuous insulation between the adjacent stud faces, or single-stud walls with 2x2 or 2x3 cross-framing. In all cases, insulation shall fill the entire wall cavity from the interior to exterior sheathing except at windows, doors and other penetrations.
22. All advanced framing details shall be met except where the builder, architect, or engineer provides a framing plan that encompasses the details in question, indicating that structural members are required at these locations and including the rationale for these members (e.g., full-depth solid framing is required at wall corners or interior / exterior wall intersections for shear strength, a full-depth solid header is required above a window to transfer load to jacks studs, additional jack studs are required to support transferred loads, additional cripple studs are required to maintain on-center spacing, or stud spacing must be reduced to support multiple stories in a multifamily building). The Rater shall retain a copy of the detail and rationale for their records, but need not evaluate the rationale to certify the home.
23. All exterior corners shall be constructed to allow access for the installation of $\geq R-6$ insulation that extends to the exterior wall sheathing. Examples of compliance options include standard-density insulation with alternative framing techniques, such as using three studs per corner, or high-density insulation (e.g., spray foam) with standard framing techniques.
24. Compliance options include continuous rigid insulation sheathing, SIP headers, other prefabricated insulated headers, single-member or two-member headers with insulation either in between or on one side, or an equivalent assembly. R-value requirement refers to manufacturer's nominal insulation value.
25. Insulation shall run behind interior / exterior wall intersections using ladder blocking, full length 2x6 or 1x6 furring behind the first partition stud, drywall clips, or other equivalent alternative.
26. In Climate Zones 6 – 8, a minimum stud spacing of 16 in. o.c. is permitted to be used with 2x6 framing if $\geq R-20.0$ wall cavity insulation is achieved. However, all 2x6 framing with stud spacing of 16 in. o.c. in Climate Zones 6 – 8 shall have $\geq R-20.0$ wall cavity insulation installed regardless of any framing plan or alternative equivalent total UA calculation.⁸
27. Existing sill plates (e.g., in a home undergoing a gut rehabilitation) on the interior side of structural masonry or monolithic walls are exempt from this Item. In addition, other existing sill plates resting atop concrete or masonry and adjacent to conditioned space are permitted, in lieu of using a gasket, to be sealed with caulk, foam, or equivalent material at both the interior seam between the sill plate and the subfloor and the seam between the top of the sill plate and the sheathing.
28. In Climate Zones 1 through 3, a continuous stucco cladding system adjacent to sill and bottom plates is permitted to be used in lieu of sealing plates to foundation or sub-floor with caulk, foam, or equivalent material.⁸
29. In Climate Zones 1 through 3, a continuous stucco cladding system sealed to windows and doors is permitted to be used in lieu of sealing rough openings with caulk or foam.⁸
30. Examples of durable covers include, but are not limited to, pre-fabricated covers with integral insulation, rigid foam adhered to cover with adhesive, or batt insulation mechanically fastened to the cover (e.g., using bolts, metal wire, or metal strapping).
31. This Checklist is designed to meet ASHRAE 62.2-2010 or later, and ANSI / ACCA's 5 QI-2015 protocol, thereby improving the performance of HVAC equipment in new homes when compared to homes built to minimum code. However, these features alone cannot prevent all ventilation, indoor air quality, and HVAC problems, (e.g., those caused by a lack of maintenance by occupants). Therefore, this Checklist is not a guarantee of proper ventilation, indoor air quality, or HVAC performance.
32. Track A – HVAC Grading shall use ANSI / RESNET / ACCA / ICC 310 including all Addenda and Normative Appendices, with new versions and Addenda implemented according to the schedule defined by the HCO that the home is being certified under.
33. For Track A, the Items in Section 5a are applicable to all unitary HVAC Systems including air conditioners and heat pumps up to 65 kBtuh and furnaces up to 125 kBtuh. All applicable systems shall comply with 5a.1 through 5a.3 for the home to be certified.

For Track B, the Items in Section 5b are applicable to split air conditioners, unitary air conditioners, air-source heat pumps, and water-source (i.e., geothermal) heat pumps up to 65 kBtuh with forced-air distribution systems (i.e., ducts) and to furnaces up to 225 kBtuh with forced-air distribution systems (i.e., ducts). All applicable systems shall comply with 5b.1 and 5b.2 for the home to be certified.

If, based on the selected Track, the Items in Section 5 are not applicable to any systems in the home, the Rater shall mark 'N/A'.

34. If the non-invasive procedure in ANSI / RESNET / ACCA / ICC 310 is not permitted to be used during the final inspection of a home (i.e., due to the equipment type or to outdoor air temperatures that do not meet the requirements of the non-invasive method), then the home is permitted to be certified with a default refrigerant charge designation of Grade III. Note that in these circumstances, the weigh-in method procedure in ANSI / RESNET / ACCA / ICC 310 may still be used to pursue a Grade I designation.
35. If installed equipment does not match the National HVAC Design Report, then prior to certification the Rater shall obtain written approval from the designer (e.g., email, updated National HVAC Design Report) confirming that the installed equipment meets the requirements of the National HVAC Design Report. In addition, if "N/A" was selected for Item 1.2 of the National Rater Design Review Checklist, then the Rater shall verify that all installed equipment is an exempted type per Footnote 14 of that Checklist or, if not an exempted type, shall re-review the National Rater Design Review Checklist to ensure compliance with all requirements (e.g., contractor credential, full completion of HVAC Design Report, HVAC design tolerances).

In cases where the condenser unit is installed after the time of inspection by the Rater, the HVAC manufacturer and model numbers on installed equipment can be documented through the use of photographs provided by the HVAC Contractor after installation is complete.
36. The Rater shall measure and record the external static pressure in the return-side and supply-side of the system using the contractor-provided test locations. However, at this time, the Rater need not assess whether these values are within a specific range to certify the home.
37. Kinks are to be avoided and are caused when ducts are bent across sharp corners such as framing members. Sharp bends are to be avoided and occur when the radius of the turn in the duct is less than one duct diameter. Compression is to be avoided and occurs when flexible ducts in unconditioned space are installed in cavities smaller than the outer duct diameter and ducts in conditioned space are installed in cavities smaller than inner duct diameter. Ducts shall not include coils or loops except to the extent needed for acoustical control.
38. Item 6.2 does not apply to ventilation ducts, exhaust ducts, or non-ducted systems. For an HVAC system with a multi-speed fan, the highest design fan speed shall be used when verifying this requirement. For an HVAC system with multiple zones, this requirement shall be verified with all zones calling for heating or cooling simultaneously; additional testing of individual zones is not required. When verifying this requirement, doors separating bedrooms from the main body of the house (e.g., a door between a bedroom and a hallway) shall be closed and doors to rooms that can only be entered from the bedroom (e.g., a closet, a bathroom) shall be open. As an alternative to the ± 3 Pa limit, a Rater-measured pressure differential ≥ -5 Pa and $\leq +5$ Pa is permitted to be used for bedrooms with a design airflow ≥ 150 CFM. The Rater-measured pressure shall be rounded to the nearest whole number to assess compliance.
39. Item 6.3 does not apply to ducts that are a part of local mechanical exhaust and exhaust-only dwelling unit mechanical ventilation systems. EPA recommends, but does not require, that all metal ductwork not encompassed by Section 6 (e.g., exhaust ducts, duct boots, ducts in conditioned space) also be insulated and that insulation be sealed to duct boots to prevent condensation.
40. Items 6.4 and 6.5 generally apply to the ducts of space heating, space cooling, and dwelling unit mechanical ventilation systems.

However, visual inspection is permitted in lieu of testing for a dwelling unit mechanical ventilation system not connected to the space heating or space cooling system, regardless of the number of dwelling units it serves. In such cases, a Rater shall visually verify that all seams and connections are sealed with mastic or metal tape and all duct boots are sealed to floor, wall, or ceiling using caulk, foam, or mastic tape.

For duct systems requiring testing, duct leakage shall be determined and documented by a Rater using ANSI / RESNET / ICC 380 including all Addenda and Normative Appendices, with new versions and Addenda implemented according to the schedule defined by the HCO that the home is being certified under. Leakage limits shall be assessed on a per-system, rather than per-home, basis.
41. For a duct system with three or more returns, the total Rater-measured duct leakage is permitted to be the greater of ≤ 6 CFM25 per 100 sq. ft. of CFA or ≤ 60 CFM25 at 'rough-in' or the greater of ≤ 12 CFM25 per 100 sq. ft. of CFA or ≤ 120 CFM25 at 'final'.
42. Note that compliance with Item 6.4.1 or 6.4.2 in conjunction with Section 4a of the National Rater Design Review Checklist automatically achieves Grade I total duct leakage per ANSI / RESNET / ACCA / ICC 310.
43. Cabinets (e.g., kitchen, bath, multimedia) or ducts that connect duct boots to toe-kick registers are not required to be in place during the 'rough-in' test.
44. Registers atop carpets are permitted to be removed and the face of the duct boot temporarily sealed during testing. In such cases, the Rater shall visually verify that the boot has been durably sealed to the subfloor (e.g., using duct mastic or caulk) to prevent leakage during normal operation.
45. Testing of duct leakage to the outdoors can be waived in accordance with the 2nd or 3rd alternative of ANSI / RESNET / ICC 301, Table 4.2.2 (1), footnote (w). Alternatively, testing of duct leakage to outdoors can be waived in accordance with Section 5.5.2 of ANSI / RESNET / ICC 380 if total duct leakage, at rough-in or final, is ≤ 4 CFM25 per 100 sq. ft. of conditioned floor area or 40 CFM25, whichever is larger. Guidance to assist partners with these alternatives, including modeling inputs, is available at <http://www.energystar.gov/newhomesguidance>.
46. As defined by ANSI / RESNET / ICC 301-2019, a Dwelling Unit Mechanical Ventilation System is a ventilation system consisting of powered ventilation equipment such as motor-driven fans and blowers and related mechanical components such as ducts, inlets, dampers, filters and associated control devices that provides dwelling-unit ventilation at a known or measured airflow rate.
47. Item 7.3 applies to any outdoor air inlet connected to a ducted return of the dwelling unit HVAC system, regardless of its intended purpose (e.g., for ventilation air, make-up air, combustion air). This Item does not apply to HVAC systems without a ducted return.
48. The Dwelling Unit Mechanical Ventilation System air flows and local exhaust air flows shall be determined and documented by a Rater using ANSI / RESNET / ICC 380 including all Addenda and Normative Appendices, with new versions and Addenda implemented according to the schedule defined by the HCO that the home is being certified under. Designers are permitted to provide multiple combinations of a design ventilation airflow rate, run-time per cycle, and cycle time. When multiple combinations are provided, the Rater shall first assess the run-time setting of the installed system and use that to determine the corresponding design ventilation rate. The Rater-measured ventilation rate must fall within the program-specified tolerance relative to that design ventilation rate.
49. For an attached dwelling unit, excluding units in dwellings (i.e., duplex) and townhomes, the override control is not required to be readily accessible to the occupant. However, in such cases, EPA recommends but does not require that the control be readily accessible to others (e.g., building maintenance staff) in lieu of the occupant.

50. For example, if an outdoor air inlet connected to a ducted return is used as a dedicated source of outdoor air for an exhaust ventilation system (e.g., bath fan), the outdoor airflow must be automatically restricted when the exhaust fan is not running and in the event of an override of the exhaust ventilation system.
51. When assessing the ventilation rate, the highest HVAC fan speed applicable to ventilation mode shall be used (e.g., if the inlet only opens when the HVAC is in 'fan-only' mode, then test in this mode). If the inlet has a motorized damper that only opens when the local mechanical kitchen exhaust is turned on, then testing is not required.

When required, the ventilation airflow through the inlet shall be measured and documented by a Rater using ANSI / RESNET / ICC 380 including all Addenda and Normative Appendices, with new versions and Addenda implemented according to the schedule defined by the HCO that the home is being certified under. As an alternative, measurement of the outdoor airflow can be waived if a Constant Airflow Regulating (CAR) damper with a manufacturer-specified maximum flow rate no higher than 15 CFM or 15% above the ventilation design value is installed on the inlet.
52. Dwelling Unit Mechanical Ventilation System fans shall be rated for sound at no less than the airflow rate in Item 2.3 of the National HVAC Design Report. Fans exempted from this requirement include HVAC air handler fans, remote-mounted fans, and intermittent fans rated ≥ 400 CFM. To be considered for this exemption, a remote-mounted fan must be mounted outside the habitable spaces, bathrooms, toilets, and hallways and there shall be ≥ 4 ft. ductwork between the fan and intake grill. Per ASHRAE 62.2-2010, habitable spaces are intended for continual human occupancy; such space generally includes areas used for living, sleeping, dining, and cooking but does not generally include bathrooms, toilets, hallways, storage areas, closets, or utility rooms.
53. Note that the 'fan-on' setting of a thermostat would not be an acceptable controller because it would continuously operate the HVAC fan.
54. Bathroom fans with a rated flow rate ≥ 500 CFM are exempted from the requirement to be ENERGY STAR certified.
55. Without proper maintenance, ventilation air inlet screens often become filled with debris. Therefore, EPA recommends, but does not require, that these ventilation air inlets be located so as to facilitate access and regular service by the occupant. Ventilation air inlets that are only visible via rooftop access are exempted from Item 7.7 and the Rater shall mark "N/A".
56. Two alternatives to the required 10 ft. distance are provided: 1) inlets providing outdoor air to a dwelling unit are permitted to be ≥ 5 ft. of stretched-string distance from outlets of both exhaust dwelling unit mechanical ventilation systems and local mechanical exhaust systems, and 2) the outlet and inlet of ERV's and HRV's may use a smaller distance if allowed by the manufacturer of the system. If the second alternative is used, the manufacturer's instructions shall be collected for documentation purposes.
57. Known contamination sources include, but are not limited to, stacks, vents, exhausts, and vehicles.
58. Continuous bathroom local mechanical exhaust fans shall be rated for sound at no less than the airflow rate in Item 8.2. Intermittent bathroom and both intermittent and continuous kitchen local mechanical exhaust fans are recommended, but not required, to be rated for sound at no less than the airflow rate in Items 8.1 and 8.2. Per ASHRAE 62.2-2010, an exhaust system is one or more fans that remove air from the building, causing outdoor air to enter by ventilation inlets or normal leakage paths through the building envelope (e.g., bath exhaust fans, range hoods, clothes dryers). Per ASHRAE 62.2-2010, a bathroom is any room containing a bathtub, shower, spa, or similar source of moisture.
59. An intermittent mechanical exhaust system, where provided, shall be designed to operate as needed by the occupant. Control devices shall not impede occupant control in intermittent systems.
60. Kitchen volume shall be determined by drawing the smallest possible rectangle on the floor plan that encompasses all cabinets, pantries, islands, peninsulas, ranges / ovens, and the kitchen exhaust fan, and multiplying by the average ceiling height for this area. In addition, the continuous kitchen exhaust rate shall be ≥ 25 CFM, per 2009 IRC Table M1507.3, regardless of the rate calculated using the kitchen volume. Cabinet volume shall be included in the kitchen volume.
61. Homes shall meet this Item. Alternatively, the prescriptive duct sizing requirements in Table 5.3 of ASHRAE 62.2-2010 or later are permitted to be used for kitchen exhaust fans based upon the rated airflow of the fan at 0.25 IWC. If the rated airflow is unknown, ≥ 6 in. smooth duct shall be used, with a rectangular to round duct transition as needed. Guidance to assist partners with these alternatives is available at <http://www.energystar.gov/newhomesguidance>. As an alternative to Item 8.1, homes are permitted to use a continuous kitchen exhaust rate of 25 CFM per 2009 IRC Table M1507.3, if they are either a) Phius or PHI certified, or b) provide both dwelling unit ventilation and local mechanical kitchen exhaust using a balanced system, and have a Rater-verified whole-building infiltration rate ≤ 1.0 ACH50 or ≤ 0.05 CFM50 per sq. ft. of Enclosure Area, and a Rater-verified dwelling unit compartmentalization rate ≤ 0.30 CFM50 per sq. ft. of Enclosure Area if multiple dwelling units are present in the building. 'Enclosure Area' is defined as the area of the surfaces that bound the volume being pressurized / depressurized during the test.
62. All intermittent kitchen exhaust fans must be capable of exhausting at least 100 CFM. In addition, if the fan is not part of a vented range hood or appliance-range hood combination (i.e., if the fan is not integrated with the range), then it must also be capable of exhausting ≥ 5 ACH, based on the kitchen volume.
63. Based upon ASHRAE 62.2-2010, ducted mechanical systems are those that supply air to an occupiable space with a total amount of supply ductwork exceeding 10 ft. in length and through a thermal conditioning component, except for evaporative coolers. Systems that do not meet this definition are exempt from this requirement. While filters are recommended for mini-split systems, HRV's and ERV's, these systems, ducted or not, typically do not have MERV-rated filters available for use and are, therefore, also exempted under this version of the requirements. EPA also recommends, but does not require, filtering air inlets to minimize outdoor particles entering the home. HVAC filters located in the attic shall be considered accessible to the occupant if either 1) drop-down stairs, a pull-down ladder, or door provide access to attic and a permanently installed walkway has been provided between the attic access location and the filter or 2) the filter location enables arm-length access from a portable ladder without the need to step into the attic and the height of the ceiling access panel or the bottom of the wall access panel where access is provided is ≤ 12 ft.
64. Sealing mechanisms comparable to a gasket are also permitted to be used. The filter media box (i.e., the component in the HVAC system that houses the filter) may be either site-fabricated by the installer or pre-fabricated by the manufacturer to meet this requirement. These requirements only apply when the filter is installed in a filter media box located in the HVAC system, not when the filter is installed flush with the return grill.

65. The pressure boundary is the primary enclosure boundary separating indoor and outdoor air. For example, a volume that has more leakage to outside than to conditioned space would be outside the pressure boundary.
66. Per the 2009 International Mechanical Code, a direct-vent appliance is one that is constructed and installed so that all air for combustion is derived from the outdoor atmosphere and all flue gases are discharged to the outside atmosphere; a mechanical draft system is a venting system designed to remove flue or vent gases by mechanical means consisting of an induced draft portion under non-positive static pressure or a forced draft portion under positive static pressure; and a natural draft system is a venting system designed to remove flue or vent gases under nonpositive static vent pressure entirely by natural draft.
67. This item only applies to furnaces, boilers, and water heaters located within the home's pressure boundary. Naturally drafted equipment is allowed within the home's pressure boundary in Climate Zones 1-3 if the Rater has followed ANSI / ACCA 12 QH-2014, Section 3.2.2, Appendix A Sections A2.2.6, A3 (Carbon Monoxide Test), A4 (Depressurization Test for the Combustion Appliance Zone), and verified that the equipment meets the limits defined within.⁸
68. This item only applies to fireplaces located within the home's pressure boundary. Naturally drafted fireplaces are allowed within the home's pressure boundary if the Rater has verified that the total net rated exhaust flow of the two largest exhaust fans (excluding summer cooling fans) is ≤ 15 CFM per 100 sq. ft. of occupiable space when at full capacity. If the net exhaust flow exceeds the allowable limit, it shall be reduced or compensating outdoor airflow provided. Per ASHRAE 62.2-2010, the term "net rated exhaust flow" is defined as flow through an exhaust fan minus the compensating outdoor airflow through any supply fan that is interlocked to the exhaust fan. Per ASHRAE 62.2-2010, the term "occupiable space" is defined as any enclosed space inside the pressure boundary and intended for human activities, including, but not limited to, all habitable spaces, toilets, closets, halls, storage and utility areas, and laundry areas. See Footnote 52 for the definition of "habitable spaces".
69. The minimum volume of combustion air required for safe operation by the manufacturer and / or code shall be met or exceeded. Also, in accordance with the National Fuel Gas Code, ANSI Z223.1 / NFPA54, unvented room heaters shall not be installed in bathrooms or bedrooms.
70. Alternatively, unvented combustion appliances other than cooking ranges or ovens are permitted to be located inside the home's pressure boundary if the Rater has followed ANSI/ACCA 12 QH-2014, Section 3.2.2, Appendix A Sections A2.2.6, A3, and A4, and verified the equipment meets the limits defined within.
71. Any Item that will be concealed by drywall (e.g., wall insulation) must be verified during the pre-drywall inspection. If drywall is installed prior to the inspection, then it must be entirely removed to fully verify all Items. It is not sufficient to remove only portions of drywall to inspect a subset of areas. Furthermore, it is not acceptable to complete a Sampled Rating on a home that has missed the pre-drywall inspection. Additional information is available in the [Technical Bulletin: Pre-Drywall Inspection Is Always Required](#).
72. Some Items can typically only be verified at a later stage of construction than when the pre-drywall inspection occurs (e.g., bath fan airflow). Any Item that has not been verified during the pre-drywall inspection must be verified prior to or during the final inspection.

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SECTION 05 50 00

METAL FABRICATIONS

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Provide miscellaneous metals as indicated on the drawings and specified herein. Work includes, but is not limited to:
 - 1. Steel railings and handrails
 - 2. Miscellaneous steel supports
 - 3. Anchors and fasteners

1.02 RELATED SECTIONS

- A. Painting: Section 09 90 00.

1.03 REFERENCES

- A. Steel Construction Manual: American Institute of Steel Construction (AISC).
- B. American Welding Society (AWS).
 - 1. AWS D1.1 - Structural Welding Code - Steel.
- C. American Society for Testing and Materials (ASTM).
 - 1. ASTM A36 - Structural Steel.
 - 2. ASTM A53 - Pipe, Steel, Black and Hot-Dipped, Zinc-coated Welded and Seamless.
 - 3. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 4. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 5. ASTM A283 – Low and Intermediate Tensile Strength Carbon Steel Plates.
 - 6. ASTM A307 - Carbon Steel Bolts and Studs Externally and Internally Threaded Fasteners, 60,000 PSI Tensile Strength.
 - 7. ASTM A325 – Structural Bolts, Steel, Heat Strengthened, 120/105 KSI Minimum Tensile Strength.
 - 8. ASTM A500 – Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 - 9. ASTM A501 - Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
- D. Society for Protective Coatings (SSPC)

1. SSPC-SP1 - Solvent Cleaning
2. SSPC-SP2 - Hand Tool Cleaning
3. SSPC-SP3 - Power Tool Cleaning
4. SSPC-SP6 - Commercial Blast Cleaning
5. SSPC-SP11 - Power Tool Cleaning to Bare Metal

1.04 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

1.05 SUBMITTALS

- A. Shop Drawings - General: Submit for all items.
- B. Shop Drawings –Handrails: Indicate in detail construction, gages of metals, jointing, methods of installation, fastening and supports, location and sizes of welds, anchors, hangers and other pertinent information and data.
 1. In addition, submit plans and details of stairs and handrails, drawn to scale not less than 1/4 inch per foot.
 2. Shop drawings shall contain design, type of steel and load assumption, bearing the seal of a licensed professional engineer registered in the State of Ohio.

1.06 QUALITY ASSURANCE

- A. Fabricate and install metal items in accordance with applicable standards of AISC and NAAMM. Welding and related procedures in accordance with AWS.
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
 1. AWS D1.1 - Structural Welding Code - Steel.
 2. AWS D1.2 - Structural Welding Code - Aluminum.
- C. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

- D. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry for installation of miscellaneous metal work. Provide setting drawings, templates, instructions and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.

1.07 PROJECT CONDITIONS

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.

1.08 COORDINATION

- A. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry for installation of miscellaneous metal work. Provide setting drawings, templates, instructions and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.

1.09 STORAGE AND HANDLING

- A. Protect from corrosion.
- B. Store materials in a weathertight and dry place until ready for use in the work.
- C. Store packaged materials in their original unbroken package or container.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Ferrous Metals
 - 1. Steel Shapes, Bars and Plates: ASTM A36.
 - 2. Steel Plates to be Bent or Cold Formed: ASTM A283, Grade C.
 - 3. Steel Pipe: ASTM A53, Type E or S, Grade B, black standard weight.
 - a. Pipe Bollards: Heavy weight, schedule 80.
 - 4. Steel for Gratings: ASTM A569 or A36.
 - a. Wire Cross Bars for Gratings: ASTM A510.
 - 5. Steel Tubing: ASTM A500, Grade A, cold-formed; or ASTM A501, hot-formed.
- B. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded

2.02 FASTENERS

- A. General

1. Provide fasteners of types as required for assembly and installation of fabricated items.
 2. Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941; Class Fe/Zn 5; at exterior walls.
- B. Bolts, Nuts and Washers: Regular hexagon head type, externally and internally threaded fasteners; include necessary nuts and plain hardened washers. Provide the following materials/finishes:
1. Steel: ASTM A307 Grade A bolts; A563 nuts. For members for support of structural members or connection thereto, provide ASTM A325 bolts.
 2. Stainless Steel: ASTM F 593 for bolts and ASTM F 594 for nuts, Alloy Group 1
- C. Expansion Anchors: Stainless steel "DH Bolts" or "Ankr Tite" devices by WEJ-IT or similar by REDHEAD, HILTI or SIMPSON. Length as required to provide minimum 2-1/2" embedment into sound masonry.
- D. Adhesive Type Anchor Bolts – In Hollow CMU: Chemically grouted adhesive anchor systems with nylon or stainless steel screen inserts. Use 1/2 inch diameter anchors, unless otherwise noted.
1. HIT HY20 Adhesive Anchors, HILTI, INC.
 2. EPCON System, ITW/RAMSET/RED HEAD
 3. Chem-Stud Adhesive Anchors, RAWLPLUG COMPANY, INC.
 4. Simpson Set Epoxy- Tie Adhesive Anchors, SIMPSON STRONG- TIE COMPANY, INC.
- E. Adhesive Type Anchor Bolts - In solid grouted CMU and Concrete: Chemically grouted adhesive anchor systems. Use 3/4 inch diameter anchors, unless otherwise noted.
1. HIT HY150 Adhesive Anchors, HILTI, INC.
 2. EPCON System, ITW/RAMSET/REDHEAD
 3. Chem-Stud Adhesive Anchors, POWERS FASTENERS, INC.
 4. Simpson Set Epoxy-Tie Adhesive Anchors, SIMPSON STRONG-TIE COMPANY, INC.
- F. Miscellaneous Fasteners
1. Lag Bolts: ANSI B18.2.1.
 2. Machine Screws: Cadmium plated steel, ANSI B18.6.3.
 3. Wood Screws: Flat head carbon steel, ANSI B18.6.1.
 4. Plain Washers: Round, carbon steel, ANSI B18.22.1
 5. Toggle Bolts: Tumble-wing or spring wing type, FS FF-B-588, type, class, and style as required.
 6. Lock Washers: Helical spring type carbon steel, ANSI B18.21.1.

2.03 FABRICATION

A. General

1. Workmanship
 - a. Construct all items to ensure ease of installation and minimal field adjustment.
 - b. Use materials of size and thickness shown, or, if not shown, of required size and thickness to produce strength and durability in finished product. Ease exposed edges to a radius of approximately 1/32 inch. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
 - c. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces. Grind crotches to 1/8" radius.
 - d. Form exposed connections with hairline joints, flush and smooth.
2. Field Measuring: Field measure all items required to obtain proper fit.
3. Exposed mill names and logos not permitted in finished work.

B. Handrail/Guardrail: Fabricate as indicated on the drawings.

1. Material: Steel pipe or shapes as detailed; meeting the requirements specified herein for the specific material.
2. Loadings: Steel guardrails and handrails shall meet the following load requirements:
 - a. Welded construction, fabricated, complete with connectors to structure designed for a concentrated load of 200 pounds applied at any point and in any direction on the handrail and at the top of the guardrail and in compliance with OBC.
 - b. Guardrails: Designed and constructed for a load of 50 pounds per lineal foot applied horizontally at the required guardrail height and a simultaneous load of 100 pounds per lineal foot applied vertically downward at the top of the guardrail.
 - c. Guardrails: Designed and constructed to resist a 200 pound concentrated horizontal load applied on a one foot square area at any point in the system including intermediate rails or other elements serving this purpose.
 - d. Handrails: Designed and constructed for a load of 50 pounds per lineal foot applied in any direction and in compliance with the OBC.
 - e. Loading conditions in paragraphs a, b, c and d shall not be applied simultaneously, but each shall be applied to produce maximum stress in each of the respective components or any of the supporting components.
3. Verify dimensions on site prior to shop fabrication.
4. Railing system shall be assembled in a shop in largest sizes for delivery to site and for installation; to minimize field-splicing and assembly.
 - a. Rails shall be disassembled only as necessary for shipping and handling.

- b. Rails shall be marked for re-assembly and coordinated installations.
- 5. Close open ends of railings, not scheduled to be closed with finials, with close fitting steel plates welded in place and ground smooth.
- 6. Welded Connection: Cope intersections of rails and posts, weld joints and grind smooth. Butt weld end-to-end joints of railings, or use welding connections at fabricator's option.
- 7. Form simple and compound curves by bending pipes in jigs to produce uniform curves.
 - a. Maintain profile of pipes throughout entire bend without buckling, twisting or otherwise deforming exposed surfaces.
- 8. Space posts and wall brackets as indicated. If not indicated, 7'-0" maximum center to center.
- 9. Brackets, Flanges and Anchors: Provide for railing posts and handrail supports. Provide inserts and sleeves as required for anchorage to concrete or masonry.
- 10. Provide wall returns at ends of wall mounted rails.
- 11. For Exterior Installations: Provide weepholes or other means for evacuation of water trapped in pipe rails.
- 12. Expansion Joints: Provide expansion joints at locations indicated. If not indicated, locate at intervals not to exceed 40 feet.
 - a. Provide slip-joint interval sleeve extending beyond joint on each side; secure sleeve to one side.
 - b. Do not locate expansion joints closer than 6" from post.
- C. Accessories: Provide all clips, bolts, anchors, fasteners, etc., as required for completion of miscellaneous metal work. Type, size and strength as noted or as suitable for conditions and construction involved.

2.05 FINISHES

- A. Preparation: Grind all exposed cut surfaces as required to remove burrs and sharp edges.
- B. Galvanizing
 - 1. Galvanize all ferrous metal items exposed to weather, embedded in masonry or concrete, and where indicated.
 - 2. Hot-dip galvanize after fabrication in accordance with ASTM A123; provide minimum of 2 oz. of galvanizing (Grade 85) per sq. ft. of subsurface. Prepare and pretreat surfaces as recommended by galvanizer. Do not weld after galvanizing.
 - 3. Galvanizing Repair Paint: Minimum 79% zinc dust by weight in dried film. TNEMEC COMPANY, INC., No. 92 Tneme-Zinc; ZRC Cold Galvanizing Compound by ZRC, Zinc-rich Galvax by ALVIN PRODUCTS.
 - 4. Do not use stainless steel or other non-galvanized fasteners in the assembly of galvanized components.

PART 3 EXECUTION

3.01 PREPARATION

- A. Coordinate and furnish anchorages, settings drawings, diagrams, templates, instructions and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

3.02 INSTALLATION

A. General

1. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.
2. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and level. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry or similar construction.
3. Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.
4. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work. Comply with the following requirements:
 - a. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - b. Obtain fusion without undercut or overlap.
 - c. Remove welding flux immediately.
 - d. 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.
5. Protection from Dissimilar Materials: Coat all aluminum surfaces in contact with steel, concrete or masonry with one coat of heavy bodied bituminous paint. Where aluminum contacts steel surfaces, and only where specifically approved, the painting required on the steel surface may be substituted for the bituminous paint.

B. Handrail

1. Adjust railings prior to anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated or specified herein. Plumb posts

in each direction. Secure posts in each direction. Secure posts and railing ends to building construction as follows.

2. Anchor posts to concrete as indicated on the drawings.
3. Weld posts to channels as indicated.
4. Secure handrails to wall with wall brackets. Provide brackets with not less than 1-1/2" clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required for design loading. Secure wall brackets and wall return fittings to concrete or masonry with expansion bolts.

3.03 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780.

END OF SECTION

SECTION 06 10 50

WOOD BLOCKING AND PLYWOOD

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Concealed blocking for support of accessories, equipment, specialty items, cabinets, fixtures, trim, facing materials and similar type items.
- B. Subflooring.
- C. Underlayment.

1.02 REFERENCES

- A. Standards
 - 1. American Wood Protection Association (AWPA): Treatment Standards.
 - a. AWP U1 - Use Category System: User Specification for Treated Wood
 - 2. American Plywood Association (APA): Grades and Standards

1.03 RELATED SECTIONS

- A. Manufactured Wood Casework: Section 12 32 00.

1.04 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
- B. Laboratory Test Reports: For adhesives, documentation indicating that products comply with the testing and product requirements.

1.05 QUALITY ASSURANCE

- A. Softwood Lumber: Grading rules and wood species shall conform with the voluntary Product Standards PS 20 including grading rules of the following associations, as applicable:
 - 1. Southern Pine: Standard Grading Rules for Southern Pine Lumber, published by Southern Pine Inspection Bureau (SPIB).
 - 2. Douglas Fir, Western Larch and Hemlock: Western Lumber Grading Rules, published by Western Wood Products Association (WWPA), Standard

Grading and Dressing Rules for West Coast Lumber Inspection Bureau (WCLIB) or National Lumber Grades Authority (NLGA).

3. Western Spruce, Pine and Fir: Western Spruce-Pine-Fir Association (WSPFA) and current Canadian Grading Rules by National Grades Association, Canada.

B. Softwood Plywood: Grading rules and wood species shall conform with Product Standard PS 1.

C. Grade Marks

1. General: Identify all lumber and plywood by official grade mark.
2. Lumber: Grade stamp to contain symbol of grading agency, mill number or name, grade of lumber, species or species grouping, or combination designation, rules under which graded, where applicable and condition of seasoning at time of manufacture.
3. Softwood Plywood: Appropriate grade trademark of the American Plywood Association.
 - a. Type, grade, class and identification index.
 - b. Inspection and testing agency mark.

1.06 STORAGE AND HANDLING

- A. Store off the ground.
- B. Protect from direct contact with the weather.
- C. Provide proper ventilation.

PART 2 PRODUCTS

2.01 SOFTWOOD LUMBER

- A. Species: Any commercial softwood.
 1. Provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship":
- B. Moisture Content: Maximum 19% at time of manufacture.
 1. Fire Retardant Treated Materials: Kiln-dry all materials after treatment to maximum 15% moisture content.
- C. Dimensions
 1. Specified lumber dimensions are nominal unless otherwise indicated.
 2. Actual dimensions conform to industry standards established by the American Lumber Standards Committee and the rules writing agencies.

D. Surfaces: Surface four sides (S4S) unless specified otherwise.

E. Grading: Construction grade.

2.02 PLYWOOD

A. General: All composite wood products will be compliant with California 93120

B. Plywood Blocking: Provide exterior grade plywood for exterior use and interior type with exterior glue for interior use. Formaldahyde free.

1. Exterior: APA-CD-EXT.
2. Interior: APA-CD-EXPOSURE I, with exterior glue.
3. Subfloor: APA RATED STURD-I-FLOOR EXP 1 or 2.
4. Underlayment: APA UNDERLAYMENT EXP 1, with sanded-face.

2.03 ROUGH HARDWARE

A. General: Provide all necessary spikes, screws, nails, bolts and other hardware for satisfactory erection of work. Except where noted to be stainless steel, provide hot-dipped galvanized finish for hardware exposed to exterior, located in toilet rooms, in contact with treated wood or in contact with roofing or flashing.

1. Nails: ASTM F1667. Common wire nails, except where noted otherwise on drawings; sizes as noted or specified herein.

2.04 ADHESIVE

A. Adhesives: Water- and mold-resistant formulation complying with ASTM D3498 that is approved for use indicated by adhesive manufacturer.

1. VOC Content: The volatile organic compound (VOC) content of adhesives shall not exceed the limits defined in Rule #1168 "Adhesive and Sealant Applications" of the South Coast Air Quality Management District (SCAQMD), of the State of California.
2. Subflooring
 - a. Use adhesives complying with APA Specification AFG-01, applied in accordance with manufacturers' recommendations. Apply to all framing member/plywood panel joints.
 - b. Provide ply-clips or similar Architect approved support methods at unsupported panel edges.

PART 3 EXECUTION

3.01 CONDITIONS OF SURFACES

A. General: Verify that surfaces to receive blocking are prepared to exact grades and dimensions.

3.02 INSTALLATION

- A. Align and anchor blocking with countersunk bolts, washers, nuts, or nails, as applicable.
- B. Locate blocking to facilitate installation of finishing materials, fixtures, specialty items and trim.
- C. Underlayment: Install where indicated over subflooring. Install with construction adhesive in accordance with manufacturer's recommendations, staggering all joints with subflooring joints. Supplement adhered connections with mechanical fasteners.
 - 1. Where underlayment is being installed over existing wood subflooring, insure that existing subflooring is tight and secure. Add blocking and screws as required.

END OF SECTION

SECTION 06 40 00

ARCHITECTURAL WOODWORK

PART 1 GENERAL

1.01 WORK INCLUDED

A. Provide architectural woodwork as indicated and specified. Work includes:

1. Plastic laminate countertops.
2. Quartz composition countertops.

1.02 RELATED SECTIONS

A. Manufactured Wood Casework: Section 12 32 00.

1.03 REFERENCES

A. Standards: Wherever the following abbreviations are used herein, they shall refer to the corresponding standard:

1. ANSI: American National Standards Institute.
2. AWI: Architectural Woodwork Institute.
3. NEMA: National Electrical Manufacturer's Association.
4. P.S.: U.S. Product Standard.

1.04 SUBMITTALS

A. Product Data: Submit for all items.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1. Provide large scale details.
2. Indicate methods of fabrication, edging, location and construction of joints.
3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections

C. AWI Quality Standards: A photo-copy of the applicable portions of the AWI publication "Architectural Woodwork Quality Standards", latest edition, shall be submitted with each set of shop drawings.

1. Each copy must be marked to clearly show all details, specifications and finishes proposed for this work.

- D. Submit samples of all finish materials, including the following:
 - 1. Plastic laminate for texture and color selections. (8" x 10").
 - 2. Solid or quartz surface material.
- E. Manufacturer's product data describing type and quality of the following:
 - 1. Plastic laminate (face grade and liner grade).

1.05 QUALITY ASSURANCE

- A. Fabricator qualifications: A firm specializing in the fabrication of millwork with a minimum of 5 years experience and a satisfactory record of performance on projects of comparable size and quality. Shop is a certified participant in AWI's Quality Certification Program.
- B. Installation: Performed only by skilled finish carpenters with a minimum of 3 years experience in installing custom millwork similar to that required for this project.
- C. All solid surface material type work shall be performed by a Manufacturer Certified fabricator.
- D. Provide lumber factory marked with type, grade, mill and grading agency identification on concealed surfaces. Omit marking and submit mill certificates for materials to receive transparent finishes that cannot be marked on a concealed surface.
- E. Quality Grade: Materials and fabrication shall be "custom grade" unless otherwise indicated on the drawings or specified herein as "premium grade", both in accordance with "Quality Standard Illustrated," of the AWI conforming to the following sections:
 - 1. Section 100: Solid wood members.
 - 2. Section 200: Plywood and particleboard.
 - 3. Section 400: Casework and tops.
 - 4. Section 1700: Installation of architectural woodwork.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Protect woodwork materials and items during delivery, storage and handling to prevent damage, soiling and deterioration.
- B. Do not deliver woodwork materials and items until concrete, masonry, painting, grinding and other similar wet work has been completed and is thoroughly dry, outside door openings are permanently watertight, exterior windows are glazed and, in case of temperature dropping below 60° F., until temporary heating and ventilating systems are in operation.
- C. Store materials in dry, well-ventilated spaces with constant minimum temperature

of 60° F., and maximum relative humidity of 55%.

1. Do not store adhesives with materials that have a high capacity to absorb VOC emissions (i.e., materials which are woven, fibrous or porous in nature, such as acoustical ceilings, carpets, textiles, etc.).
2. Do not store adhesives in occupied spaces.

1.08 PROJECT CONDITIONS

- A. Provide and maintain a constant temperature and humidity before, during and after installation as required to maintain optimum moisture content of installed materials.
- B. Field Measurements: Where cabinets are 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.
 1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed, and indicate measurements on Shop Drawings.
- C. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.09 COORDINATION

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

PART 2 PRODUCTS

2.01 MATERIALS

- A. General: All composite wood products will be compliant with California 93120
- B. Particle Board (Substrate for Laminate Surfaces): High density industrial grade with a minimum density of 45 pounds per cubic foot and a moisture content between 9% maximum and 6% minimum, meeting or exceeding ANSI A208.1 or ASTM D1037; formaldehyde-free. ASTM E84, Class A.
 1. FLAKEBOARD Vesta FR Particleboard
 2. SIERRAPINE Encore FR
 3. PANEL SOURCE INTERNATIONAL Pyroblock Platinum Particleboard
- C. Plastic Laminate: Conform to the requirements of the National Electrical

Manufacturer's Association (NEMA) Publication Number LD-3.

1. General Purpose Grade: 0.05 inches thick.
 2. Provide solid color type where indicated on drawings.
 3. Fill and seal plastic laminate joints with Seamfil by KAMPEL ENTERPRISES, INC. or equal. Colors to match plastic laminate.
- D. Adhesive: Low-VOC, FS MMM-A-125C, Type II, water- and mold-resistant; complying with required VOC regulations.
1. VOC Content: The volatile organic compound (VOC) content of adhesives shall not exceed the limits defined in Rule #1168 "Adhesive and Sealant Applications" of the South Coast Air Quality Management District (SCAQMD), of the State of California.
- E. Quartz Composition Material: Non porous, scratch and high temperature resistant crushed quartz composition.
1. Thicknesses: As indicated.
 2. Flexural properties: ASTM D 790, ASTM C 880
 3. Compression strength: ASTM C 170
 4. Certified food contact: NSF/ANSI 51 Certified.
 5. Surface burning characteristics - ASTM E 84: Class I or A, and as follows:
 - a. Flame spread: <25.
 - b. Smoke developed: <25.
 6. Joints: Provide watertight color matched, fused joints as recommended by manufacturer.
 7. Edge Treatment: As detailed on drawings. Ease all exposed edges not otherwise detailed.
 8. Manufacturer and Color: As indicated
 9. Other Acceptable Manufacturers: Solid surface manufactured by the following companies are acceptable providing they meet the requirements specified herein and the patterns and colors are an acceptable match as determined by the Architect.
 - a. DU PONT Corian
 - b. CAMBRIA
 - c. CAESERSTONE
 - D. LG VIATERA

2.02 FABRICATION

- A. General: Except as specified hereinafter, fabricate all work in accordance with AWI quality standards as specified. Work not specified with a level of quality shall be not less than "Custom" quality per AWI.
- B. Plastic Laminate Countertops
1. Quality Standard: Custom Grade per AWI Section 400.
 2. Top Core: Construct tops of 3/4" thick particle board core typical; provide

exterior grade plywood (Plyform) at counters with sinks (and associated splashes) and other locations where indicated on drawings.

- a. Where double layers indicated, glue together to form monolithic 1-1/2" thick panel.
3. Splashes: Provide with minimum 1/4" scribe typical.
 - a. Integral coved back splash with permanently attached straight side splash coped into backsplash
 - b. Seal: Prior to permanent attachment of straight splashes to top, seal all joints by setting in continuous bead of clear silicone sealant.
4. Exposed Edges: Build exposed edges to 1-1/2" thick at overhang by attaching continuous strip of core material to bottom side of top.
5. Joints in core, if required, to be fitted with mechanical panel fasteners; spacing not to exceed 12" apart nor more than 3" from outside corners.
6. Finishes: Finish tops, splashes and edges with plastic laminate as follows:
 - a. General purpose grade
 - b. Balance underside of tops with backing sheets, 0.020".
 - c. Finish bottom of all overhangs with laminate.

C. Solid Surface and Quartz Surface Material Countertops and Components: Fabricate to profiles, sizes and edge conditions indicated on drawings and as directed by manufacturers requirements.

1. Solid Surface: Back and side splashes, where indicated, to be fused to top to ensure watertight joint.
2. Fabricate with openings and mortises precut, where possible to receive fixtures, accessories and other similar items of work.
3. Ease edges as indicated on the drawings.
4. Fabricate components in shop to greatest extent practical to sizes and shapes indicated, in accordance with approved shop drawings and solid surface manufacturer requirements.
5. Where countertops do not have a continuous substrate, locate and provide closure strips to prevent openings from countertop underside to top of support casework.
6. Where joint design intent indicated is to be seamless, provide manufacturers recommended adhesive to create inconspicuous, nonporous joints, with chemical bond.
7. Provide counter supports at 42" maximum or as recommended by manufacturer.

PART 3 EXECUTION

3.01 PREPARATION

- A. Condition architectural woodwork materials, items and products to average prevailing humidity conditions in installation areas before installing.
- B. Install blocking and anchoring devices built into substrates for anchorage of architectural woodwork.

- C. Deliver inserts and anchoring devices to be built into substrates well in advance of time substrates are to be built.
- D. Before installing woodwork, examine shop-fabricated work for completion and back priming.
- E. Ventilation for Adhesives: Comply, at a minimum, with the adhesive manufacturers' recommendations for space ventilation during and after installation. Maintain the following ventilation conditions during the adhesive curing period or for 72 hours after installation (whichever is longer): 1) supply 100% outside air 24 hours a day; 2) supply airflow at a rate of 6 air changes per hour, when outside air temperatures are between 55° F and 85° F and humidity is between 30% and 60%; and 3) supply airflow at a rate of 1.5 air changes per hour, when outside air conditions are not within the range stipulated in the previous item 2.

3.02 INSTALLATION

- A. Quality: Comply with AWI Section 1700.
- B. Install woodwork materials and products plumb, level, true and straight with no distortion. Shim as required using concealed shims. Install to a tolerance of 1/8" in 8'-0" for plumb and level (including countertops, window stools and shelves), and with 1/16" maximum offset in flush adjoining surfaces, 1/8" maximum offsets in revealed adjoining surfaces.
- C. Scribe and cut work to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.
- D. Install countertops level, true to alignment, accurately fit to wall conditions and securely fastened to base units and other support systems as indicated.
- E. Anchor woodwork to anchors or blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk concealed fasteners and blind nailing as required for a complete installation. Use fine finishing nail for exposed nailings, countersunk and filled flush with woodwork.

3.03 CLEANING AND PROTECTION

- A. Repair damaged and defective millwork to eliminate functional and visual defects. Where not possible to repair properly, replace millwork as directed by the Architect.
 - 1. Chipped, scratched or patched plastic laminate will not be accepted and must be replaced.
- B. Clean hardware, lubricate and make final adjustments for proper operation.
- C. Protect installed work during remaining construction operations.

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

END OF SECTION

SECTION 06 83 16

FIBERGLASS REINFORCED PANELING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Fiber glass reinforced composite wall panels at backsplashes.
- B. Trim and installation accessories.

1.02 RELATED SECTIONS

- A. Joint Sealants: Section 07 92 00.

1.03 REFERENCES

- A. Conform to the following standards of the American Standards for Testing and Materials (ASTM)
 - 1. ASTM D 149 - Standard Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies.
 - 2. ASTM D 256 - Standard Test Method for Determining the Pendulum Impact Resistance of Notched Specimens of Plastics.
 - 3. ASTM D 543 - Standard Test Method for Resistance of Plastics to Chemical Reagents.
 - 4. ASTM D 570 - Standard Test Method for Water Absorption of Plastics.
 - 5. ASTM D 638 - Standard Test Method for Tensile Properties of Plastics.
 - 6. ASTM D 696 - Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30 degrees C and 30 degrees C.
 - 7. ASTM D 790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
 - 8. ASTM D 792 - Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
 - 9. ASTM D 2583 - Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
 - 10. ASTM D 3841 - Standard Specification for Glass-Fiber-Reinforced Polyester Plastic Panels.
 - 11. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.04 SUBMITTALS

- A. Product Data: Provide manufacturer's standard details and catalog data demonstrating compliance with referenced standards. Provide installation

instructions.

B. Samples

1. Submit 6 x 6-inch samples of each surface and color required.
2. Submit 6-inch samples of each trim profile and trim color required.

1.05 QUALITY ASSURANCE

A. Conform to building code requirements for interior finish for smoke and flame spread requirements as tested in accordance with:

1. ASTM E 84 (Method of test for surface burning characteristics of building Materials) Wall Required Rating – Class A.

B. Sanitary Standards: System components and finishes to comply with:

1. United States Department of Agriculture (USDA) requirements for food preparation facilities, incidental contact.
2. Food and Drug Administration (FDA) 1999 Food Code 6-101.11.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store products indoors and protect from moisture, construction traffic, and damage.
- B. Store panels flat on clean, dry surface. Do not stand on edge or stack on fresh concrete or other surfaces that emit moisture.
- C. Store panels at least 24 hours temperature and humidity conditions approximating the average environment of the finish room.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: Specifications are based on Glasbord with Surfaseal finish manufactured by CRANE
- B. Other Manufacturers: Subject to requirements, products manufactured by NUDO PRODUCTS, INC., MARLITE, SEQUENTIA, INC., VARIETEX or KEMLITE are acceptable.

2.02 PANEL MATERIALS

A. General

1. Composite plastic panels of random chopped fiber glass roving, modified polyester copolymer, inorganic fillers, and pigments.

2. Resistant to rot, corrosion, staining, denting, peeling, and splintering.
3. USDA accepted.
4. Comply with ASTM D 3841, Type II.

B. Panel:

1. Typical Standard Panel Physical Properties:
2. Surface burning classification: Class A.
 - a. Flame spread (ASTM E 84): 25 or less.
 - b. Smoke developed (ASTM E 84): 450 or less.
3. Flexural strength (ASTM D 790): 8,830 psi.
4. Flexural modulus (ASTM D 790): 0.26×10^6 psi.
5. Tensile strength (ASTM D 638): 5,700 psi.
6. Tensile modulus (ASTM D 638): 0.50×10^6 psi.
7. Impact strength, IZOD (ASTM D 256): 7.7 ft.lb./in.
8. Thermal Conductivity (ASTM C 17): 0.50 BTU/in./hr./sq.ft. deg.F.
9. Water absorption (ASTM D 570): 0.16% in 24 hrs. @ 77 deg.F.
10. Chemical resistance (ASTM D 543):

Distilled water	0.59	0.19	No change.
Ethyl alcohol, 95%	0.92	0.18	Some fibers showing.
Sulfuric acid, 3%	0.43	0.08	Some fibers showing.
Sulfuric acid, 30%	0.28	0.13	Some fibers showing.
Sodium hydroxide, 1%	0.63	0.12	Some fibers showing.
Sodium hydroxide, 10%	0.26	0.17	Some fibers exposed, reduction in glass.
Toluene	0.14	0.13	Few fibers showing.
Sodium chloride, 1%	0.43	0.18	No change.
Hydrochloric acid, 10%	0.24	0.01	Few fibers showing.
Chlorine Gas	NC	NC	No change (NC).
Hydrogen sulfide	NC	NC	No change (NC).

No dimensional change under any of the listed reagents.

C. Size

1. Wall panel width: 48 inches.
2. Wall panel length: Provide full-length panels unless substrate dimensions exceed available fabricated size.

D. Thickness: 0.12 inch.

E. Dimensional Tolerances:

1. Width and length: +/- 1/8 inch.
2. Thickness: +/- 10%.
3. Squareness: Not more than 1/8 inch out of square.

2.03 FINISHES

- A. Exposed Surface: Pebble-like embossed finish.
- B. Back Surface: Smooth. Imperfections that do not affect functional properties are not cause for rejection.
- C. Colors: As selected by Architect; uniform throughout.

2.04 TRIM ACCESSORIES

- A. Provide panel manufacturer's standard vinyl moldings to meet project conditions. Provide types as required by layouts and wall conditions indicated on the drawings.
- B. Adhesive: Structural construction adhesive as recommended by manufacturer.
 - 1. VOC Content: The volatile organic compound (VOC) content of adhesives shall not exceed the limits defined in Rule #1168 "Adhesive and Sealant Applications" of the South Coast Air Quality Management District (SCAQMD), of the State of California.
- B. Sealant: Clear silicone sealant. See Section 07 92 00.
 - 2. VOC Content: The volatile organic compound (VOC) content of adhesives shall not exceed the limits defined in Rule #1168 "Adhesive and Sealant Applications" of the South Coast Air Quality Management District (SCAQMD), of the State of California

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates to receive panels to ensure surfaces are smooth, dry, true, and free of dirt, dust, oil, or grease.
- B. Remove high spots. Fill low spots.
- C. Verify that substrate construction is completed and approved.
- D. Correct deficiencies in substrate before installing panels.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's printed installation instructions, using both mechanical fasteners and adhesive.
- B. Cutting Panels
 - 1. Cut panels with carbide-tipped saw blade or swivel head shear.
 - 2. Allow 1/2-inch clearance in length per 8-foot panel length.

3. Allow 1/8-inch clearance at cut-outs for penetrations.
- C. Apply adhesive between 50 and 90 degrees F, unless otherwise approved.
1. Spread adhesive 1/4-inch deep over entire back side of panel to achieve 100% coverage.
 2. Do not use beads of adhesive.
 3. Do not use mechanical fasteners or adhesive alone.
 4. Roll panel surface to ensure complete contact.
 5. If necessary, install bracing to maintain intimate contact until adhesive cures in accordance with manufacturer's instructions.
- D. Moldings: Install as recommended by panel manufacturer. Apply sealant within all trim pieces.
- E. Sealants: Seal corner seams, ceiling and base junctures, around door frames and other openings, and between penetrating items and panel cut-outs.
- 3.03 ADJUST AND CLEAN
- A. Remove scraps and debris from the site, and leave in a neat and clean condition.

END OF SECTION

SECTION 07 01 30

MAINTENANCE OF ROOFING SHINGLES

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Repair existing roofing shingles as required.

1.02 SUBMITTALS

- A. Product Data: Provide manufacturer's printed product information indicating material characteristics, performance criteria, and product limitations.
- B. Manufacturer's Installation Instructions: Provide published instructions that indicate preparation required and installation procedures.

1.03 QUALITY ASSURANCE

- A. Installer Qualifications: Contractor shall provide qualified workers, trained and experienced in roofing systems of this configuration, and shall submit documentation of 5 consecutive years of work of this type.

1.04 PROJECT/SITE CONDITIONS

- A. Environmental Requirements: Do not proceed with work unless existing and forecasted weather conditions permit work to be performed in accordance with manufacturer's recommendations.
- B. Temporary Protection Materials: Provide and maintain materials on the site at all times for temporary roofing, flashing, and other protection when delays and/or changed weather conditions do not permit completion of each unit of work prior to the end of each working day. Materials which have been used for temporary roofing, flashing and other protection shall be removed and discarded.

PART 2 PRODUCTS

2.01 ASPHALT GLASS FIBER ROOFING SHINGLES

- A. Type: Glass fiber mat base; ceramically colored/UV resistant mineral surface granules across entire face of shingle; self-sealing type.
- B. Conformance: ASTM D3018 Type I - self-sealing; UL Certification of ASTM D3462; UL 997 Wind Resistance and UL Class A Fire Resistance
- C. Style and Manufacturer: Match existing.

- D. Roofing Felt: Asphalt-saturated felt. ASTM D4869, Type I.
- E. Self Adhering Underlayment Material: Polyethylene sheet backed rubberized asphalt membrane, 40 mils thick. Provide primer as recommended by membrane manufacturer. Conformance: ASTM D1970.
 - 1. Manufacturers: Bituthene Ice and Water Shield by W. R. GRACE; Polyken 640 Underlayment Membrane by POLYKEN TECHNOLOGIES; Polyguard Deck Guard by POLYGUARD PRODUCTS; Weather Watch by GAF; Winterguard by CERTAINTEED.
- F. Nails: 11 ga., 1-1/4 inch long (ridge 1-1/2 inch long), 7/16 inch diameter head, galvanized. Use longer nails where additional roofing material is used or if required by manufacturer. Staples not permitted.
- G. Roof Penetration Vent Flashing: Hard thermoplastic plastic, ultraviolet resistant, base roof vent flashing with elastomer collar.

PART 3 EXECUTION

3.01 EXAMINATION AND INSTALLATION

- A. Verify that roof penetrations and plumbing stacks are in place and flashed to deck surface.
- B. Verify roof openings are correctly framed prior to installing work of this section.
- C. Verify deck surfaces are dry and free of ridges, warps, or voids.
- D. Follow shingle and vent flashing manufacturer's recommendations for acceptable roof deck materials, procedures and installation for watertight installation.

END OF SECTION

SECTION 07 21 00

THERMAL INSULATION

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Loose fill insulation.
- B. Glass fiber blanket wall insulation.

1.02 SUBMITTALS

- A. Product Data: Submit for all items.

1.03 QUALITY ASSURANCE

- A. Insulation Thermal Properties: Thermal conductivity k-factors and thermal resistance R-values indicated are values at 75 degrees F., mean temperature.
 - 1. Where insulation is identified by R-value, provide thickness required to achieve indicated R-value. Foam insulation R-values are "aged" thermal values in accordance with LTTR – Long Term Thermal Resistance predicted by ASTM C1289.
- B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver insulation materials in manufacturer's original, unopened, and labeled packages.
- B. Store insulation materials at the site inside storage trailers or the building in a dry, ventilated place. Exterior storage not permitted. Comply with manufacturer's recommendations for handling and protection during installation.
- C. Remove fibrous batt insulation that has become wet before or after installation. Replace with new, dry insulation.

PART 2 PRODUCTS

2.01 LOOSE FILL INSULATION

- A. Glass-Fiber Loose-Fill Insulation: ASTM C 764, Type I for pneumatic application; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E 84.

2.02 GLASS-FIBER BLANKET INSULATION

- A. Type: Glass fiber blanket designed to friction fit with metal. Manufacturers standard lengths; widths as required to fit framing conditions; density not less than 0.75 pounds per cubic foot. Provide facings as follows:
 - 1. Unfaced: Conform to ASTM C665 Type I, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E84; passing ASTM E 136 for combustion characteristics.
 - 2. Kraft Facing: Areas where insulation is not exposed (concealed behind gypsum board). Conform to ASTM C665 Type II, Class C, Category 1.
 - 3. Flame Resistant Foil Facing: Areas where insulation is exposed (not covered by gypsum board or concealed interstitial space between faced insulation and gypsum wall board face). Conform to ASTM C665 Type III, Class A, Category 1; flame-spread index of 25 or less.
- B. Thickness: As indicated.
- C. Manufacturer: Subject to compliance with requirements, provide products by JOHNS MANVILLE, OWENS-CORNING FIBERGLASS, CERTAINTEED, GUARDIAN BUILDING PRODUCTS or KNAUF INSULATION.
- D. Tape: Type as approved by insulation manufacturer.

PART 3 EXECUTION

3.01 PREPARATION

- A. Examine substrates and installation conditions. Do not proceed with insulation work until unsatisfactory conditions have been corrected.
- B. Verify substrate surfaces are dry and free of irregularities or substances harmful to insulation. Clean substrates of substances that are harmful to insulation or that interfere with insulation attachment.

3.02 INSTALLATION OF LOOSE FILL INSULATION

- A. Loose-Fill Insulation: Apply according to ASTM C 1015 and manufacturer's written instructions. Level horizontal applications to uniform thickness as indicated, lightly settle to uniform density, but do not compact excessively.

3.03 INSTALLATION OF BLANKET/BATT INSULATION

- A. Install blanket type insulation with tight fitting butt joints. Provide supplementary

support at vertical and horizontal installations when required to maintain insulation in permanent proper location.

1. Spot adhere insulation to inside face of exterior sheathing or similar back-up material as required to maintain insulation in it's proper location.
- B. Fit insulation between members.
- C. Locate facing to room side, where applicable.
- D. Install interior wall sound attenuation at interior partitions where indicated on floor plans or wall types.

END OF SECTION

SECTION 07 27 19

PLASTIC SHEET AIR BARRIERS

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Provide plastic film air barrier at exterior stud walls. Materials to bridge and seal the following air leakage pathways and gaps:
1. Connections of the walls to the roof air barrier or membrane.
 2. Connections of the walls to the foundation or structure.
 3. Expansion joints.
 4. Openings and penetrations of all window frames, storefront, curtain wall.
 5. Door frames.
 6. Piping, conduit, duct and similar penetrations.
 7. Masonry ties, screws, bolts and similar penetrations.
 8. All other air leakage pathways in the building envelope.

1.02 SUBMITTALS

- A. Product Data: Submit material Manufacturer's Product Data, material manufacturer's instructions for evaluating, preparing, and treating substrate, temperature and other limitations of installation conditions, Technical Data, and tested physical and performance properties.
- B. Submit manufacturer's instructions and details for installation over sheathing and related methods approved and recommended by air barrier manufacturer for Architects approval and comments. Details to include but not limited to:
1. Opening for windows, doors, storefronts, louvers and related openings.
 2. Penetrations
 3. Transitions
 4. Terminations
 5. Fastening methods and patterns
 6. Tapes and seaming.
- C. Compatibility: Submit letter from primary material manufacturer stating that materials proposed for use are permanently chemically compatible and adhesively compatible with adjacent materials proposed for use.

1.03 QUALITY CONTROL

- A. Pre-installation Conference: Conduct to review conditions and review installation requirements and all detailing.

1. Attendance is required by representatives of related trades including covering materials, substrate materials and adjacent materials.
 - B. All tapes, fasteners and accessories to be approved by air barrier manufacturer for complete continuous assembly.
 - C. Representative: Provide air barrier manufacturer representative to attend job site to inspect installation to verify compliance with manufacturer's standard installation requirements.
- 1.04 PROJECT CONDITIONS
- A. Do not install membrane air barriers until substrate construction and all penetrating items and features are completed.
 - B. Sequencing. Do not install air barrier material before the roof assembly has been sufficiently installed to prevent a buildup of water in the interior of the building
 - C. Field Conditions: Do not install air barrier in snow, rain, fog, or mist. Do not install air barrier when the temperature of substrate surfaces and surrounding air temperatures are below those recommended by the primary material manufacturer.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Flexible Plastic Sheet Air Barrier: Tyvek Commercial Wrap by DuPONT or equal by GLOBAL WRAP, STEGO, RAVEN INDUSTRIES or HENRY COMPANY meeting the following performance requirements:
 1. Air Penetration – ASTM E1677: Type I
 2. Water Vapor Transmission – ASTM E96 Method B: 200.
 3. Water Penetration Resistance – AATCC-127: >280.
 4. Tear Resistance – ASTM D882 Method A: 38/35.
 5. Surface Burning Characteristics – ASTM E84: Class A for flame spread and smoke developed.
 6. Water Vapor Transmission: ASTM E96-05 Method B (perms) 30
- B. Mechanical Fasteners, Flashings and Tape: Types as recommended by film manufacturer.
 1. Steel Frame Fasteners: Corrosion resistant, gasketed with washer in sufficient length(s).
 2. Wood Frame Fasteners: Corrosion resistant nail with plastic cap or plastic cap staple in sufficient length(s).
 3. Flashings and Tapes: Self adhering for substrates encountered.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and conditions are suitable prior to commencing work of this section. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Verify substrate is visibly dry.
- C. Ensure that the following conditions are met:
 - 1. Surfaces are sound, dry, even, and free of contaminants.
 - 2. Inspect surfaces to be smooth without large voids or sharp protrusions.
- D. Verify sealants are compatible with flexible sheet air barrier proposed for use.

3.02 INSTALLATION

- A. Install air barrier in a way that provides continuity throughout the building envelope. Install materials in accordance with manufacturer's instructions and the following (unless manufacturer requires other procedures in writing based on project conditions or particular requirements of their recommended materials):
 - 1. Install head flashing material over all doors, windows and similar openings which to be later covered by air barrier material for proper drainage of water away from the window.
 - 2. Install building wrap over sheathing board, rigid insulation or other fully-supported continuous substrates as per manufacturer's instructions.
 - 3. Ensure air barrier material is plum and level on foundation, and unroll extending over window and door openings.
 - 4. Ensure air barrier material is applied over back edge of weep screed for proper water drainage.
 - 5. Unroll the air barrier material with the printed side facing out, wrapping the entire building, including door and window openings.
 - 6. Attach into wood stud framing, through insulated sheathing board or into metal stud framing with plastic cap nails or fasteners specified by air barrier material manufacturer. The fasteners must penetrate the framing member a minimum of 1/2 inch on every vertical stud line.
 - 7. Fasteners need to be installed along every stud vertically and 12" or closer together as specified by the material manufacturer apart horizontally to maintain integrity of air barrier assembly to ensure the material is fastened to building when negative and positive pressures are exerted.
 - 8. Install with drainage plane surface pattern in horizontal position. Install lower level air barrier material ensuring the upper layers of air barrier material lap the bottom layer to ensure proper shingling and water drainage.
 - 9. Overlap at all corners of building by a minimum of 12 inches.
 - 10. Overlap vertical seams by a minimum of 6 inches.

11. Prepare each window and door rough opening as recommended by the air barrier manufacturer or prepare by cutting a modified "I" pattern and wrap excess material to the inside of the rough opening and fasten securely to a framing member. At the window header, make a 6 to 8 inch diagonal cut at the corners of the air barrier and fold the material up above the rough opening, exposing the underlying sheathing. If windows are already in place when installing air barriers, trim as close to them as possible and tape all edges with manufacturer approved sealant tape.
12. Detail remaining terminations and penetrations with accessory materials as per manufacturer's instructions for air leakage and ensuring lapping of the material for proper shingling and drainage of bulk water.
13. When the end of a roll is reached, fold the edge of the building wrap under itself and attach to the structural sheathing or through non-structural sheathing to the nearest framing member.
14. Tape all horizontal and vertical seams with manufacturer approved construction tape.
15. Seal top and bottom edges of rolled out material to substrate with manufacturer approved construction tape.
16. Seal all tears and cuts with manufacturer approved construction tape.

3.02 PROTECTION

- A. Protect installed air barrier from damage until installation of covering materials. Seal all cuts, punctures, and penetrations with tape.

[3.03 INSPECTION

- A. Arrange for and facilitate special inspection in accordance with OBC Section 1704.5.1.2.]

END OF SECTION

SECTION 07 31 13

ROOFING SHINGLES

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Work of this Section includes roofing shingles, felt underlayment, eave protection underlayment, ridge vents and miscellaneous fasteners.

1.02 RELATED SECTIONS

- A. Flashing and Sheet Metal: Section 07 62 00.

1.03 REFERENCES

- A. American Society for Testing and Materials
 1. ASTM D 1970 - Standard Specification for Self-Adhering Modified Bituminous Steep Roofing Underlayment.
 2. ASTM D 3018 - Standard Specification for Class A Shingles Surfaced with Mineral Granules.
 3. ASTM D 3161 - Standard Test Method for Wind-Resistance of Asphalt Shingles.
 4. ASTM D 3462 - Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules.
 5. ASTM D 4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free.
 6. ASTM E 108 - Standard Test Methods for Fire Tests of Roof Coverings.
 7. ASTM E 2178 - Standard Test Method for Air Permeance of Building Materials
- B. International Code Council (ICC)
 1. AC 48 - Acceptance Criteria For Roof Underlayment For Use In Severe Climate Areas.
 2. AC 207 - Acceptance Criteria for Polypropylene Roof Underlayments.

1.04 SUBMITTALS

- A. Product Data: Provide manufacturer's printed product information indicating material characteristics, performance criteria, and product limitations.
- B. Manufacturer's Installation Instructions: Provide published instructions that indicate preparation required and installation procedures.

- C. Certificate of Compliance: Provide Certificate of Compliance from an independent laboratory indicating that the asphalt fiberglass shingles made in normal production meet or exceed the requirements of the following:
 - 1. ASTM E 108/UL 790 Class A Fire Resistance.
 - 2. ASTM D 3161/UL 997 Type I Wind Resistance.
 - 3. ASTM D 3462.
- D. Shop Drawings: Indicate specially configured metal flashing, jointing methods and locations, fastening methods and locations, and installation details, as required by project conditions indicated.

1.05 STORAGE AND HANDLING

- A. Store all materials off ground on wooden pallets.
- B. Stand felt rolls on end for storage.
- C. Use care not to damage products in handling.

PART 2 PRODUCTS

2.01 ASPHALT GLASS FIBER ROOFING SHINGLES

- A. Type: Glass fiber mat base; ceramically colored/UV resistant mineral surface granules across entire face of shingle; self-sealing type.
- B. Conformance: ASTM D3018 Type I - self-sealing; UL Certification of ASTM D3462; UL 997 Wind Resistance and UL Class A Fire Resistance.
- C. Color: As selected by Architect.
- D. Warranty: 40 year minimum.
- E. Style and Manufacturer: Dimensional style - Timberline 40 by GAF with Timbertex hip and ridge. Products by CERTAINTEED, GEORGIA-PACIFIC or ELK CORPORATION are acceptable providing they meet the requirements specified.

2.02 ROOFING FELT - UNDERLAYMENT

- A. Type: Asphalt-saturated felt. ASTM D4869, Type I.
- B. Weight: 15 lbs per 100 square feet.
- C. Size: 36 inch minimum roll width.

2.03 SELF-ADHERED UNDERLAYMENT

- A. Material: Polyethylene sheet backed rubberized asphalt membrane, 40 mils thick.

Provide primer as recommended by membrane manufacturer.

- B. Conformance: ASTM D1970.
- C. Warranty: Equal to shingle warranty.
- D. Manufacturers: Bituthene Ice and Water Shield by W. R. GRACE; Polyken 640 Underlayment Membrane by POLYKEN TECHNOLOGIES; Polyguard Deck Guard by POLYGUARD PRODUCTS; Weather Watch by GAF; Winterguard by CERTAINTEED.

2.04 ACCESSORIES

- A. Nails: 11 ga., 1-1/4 inch long (ridge 1-1/2 inch long), 7/16 inch diameter head, galvanized. Use longer nails where additional roofing material is used or if required by manufacturer. Staples not permitted.
- B. Roofing Cement: Asphalt roofing cement as recommended by roof product manufacturer; ASTM D4586.

2.05 SHINGLE RIDGE VENT

- A. Vent Material: High density linear polyethylene; .08" thick with weather filter.
- B. Length: Continuous along each ridge, unless otherwise indicated on drawings.
- C. Color: As selected by Architect.
- E. High Point Roof Vent System by NORTH AMERICAN BUILDING PRODUCTS or Shinglevent by AIR VENT, INC. (CERTAINTEED) or equal.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that roof penetrations and plumbing stacks are in place and flashed to deck surface.
- B. Verify roof openings are correctly framed prior to installing work of this section.
- C. Verify deck surfaces are dry and free of ridges, warps, or voids.

3.02 ROOF DECK PREPARATION

- A. Follow shingle manufacturer's recommendations for acceptable roof deck materials.
- B. Broom clean deck surfaces under eave protection and underlayment prior to their application.

3.03 INSTALLATION - UNDERLAYMENT

- A. Place eave edge and gable edge metal flashing tight with fascia boards. Weather lap joints 2 inches. Secure flange with nails spaced 8 inches on center.
- B. Apply eave protection shingle underlayment in accordance with manufacturer's instructions.
- C. Extend eave protection membrane minimum 24 inches up slope beyond interior face of exterior wall. (Eave width plus wall thickness and 24 inches.)
 - 1. In addition to eaves, apply at entire perimeter surfaces to receive asphalt shingles, including ridges, hips and rakes.

3.04 INSTALLATION - PROTECTIVE UNDERLAYMENT

- A. Roof Slope Between 2:12 and 4:12: Apply one layer of self adhered underlayment over entire roof area, with ends and edges weather lapped minimum 12 inches. Stagger end laps each consecutive layer.
- B. Roof Slope 4:12 and Greater
 - 1. Roofing Felt Underlayment
 - a. Apply one layer of felt underlayment horizontal over entire surface to receive asphalt shingles. Lap succeeding courses a minimum of 2 inches; end laps a minimum of 4 inches, and hips a minimum of 6 inches.
 - b. Secure felt underlayment to deck with roofing nails 1 inch in from edge and 12 inches o.c. Three rows per sheet width. Lap felt underlayment 12 inches at valleys and hips.
 - c. Omit felt underlayment at areas listed below to receive self-adhering underlayment. Lap felt underlayment over eave underlayment as recommended by manufacturer but not less than 2 inches.
 - 2. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free, on roof deck. Comply with environmental restrictions of underlayment manufacturer. Install membrane lapped in direction to shed water. Lap sides not less than 3-1/2 inches. Lap ends not less than 6 inches staggered 24 inches between courses. Roll laps with roller. Cover underlayment within seven days. Provide at the following locations:
 - a. Eaves: Extend from edges of eaves to a minimum of 24 inches beyond interior face of exterior wall.
 - b. Rakes: Extend from edges of rake 24 inches beyond interior face of exterior wall.
 - c. Valleys: Extend from lowest to highest point a minimum of 18 inches on each side.
 - d. Hips: Extend 18 inches on each side.

- e. Ridges: Extend 36 inches on each side without obstructing continuous ridge vent slot.
- f. Sidewalls: Extend beyond sidewall 18 inches, and return vertically against sidewall not less than 4 inches.
- g. Dormers, Chimneys, Skylights, and Other Roof-Penetrating Elements: Extend beyond penetrating element 18 inches, and return vertically against penetrating element a minimum of 4 inches.
- h. Roof Slope Transitions: Extend 18 inches on each roof slope.

3.05 VALLEY FLASHING

- A. Provide metal valley flashing installed to provide an open valley.
- B. Provide flashing with the following:
 - 1. 1" V-crimp at flashing center running parallel with direction of valley.
 - 2. Edges formed with hook edge and cleated on 24" centers.
 - 3. Lap ends 8" in direction of water flow.
 - 4. Conform to SMACNA Figure 4-10.
- C. See Section 07 62 00 for prefinished metal flashing material.

3.06 SHINGLE - INSTALLATION

- A. Use starter strip of shingle material cut on slotted end to 9" width and nail to eave with slot end up and edge overhanging eave 3/8".
- B. Use shingles with 5" maximum exposure unless manufacturer recommends less.
- C. Lay first course directly over starter strip with ends flush with starter strip at eaves.
- D. Insure alignment by running vertical line down center of roof and laying shingles from center to rake.
- E. Cutouts may break joints at either thirds or halves but system shall be consistent over entire roof.
- [F. Use number of nails per shingle as recommended by shingle manufacturer. Should any nail fail to penetrate solid decking, drive an additional one nearby.]
- G. Run a chalk line so valley will be 6" wide at top and diverge 1/8" per ft down to eaves. Neatly trim shingles to this line. Clip off shingle and glue upper inside corner of each shingle to valley with asphalt cement.
- H. Ridge shingles shall be 9" x 12" cut from strip shingles or factory supplied. Apply with 5" exposure, blind nailed, and tabbed. Run ridge shingles with wind.
- I. Vent pipe sleeve flange minimum width 6". Fit shingles under lower edge and over

sides and upper edge.

- J. Run courses true to line with slots properly placed. Leave shingles flat without wave and properly placed.
- K. Clean shingles and building of soiling caused by this installation.

END OF SECTION

SECTION 07 46 33

VINYL SIDING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Provide vinyl siding, corner board trim, window trim and miscellaneous trim as indicated on drawings or required for a complete installation.

1.02 RELATED SECTIONS

- A. Flashing: Section 07600.
- B. Fiber Cement Siding: Section 07463.

1.03 REFERENCES

- A. ASTM: American Society for Testing and Materials.

1.04 SUBMITTALS

- A. Samples: Submit minimum 9" long by full width sample of siding showing finish, pattern, color, gage and profile.

1.05 HANDLING AND STORAGE

- A. Exercise care so as not to damage or deform material.
- B. Stack on platforms or pallets and cover to protect from weather.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Specifications based on Restoration Classic Smooth by WOLVERINE TECHNOLOGIES; Silhouette Double 4 by ALCOA BUILDING PRODUCTS; Monogram by CERTAINTEED.

2.02 SIDING, SOFFIT AND TRIM

- A. Siding and Soffit - General Requirements: Polyvinyl chloride products with the following characteristics:
 - 1. Siding: Comply with ASTM D 3679, Class 2.
 - 2. PVC cell classification in accordance with ASTM D 1784: 13334.

3. Coefficient of linear expansion in accordance with ASTM D 696: .000029 inch per inch per degree F.
 4. Tensile strength when tested in accordance with ASTM D 638: Minimum 7,100 pounds per square inch.
 5. Modulus of elasticity when tested in accordance with ASTM D 638: Minimum 360,000 pounds per square inch, average.
 6. Izod impact, standard 1/8 inch bar when tested in accordance with ASTM D 256: 3.30 foot-pounds per inch, average.
 7. Shore D Hardness: Minimum 73.
 8. Specific Gravity: Minimum 1.39.
 9. Deflection temperature when tested in accordance with ASTM D 648: 170 degrees F, 264 pounds per square inch.
 10. Smoke density rating when tested in accordance with ASTM D 2843: 48 percent, average.
 11. Horizontal flammability, when tested in accordance with ASTM D 635:
 - a. Burn distance: 20 mm.
 - b. Burn time: Less than 5 seconds.
 12. Surface burning characteristics when tested in accordance with ASTM E 84: Flame spread less than 20, fuel contribution 0, smoke density 400.
 13. Fire Resistance - Siding: 1 hour, when tested in accordance with ASTM E 119, with siding applied over gypsum sheathing.
 14. Flammability - Siding: Comply with requirements of UBC Std 26-9.
- B. Manufacturer: Verify and match existing.
1. Wall Thickness: .044" nominal.
 2. Profile: Double 4" clap board.
 3. Finish: Smooth.
 4. Color, Size and Type: Match existing adjacent.
- C. Corner Board Trim and Window Trim: Provide nominal 4" wide corner trim and window surrounds; materials per manufacturer's requirements.
- D. Soffit:
1. Color, Size and Type: Match existing adjacent.
 2. Wall Thickness: .040" nominal.
 3. Ventilation: 9" of net free area.
 4. Finish: Smooth.

PART 3 EXECUTION

3.01 INSPECTION

- A. Commencement of siding installation implies acceptance of the substrate as suitable to accept siding.

3.02 INSTALLATION

- A. Install in accordance with the latest edition of the "Rigid Vinyl Siding Application

Manual", published by the Vinyl Siding Institute of the Society of the Plastics Industry, Inc.

- B. Provide "J -Blocks" at all siding areas where light fixtures, hose bibs, outlets and similar type items occur.

3.03 CLEAN UP

- A. Clean all siding surfaces of dirt, grime, and other surface blemishes.
- B. Remove from the site all excess material, shipping packaging, debris and etc., related to the siding work.

END OF SECTION

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Provide flashing and sheet metal work as shown and specified. Work includes:
1. Gutters, scuppers, leader boxes (conductor heads) and downspouts including brackets and supports.
 2. Flashing and counterflashing.
 3. Soffit
 4. Fascia.
 5. Fasteners, sealants, solder and accessories to complete the work.
 6. Gutterguards

1.02 QUALITY ASSURANCE

- A. Comply with Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) "Architectural Sheet Metal Manual" recommendations for fabrication and installation of the work.
- B. Reference Standards
1. American Society for Testing and Materials (ASTM).
 2. American Architectural Manufacturers Association (AAMA)
 - a. AAMA 2605; Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing High Performance Organic Coatings on Architectural Extrusions and Panels.
 3. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA):
 - a. SMACNA "Architectural Sheet Metal Manual".
 4. Single Ply Roofing Industry: SPRI ES-1, Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems.
- C. Subcontractor: Subcontract sheet metal associated with roofing as a part of the roofing contract for undivided responsibility.
- D. Attachments to or penetrations in roofing systems to be made only with full approval of roofing manufacturer. Obtain approvals as required for installation of work under this section. Notify Architect if deviations from documents is required to obtain approval from roofing manufacturer prior to fabrication.
- F. Painted Finishes: Factory painted finish to be performed by an applicator

specifically approved by the paint manufacturer. The applicator shall provide written notification of approval by paint manufacturer prior to application of the finish.

1.03 SUBMITTALS

- A. Shop Drawings and Product Data: Submit on all sheet metal work specified herein. Drawings to show all expansion joint details, joint details, waterproof connections to adjoining work and at obstructions and penetrations, methods of attaching to building and all formed sections. Include the following:
 - 1. Gutter and downspout construction, including brackets, supports and gutter expansion joints.
- B. Submit 8" square material samples for each type of sheet metal required.
- C. Submit full width by 8" long samples of all manufactured and fabricated items. Provide with specified finish and color.

1.04 PROJECT CONDITIONS

- A. Do not proceed with the installation of flashing and sheet metal work until substrate construction, blocking and other construction to receive the work are completed.
 - 1. Metal roofing work is to follow progress of substrate as close as practical to limit exposure of insulation and wood materials.

1.05 WARRANTY

- A. Contractor's warranty required for roofing system work shall include all related roof flashing and sheet metal work.
- B. Provide Contractor's guarantee for all sheet metal work under this Section to be free from defects of material and workmanship for a period of two years. Work that is not water tight or is damaged by winds that do not exceed 90 mph will be considered defective.
- C. Provide manufacturer's guarantee of paint finish against failure of paint finish. Failure includes blistering, peeling, cracking, flaking, checking, excessive color change and chalking. Color change shall not exceed 5 N.B.S. units (per ASTM D523) and chalking shall not less than a rating of 8 per ASTM D4214.
 - 1. Warranty Period: 20 years.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Prefinished Aluminum Sheet - All Flashings Exposed to View

1. Description: 3004 alloy aluminum sheet with factory applied finish.
2. Finish
 - a. Exposed Surfaces
 - 1) Material/Manufacturer: Fluoropolymer baked enamel finish with Kynar 500 (70%) resins by ELF ATOCHEM OF NORTH AMERICA INC.; "Trinar" by AKZO; "Duranar" by PPG; "Fluoropon" by VALSPAR or equal. Total dry film thickness not less than 1.0 mils
 - 2) Reference: Meet the requirements of AAMA 2605, Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing High Performance Organic Coatings on Architectural Extrusions and Panels.
 - 3) Color: As selected by Architect from paint manufacturer's complete specified line.
 - 4) Application: Apply coating systems in strict accordance with manufacturer's printed instructions and recommendations. Refer to Quality Assurance in Part 1.
 - b. Concealed Surfaces: Can be manufacturer's standard coating for concealed surfaces.
3. Thicknesses: Provide the following minimum thicknesses:
 - a. Flashing and Counterflashing: .032".
 - b. Gutters and Downspouts: .032".
 - c. Downspout Straps: .064".
 - d. Gutter Brackets and Supports: .125".
 - e. Miscellaneous Flashing (not otherwise identified): .032".
- B. Miscellaneous Flashing - Not Exposed to View: Galvanized steel, ASTM A653 G60. Mill phosphatized for paint adhesion. 0.0276". minimum unless otherwise indicated.
- C. Soffit Panels: Aluminum, solid and ventilated type. Formed to approximately 3/8" thick panel with reveals at approximately 5"-6" on center.
 1. Finish: Match type specified hereinbefore.
 2. Colors: As selected by Architect.
 3. Provide all trims, carriers and fasteners required for a complete installation.
 4. Manufacturer: REYNOLDS METALS COMPANY Double 5 ReynoGuard Soffit, ALCOA Traditional Select or equal.
- D. Gutterguards: 024" solid aluminum interlocking panels with nose-forward channels designed to fit directly to any standard 5" or 6" gutter. Provide all accessories for complete installation.
 1. Finish: Baked on powder coat enamel
 2. Drainage Capacity 6-8 inches rainfall/hour
 3. Basis of Design: EGUTTER LeafPro XL

2.03 FABRICATION

- A. Shop fabricate sheet metal work to comply with standard industry standards as shown by SMACNA in the "Architectural Sheet Metal Manual."
- B. Form sections square, true and accurate to size and profile, free from distortion and other defects detrimental to appearance or performance.
 - 1. Make all lines, edges, angles and moldings straight, sharp and true; reinforce for rigidity and strength.
- C. Fabricate for watertight and weatherproof performance with expansion provisions for running work, sufficient to permanently prevent leakage, damage or deterioration of the work. Form exposed sheet metal work with exposed edges folded back to form hems.
 - 1. Fabricate with seams overlapping in the direction of water flow.
- D. Fabricate non-moving seams in sheet metal with flat lock or butt hairline joints except as otherwise indicated. Fabricate corners mitered, soldered and sealed as one piece. Locate corner joints 2'-0" from corners and intersections.
- E. Seal movable non-expansion type joints with joint sealant. Form joints as indicated, when not indicated, in compliance with industry standards to receive joint sealants.
- F. Provide for separation of metal from non-compatible or corrosive substrates by coating concealed surfaces with bituminous coating or other permanent separation as recommended by the sheet metal manufacturer.
- G. Gutters
 - 1. Form to size and shape as detailed or comply with (SMACNA) recommendations if not indicated. Provide adequate reinforcing, brackets, straps and fasteners for attachment to building as indicated and as required.
 - 2. Provide downspout outlets as indicated on drawings.
- H. Downspout: Form to size and shape detailed or comply with (SMACNA) recommendations if not indicated.

PART 3 EXECUTION

3.01 PREPARATION

- A. Examine substrates and installation conditions. Do not install flashing and sheet metal work until unsatisfactory conditions have been corrected.
- B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

- C. Coordinate flashing and sheet metal work with other work for the correct sequencing of items which make up the entire membrane or system of weatherproofing and rain drainage.

3.02 INSTALLATION

- A. Comply with SMACNA "Architectural Sheet Metal Manual" recommendations, and drawing details for installation of the work.
- B. Install prefabricated items in accordance with manufacturer's instructions and recommendations.
- C. Anchor units securely in place by methods indicated, providing for thermal expansion. Conceal fasteners and expansion provisions whenever possible. Install joint sealants where indicated.
- D. Set units true to lines and levels indicated. Install work with laps, joints and seams which will be permanently watertight and weatherproof.
- E. Separate sheet metal work from dissimilar metals, treated wood, and cementitious materials. Provide roofing felt underlayment and rosin-sized paper slip sheet over treated wood surfaces.
- F. Fabricate, support and anchor downspouts in a manner which will withstand thermal expansion, stresses and full loading by ice or water without damage, deterioration or leakage.

END OF SECTION

SECTION 07 84 00

FIRESTOPPING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Provide firestop systems consisting of a material, or combination of materials installed to retain the integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and/or hot gases through penetrations, blank openings, construction joints, or at perimeter fire containment in or adjacent to fire-rated barriers in accordance with the requirements of the Building Code for this project.
- B. Firestop systems shall be used in locations including, but not limited to, the following:
 - 1. Penetrations through fire resistance rated floor and roof construction including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
 - 2. Penetrations through fire resistance rated walls and partitions including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
 - 3. Penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.

1.02 RELATED SECTIONS

- A. Plumbing: Division 22.

1.03 DEFINITIONS

- A. Firestopping: Material or combination of materials (assembly) to retain integrity of fire rated construction by maintaining an effective barrier against the spread of flame, smoke, and gases.
- B. Through-penetration: Any penetration of a fire-rated wall or floor that completely breaches the barrier.
- C. Through-Penetration Firestop Systems: Material or combination of materials which are field constructed of fill, void, or cavity materials and forming materials, designed to resist fire spread when installed as a complete firestop system.
- D. Through-Penetration Firestop Devices: Factory built products designed to resist fire spread. Complete when delivered to site; ready for installation.

- E. System: The use of a specific firestop material or combination of materials in conjunction with a specific wall or floor construction type and a specific penetrant(s).
- F. Barrier: Any bearing or non-bearing wall or floor that has an hourly fire and smoke rating.
- G. Membrane-penetration: Any penetration in a fire-rated wall that breaches only one side of the barrier.
- H. Fire Resistive Joint: Any gap, joint, or opening, whether static or dynamic, between two fire rated barriers including where the top of a wall meets a floor; wall edge to wall edge applications; floor edge to floor edge configurations; floor edge to wall.
- I. Perimeter Barrier: Any gap, joint, or opening, whether static or dynamic, between a fire rated floor assembly and a non-rated exterior wall assembly.

1.04 REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1. E84: Test Method for Surface Burning Characteristics of Building Materials.
 - 2. E119: Fire Tests of Building Construction Materials.
 - 3. E814: Fire Tests of Through Penetration Fire Stops.
 - 4. E2174: Standard Practice for On-Site Inspection of Installed Fire Stops
- B. National Fire Protection Association (NFPA)
 - 1. 70: National Electrical Code (NEC)
 - 2. 101: Code for Safety to Life from Fire in Buildings and Structures (Life Safety Code).
- C. Underwriters' Laboratories (UL)
 - 1. UL1479: Fire Tests of Through Penetration Fire Stops.
 - 2. UL2079: Tests for Fire Resistance of Building Joint Systems
- D. Firestop Design Classification References
 - 1. Warnock Hersey Listing Manual
 - 2. UL Fire Resistance Directory - Vol. 1
- E. Factory Mutual (FM) Research
 - 1. FM Approval Standard of Firestop Contractors – Class 4991

1.05 SYSTEM PERFORMANCE REQUIREMENTS

- A. System Design and Product Selection: Contractor responsible for selection of products and tested designs that fulfill the firestopping requirements of this section.
- B. General: Provide firestopping systems that are produced and installed to resist the spread of fire, according to requirements indicated, and the passage of smoke and other gasses.
- C. F-Rated Through Penetration Firestop Systems: Provide through penetration firestop systems with F ratings indicated as determined per ASTM E814, UL 1479 but not less than that equaling or exceeding the fire resistance rating of the constructions penetrated.
- D. T-Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with T ratings, in addition to F ratings, as determined per ASTM E814, where indicated and where systems protect penetrating items exposed to contact with adjacent materials in occupiable floor areas. T -rated assemblies are required where specified by codes or where the following conditions exist:
 - 1. Where firestop systems protect penetrations located outside of wall cavities.
 - 2. Where firestop systems protect penetrations located outside fire resistive shaft enclosures.
 - 3. Where firestop systems protect penetrations located in construction containing doors required to have a temperature rise rating.
 - 4. Where firestop systems protect penetrating items larger than a 4 inch diameter nominal pipe or 16 square inch in overall cross sectional area.
- E. L – Rated Through-Penetration Firestop Systems: Provide firestop systems with L ratings, in addition to F and T ratings, as determined per UL 1479, where indicated by Code.
- F. Fire Resistive Joint Sealants: Provide joint sealants with fire resistance ratings indicated, as determined per ASTM E119, UL 1479 and UL 2079 but not less than that equaling or exceeding the fire resistance rating of the construction in which the joint occurs.
- G. For firestopping exposed to traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions and will meet load requirements.
 - 1. For piping penetrations for plumbing and wet pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 - 2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.

3. For penetrations involving insulated piping, provide through-penetration firestop systems not required removal of insulation.
- H. For through-penetration firestop systems exposed to view, provide products with flame spread of less than 25 and smoke developed ratings of less than 450, as determined per ASTM E 84.
- I. Where there is no specific third party tested and classified firestop system available for an installed condition, obtain from the firestopping material manufacturer an Engineering Judgment (EJ) to be submitted to the Approving Authority and Authority Having Jurisdiction for approval prior to installation. The EJ shall follow International Firestop Council (IFC) guidelines.

1.06 SUBMITTALS

- A. Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of UL or other nationally recognized independent testing laboratories firestop systems to be used, and manufacturer's installation instructions.
 1. Manufacturer's engineering judgement identification number and drawing details when no tested system is available.
- B. Shop drawings detailing materials, installation methods, and relationships to adjoining construction for each through-penetration firestop system, and each kind of penetrating item. Include firestop design designation of qualified testing and inspecting agency evidencing compliance with requirements for each condition indicated.
 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop configuration for construction and penetrating items.
 2. Where project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular through-penetration firestop condition, submit illustration approved by firestopping manufacturer with modifications marked.
- C. Product certificates signed by manufacturers of firestopping products certifying that their products and installation comply with specified requirements. Certification shall be signed by the Installer.
- D. Certification is required from manufacturer that Installer has been trained in the handling and installation of their products.
- E. Firestopping installer shall provide a letter of certification stating that all firestopping systems have been installed in accordance with the Contract Documents.

1.07 QUALITY ASSURANCE

- A. Meet requirements of ASTM E814 or UL 1479 tested assemblies that provide a fire rating equal to that of construction being penetrated and other ASTM Standards as applicable for the installation.
 - 1. ASTM E84 "Test Method for Surface Burning Characteristics of Building Materials."
 - 2. ASTM E119 "Test Methods for Fire Tests of Building Construction and Materials."
- B. Requirements of Regulatory Agencies: Comply with the applicable requirements for fire separations and penetrations of the following:
 - 1. OBC: See Chapter 6, Table 601 and 602 for the time rated construction requirements.
 - 2. NFPA 70.
 - 3. NFPA 101.
- C. Installer: Specialist in the installation of type(s) of firestopping required; trained and approved by the firestop manufacturer.
 - 1. Shown to have successfully completed not less than 5 firestop projects similar in type and size to that of this Project.
- D. Provide firestopping products containing no detectable asbestos as determined by the method specified in 40 CFR Part 763, Subpart F, Appendix A, Section 1, "Polarized Light Microscopy".
- E. Do not use any product containing solvents that require hazardous waste disposal or which after curing dissolve in water.
- F. Coordinating Work: Coordinate construction of openings and penetrating items to ensure that designated through-penetration firestop systems are installed per specified requirements.
- G. Single Source Responsibility: Obtain firestop systems for each kind of penetration and construction condition indicated from a single primary firestop systems manufacturer.
 - 1. Materials of different manufacture than allowed by the tested and listed system shall not be intermixed in the same firestop system or opening.
 - 2. Tested and listed firestop systems are to be used before an Engineering Judgment (EJ) or Equivalent Fire Resistance Rated Assembly (EFRA) is installed.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver firestopping undamaged products to project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacturer; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multi-component materials.

- 1. Comply with recommended procedures, precautions, or remedies described in material safety data sheets as applicable.

- B. Store and handle firestopping materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

- C. Do not use damaged or expired materials.

1.09 PROJECT CONDITIONS

- A. Environmental Conditions: Do not install firestopping when ambient or substrate temperatures are outside limits permitted by firestopping manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

- B. Ventilation: Ventilate firestopping per firestopping manufacturers' instructions by natural means or, where this is inadequate, forced air circulation.

1.10 SEQUENCING AND SCHEDULING

- A. Coordinate this Work as required with work of other trades. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.

- B. Do not cover up those firestopping installations that will become concealed behind other construction until Owner's inspection agency and authorities having jurisdiction, if required, have examined each installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide products from one or more of the following manufacturers according to the suitability of the product for the intended purpose.

- 1. W.R. GRACE (Flamesafe System)
 - 2. FYRESLEEVE INDUSTRIES
 - 3. TREMCO
 - 4. HILTI, INC.
 - 5. SPECIFIED TECHNOLOGIES (STI).
 - 6. 3M FIRE PROTECTION PRODUCTS.
 - 7. THE RECTORSEAL CORPORATION (Metacaulk and Bio Fireshield).
 - 8. NELSON FIRESTOP PRODUCTS.

2.02 MATERIALS - GENERAL

- A. As selected by Contractor. See SYSTEM PERFORMANCE REQUIREMENTS in Part 1 hereinbefore.
- B. Compatibility: Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by firestopping manufacturer based on testing and field experience.
 - 1. All materials shall comply with ASTM E814 or E 119 (UL 1429), and shall be manufactured of nontoxic, non-hazardous, asbestos free materials, and unaffected by water or moisture when cured.
 - 2. Primers: Conform to manufacturer's recommendations for primers required for various substrates and conditions.
 - 3. Backup Materials: Backup materials, supports, and anchoring devices shall be provided as required by UL testing.
 - 4. Provide all firestopping sealant materials within the VOC limits specified in Section 01 81 13.
- C. Accessories: Provide components for each firestopping system that are needed to install fill materials and to comply with "System Performance Requirements" in Part 1. Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire resistance rated systems. Accessories include but are not limited to the following items:
 - 1. Permanent forming/damming/backing materials must be noncombustible and may include the following:
 - a. Semi-refractory fiber (mineral wool) insulation.
 - b. Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.
 - c. Joint fillers for joint sealants.
 - 2. Temporary forming materials.
 - 3. Substrate primers.
 - 4. Collars.
 - 5. Steel sleeves.

2.03 MIXING

- A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of firestopping. Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Verify penetrations are properly sized and in suitable condition for application of materials.

3.02 PREPARATION

- A. Surface Cleaning: Clean out openings and joints immediately prior to installing firestopping to comply with recommendations of firestopping manufacturer and the following requirements:
 - 1. Remove all foreign materials from surfaces of opening and joint substrates and from penetrating items that could interfere with adhesion of firestopping.
 - 2. Clean opening and joint substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestopping. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop systems seal with substances.

3.03 INSTALLING THROUGH-PENETRATION FIRESTOPS

- A. General: Comply with the "System Performance Requirements" in Part 1 and the through-penetration firestop manufacturer's installation instructions and drawings pertaining to products and applications indicated.
- B. Install forming/damming materials and other accessories of types required to support fill materials during their application and in the position needed to produce the cross sectional shapes and depths required to achieve fire ratings of designated through-penetration firestop systems. After installing fill materials,

remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.

- C. Install fill materials for through-penetration firestop systems by proven techniques to produce the following results:
 - 1. Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.04 INSTALLING FIRE RESISTIVE JOINT SEALANTS

- A. General: Comply with the "System Performance Requirements" in Part 1 with ASTM C1193, and with the sealant manufacturer's installation instructions and drawings -pertaining to products and applications indicated.
- B. Install joint fillers to provide support of sealants during application and at position required to produce the cross sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability and develop fire resistance rating required.
- C. Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross sectional shapes and depths relative to joint width that optimum sealant movement capability. Install sealants at the same time joint fillers are installed.
- D. Tool nonsag sealants immediately after sealant application and prior to the time skinning or curing begins. Form smooth, uniform beads of configuration indicated or required to produce fire resistance rating, as well as to eliminate air pockets, and to ensure contact and adhesion of sealants with sides of joint. Remove excess sealant from surfaces adjacent to joint.
Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

3.05 IDENTIFICATION

- A. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:

1. The words "Warning - Through-Penetration Firestop System - Do Not Disturb. Notify Building Management of Any Damage".
2. Contractor's name, address, and phone number.
3. Through-penetration firestop system designation of applicable testing and inspecting agency.
4. Date of installation.
5. Through-penetration firestop system manufacturer's name.

3.06 FIELD QUALITY CONTROL

- A. The inspector shall advise the contractor of any deficiencies noted.
- B. Do not proceed to enclose firestopping with other construction until inspection agency has verified that the firestop installation complies with the requirements.
- C. Where deficiencies are found, repair or replace the firestopping so that it complies with requirements of tested and listed system design.

3.07 CLEANING

- A. Clean off excess fill materials and sealants adjacent to openings and joints as work progresses by methods and with cleaning materials approved by manufacturers of firestopping products and of products in which opening and joints occur.
- B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Contract Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop system complying with specified requirements.

END OF SECTION

SECTION 07 92 00

JOINT SEALANTS

PART 1 GENERAL

1.01 SCOPE

- A. General: Prepare joints and apply sealant at all locations which normally require sealing to prevent infiltration of air, water, and insects and to reduce transmission of sound.
- B. Apply sealants to exterior and interior non-static joints. Do not seal normal drainage points or weep holes. Include the following:
 - 1. masonry control and expansion joints
 - 2. around exterior trim, windows, door frames, and other penetrations or openings in exterior walls
 - 3. threshold bedding
 - 4. joints between different wall materials
 - 5. other applications indicated
- C. Sealing of joints in concrete construction, including sidewalk joints, concrete paving joints and floor joints, tile floor expansion joints and other floor joints as indicated.
- D. Sealing of all exterior and interior locations where materials or equipment do not fit together or against the adjoining surface with a hairline joint.
- E. Caulking of interior static joints. Include the following:
 - 1. intersection of cabinets, casework and similar items applied to or recessed in walls
 - 2. other applications indicated
- F. Sealing between wall and wall mounted plumbing fixtures and floor and floor mounted plumbing fixtures.
- G. Sealing at intersection of tops and side/backsplashes to each other and to wall.
- H. Seal penetrations through ceramic tile work.
- I. Trim exposed masonry flashing.

1.02 GENERAL PERFORMANCE

- A. Except as otherwise indicated, joint sealant is required to establish and maintain airtight and waterproof continuous seals on a permanent basis, within recognized

limitations of wear and aging as indicated for each application.

- B. Failures of installed sealant to comply with this requirement will be recognized as failures of both materials and workmanship.

1.03 SUBMITTALS

- A. Submit manufacturer's product data and installation instructions.
 - 1. Certification, in the form of manufacturer's standard data sheet or by letter, stating that each type of compound and sealant to be furnished complies with these specifications.
 - 2. Statement that each product to be furnished is recommended for the application shown and is compatible with all materials to which applied.
 - 3. Instructions for handling, storage, mixing, priming, installation, curing and protection for each type of sealant.
- B. Submit manufacturer's color chart for color selections.
- C. Submit cured sealant samples in colors required for the work. Architect's approval will be for color only. Compliance with other requirements is the Contractor's responsibility.

1.05 STORAGE AND HANDLING

- A. Prevent inclusion of foreign matter or the damage of materials by water or breakage.
- B. Procure and store in original containers until ready for use.
- C. Materials showing evidence of damage shall be rejected.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Definition: The term "sealant" will be understood to be an elastomeric type. The term "caulk" will be understood to be a synthetic resin base of highest quality acrylic latex compound.
- B. General
 - 1. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
 - 2. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the following limits

- for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - a. Architectural Sealants: 250 g/L.
 - b. Sealant Primers for Nonporous Substrates: 250 g/L.
 - c. Sealant Primers for Porous Substrates: 775 g/L.
 3. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
 4. Colors: As selected by Architect from manufacturer's full range; selected colors to match adjacent materials.
 5. Where exposed to foot traffic, select materials of sufficient strength and hardness to withstand stiletto heel traffic without damage or deterioration of sealant system.
- C. Manufacturers: BOSTIK; DOW CORNING CORPORATION; EUCLID CHEMICAL; TREMCO MANUFACTURING COMPANY; GENERAL ELECTRIC COMPANY/MOMENTIVE; SIKA CHEMICAL CO.; MAMECO INTERNATIONAL; BASF BUILDING SYSTEMS; VULCHEM.
1. Manufacturer's listed under the following applications are for basis of design. Equal products by above listed manufacturers are acceptable.
- D. Exterior Vertical and Overhead Joints: Single-component neutral curing silicone sealant meeting ASTM C920, Type S, Grade NS, Class 50.
1. DOW 791
 2. GE SCS9000 Silpruf NB
 3. TREMCO Spectrum 2
 4. PECORA 895 NST
- E. Horizontal Wearing Expansion Joints; Interior and Exterior
1. Type: Two-part polyurethane based elastomeric sealant, complying with ASTM C920, Class 25, Type M, Grade P. Self-leveling or gun grade type as recommended by manufacturer for application shown.
 2. Location: For joints in exterior concrete pavements, sidewalks and interior floors.
 - a. BOSTIK Chem-Calk 555-SL
 - b. EUCLID Eucolastic II
 - c. SONNEBORN Sonolastic SL 2
 - d. TREMCO THC 900/901
- F. Interior Vertical and Overhead Joints: Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.
1. DOW 799
 2. GE SCS2000 SilPruf
 3. TREMCO Spectrum 2

4. PECORA 895 NST

G. Sealants at Countertops, Backsplashes and Plumbing Fixtures: ASTM C920, Type S, Grade NS, Class 25. Provide with mildew resistive additive.

1. Sealant Colors

- a. Countertops and Backsplashes: Clear.
- b. Plumbing Fixtures: white, unless colored fixtures are selected, then sealant color shall match fixture color.

2. Manufacturers/Products

- a. DOW 786
- b. GE SCS1700 Sanitary.
- c. SONNEBORN Sonolastic Omniplus
- d. TREMCO Tremsil 600
- e. PECORA 898 Sanitary Sealant

H. Caulk Joints – Interior, Static - Paintable: High quality acrylic latex compound, non-staining non-bleeding complying with ASTM C834, as supplied by one of the above listed manufacturers.

2.02 ACCESSORIES

- A. Joint Primer/Sealer: Non-staining type, recommended by sealant manufacturer; compatible with joint forming material.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming material.
- C. Bond Breaker Tape: Pressure sensitive polyethylene or plastic tape, recommended by sealant manufacturer, to suit applications where bond to substrate should be avoided for proper joint sealant performance.
- D. Joint Backing: Compressible rod stock conforming to ASTM C1330, Type B; material as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance
- E. Solvents: Cleaning agent recommended by the manufacturer of the sealant in writing to Architect.

PART 3 EXECUTION

3.01 INSPECTION

A. Pre-Installation Meeting

- 1. Prior to sealant installation, and at the Contractor's direction, meet at project site to review material selections, joint preparations, installation

- procedures, weather conditions and coordination with other trades.
2. Include sealant installer, Contractor, Architect, manufacturer's representative and representatives of other trades or subcontractors affected by the sealant installation.
- B. Examine substrates and installation conditions. Do not proceed with joint sealant work until unsatisfactory conditions have been corrected.
 - C. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 PREPARATION

- A. Clean, seal and prime surfaces in accordance with manufacturer's recommendations. Confine primer/sealant to areas of sealant bond.
- B. Remove dust, dirt, loose coatings, moisture and other substances which could interfere with sealant bond.
- C. Remove lacquers and protective films from metal surfaces.
- D. Architectural Concrete and Stone: Apply masking around joints to protect adjacent surfaces from defacement and staining during sealing operations. Repair damaged masking until sealant is installed.

3.03 INSTALLATION

- A. Apply joint sealant as late as possible in construction, preceding painting and following cleaning operations. Do not apply sealant during inclement weather conditions or when temperature is above or below manufacturer's limitations for installation.
- B. Install joint sealant materials and accessories in strict accordance with manufacturer's installation instructions.
- C. Set joint filler units at depth or position in joint as indicated to coordinate with other work. Do not leave voids or gaps between ends of joint filler units.
- D. Install sealant backer rod, except where recommended to be omitted by sealant manufacturer for application indicated. Use rod diameter that will cause compression when installed.
- E. Install bond breaker tape and where required by manufacturer's recommendations to ensure that sealants will perform as intended.
- F. Apply joint sealants in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surfaces on both sides. Fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. At horizontal joints between a horizontal surface and vertical surface, fill joint to form a slight cove, so

that joint will not trap moisture and dirt. Hand tool and finish all joints.

- G. Install joint sealants within recommended temperature ranges and to depths indicated or when not indicated, as recommended by sealant manufacturer. For normal moving vertical and horizontal joints, fill joints to a depth equal to 50% of joint width, but not more than 1/2" deep nor less than 1/4" deep, measured at the center section of bead.
- H. Confine materials to joint areas with masking tapes or other acceptable methods. Remove excess sealant materials promptly as work progresses and clean adjoining surfaces.
- I. Masonry Flashing: Where sealant joint is in direct contact with flexible masonry flashing, trim flashing flush with face of masonry after sealant is installed and cured. Verify during this procedure that weep holes have not been compromised during sealing operations.

3.04 CLEANING

- A. Upon completion, remove and dispose of masking materials; remove all excess sealing materials; clean adjacent materials of all soil and stain resulting from sealing operations.
 - 1. Replace damaged material and material which cannot be properly cleaned.

END OF SECTION

SECTION 08 16 13.13

STEEL ENTRANCE DOORS

PART 1 GENERAL

1.01 DESCRIPTION

- A. Work Includes:
1. Exterior steel entrance doors.

1.02 SUBMITTALS

- A. Product Data: Submit product data, specifications and installation instructions for each type of door and frame.
1. Include details of core, stile and rail construction, including trim for lites and similar components.
 2. Include details of finish hardware mounting.
- B. Shop Drawings: Submit in accordance with the General Conditions and Section 01 33 23. Include the following:
1. Door and frame fabrication, sections and details as required.
 2. Installation details, including frame relationship to supporting and adjacent components.
 3. Door and frame elevations.
 4. Anchors, joint system, expansion provisions, and other components not included in manufacturer's standard product data.
 5. Glazing details.

1.04 SYSTEM PERFORMANCE

- A. Provide exterior door assemblies that have been designed and fabricated to comply with system performance characteristics specified herein, as demonstrated by manufacturer's corresponding stock systems according to test methods designated.
1. Thermal Transmission, AAMA 1503.01: U-value of not more than 0.32 BTU/Hr. x sf x degrees F. SHGC minimum of .015.

1.05 DELIVERY, STORAGE AND PROTECTION

- A. Conform to manufacturer's standard precautions. Include the following:
1. Deliver, handle and store doors and frames at the job site in such a manner as to prevent damage.

2. Do not receive doors before the building is enclosed.
3. Only remove cartons upon arrival of doors at job site if cartons are wet or damaged.
4. Store doors out of weather and/or extreme temperatures.
5. Store doors in a vertical position on blocking, clear of the floor and with blocking between the doors to permit air circulation between the doors.
6. Immediately remove all damaged or otherwise unsuitable doors and frames from the job site.

1.06 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Minimum 10 years of experience in manufacturing fiberglass doors. Must have a minimum of 5 projects within the last 3 years of similar or greater magnitude.

1.07 JOB CONDITIONS

- A. Field Measurements: Take field measurements prior to fabrication of doors and frames to insure proper fit of assemblies.

1.08 WARRANTY

- A. Provide manufacturer's written 5 year warranty to replace, at no cost to the Owner, doors, frames or hardware provided under this section, that fail in materials or workmanship. Failures of materials or workmanship includes excessive deflection, faulty operation of entrances, deterioration of finish or construction, in excess of normal weathering, and defects in hardware, weatherstripping, and other components of the work.

PART 2 PRODUCTS

2.01 EXTERIOR DOORS

- A. Manufacturer: THERMATRU Classic Craft
- B. Door:
 1. Faces: .021-inch (24 gauge) minimum thickness, tension-leveled cold rolled steel, zinccoated, conversion-coated to permit paint bond
 2. Edges: Machinable kiln-dried hardwood, flush and square with door faces, lock edge reinforced with full-length integrated 3-1/2-inch wide engineered lumber core. Door bottom edge: moisture- and decay-resistant composite.
 3. Core: Foamed-in-place polyurethane, density 1.9 pcf minimum. Except where certification does not permit, standard factory sizes may be edge trimmed or end trimmed in shop or field to suit replacement door size requirements.
- C. Frame: 5/4" select softwood, water-repellent.
- D. Sill: 1/2" low profile sill; extruded aluminum with mill finish.

- E. Glazing: Factory glazed quality 1 fully tempered float glass complying with ASTM C1048. Clear argon-filled, low-E coated dual-seal insulating glass.
- F. Weatherstripping: Jacketed thermoset open-cell foam, press-fit in kerfs at jamb stops in frames. Extruded thermoplastic elastomer, finned and chambered design, press-fit into bottom kerf of doors. Corner pads at bottom margin corners from jacketed thermoset open-cell foam.
- G. Hinges: Steel ball bearing.
- H. Lockset: See Door Hardware, Section 08 71 00.

2.02 GLAZING

- A. Factory glaze sash.
- B. General: Comply with specification 08 81 00. Low E coated clear insulated, preassembled units consisting of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space and complying with ASTM E774 for performance classification indicated as well as with other requirements specified for thermal glass characteristics, air space, sealing system, sealant, spacer material, corner design and desiccant.
- C. Glass Type: Tempered type I, Class 1 for clear glass, Quality q³, conforming to ASTM C1036.

2.03 FABRICATION

- A. Fabricate doors and frames as shown on the drawings. Provide frames rigid, neat in appearance and free from defects. Take field measurements as required for coordination with adjoining work.
- B. Form exposed surfaces free from warp, wave and buckle, with all corners square, unless otherwise shown. Set each member in proper alignment and relationship to other members with all surfaces straight and in a true plane.

PART 3 EXECUTION

3.01 INSPECTION

- A. Installer: Examine the substrate and conditions under which fiberglass reinforced plastic work is to be installed and notify the General Contractor in writing of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

3.01 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and recommendations to achieve weathertight and freely operating installation.

- B. Maintain alignment with adjacent work. Secure assembly to framed openings, plumb and square, without distortion.
- C. Place insulation in shim spaces around unit perimeter to maintain continuity of building thermal barrier.
- D. Install sealant and related backing materials at perimeter of assembly.
- E. Leave door units closed and locked.

3.03 TOLERANCES

- A. Maximum Diagonal Distortion: 1/8" measured with a straight edge, corner to corner. Maximum measurable plane is 4'-0" x 7'-0".
- B. Provide clearance for doors of 1/8" at jambs and heads; 1/4" clearance above threshold.

3.04 ADJUSTING

- A. At substantial completion, adjust all operable components to ensure proper installation and that they function smooth and freely.

3.05 CLEANING

- A. Remove dirt and excess sealant from exposed surfaces. Follow the manufacturer's recommended cleaning techniques and procedures for cleaning all surfaces. Use only cleaning products that will not scratch or damage the surfaces, and are recommended by the manufacturer.

END OF SECTION

SECTION 08 19 00

INTERIOR PRE-HUNG DOORS

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Provide interior doors and frames as indicated and specified. All doors to be pre-hung assemblies. Types include
 - 1. Solid core flush.
 - a. Paint grade MDO or hardboard faces.
 - b. Wood veneer to match
- B. Intended Use: Products specified are intended for interior applications for single family and multifamily dwelling.

1.02 RELATED SECTIONS

- A. Hardware: Section 08 71 00.
- B. Finish Carpentry: Section 06 20 00.

1.03 SUBMITTALS

- A. Submit manufacturer's product data and installation instructions for each type of wood door required.
 - 1. Include details of core and edge construction.
 - 2. Include certification indicating compliance with specification requirements.

1.04 DELIVERY

- A. Deliver doors in manufacturer's original unopened protective packaging or wrapper.
- B. Store, handle and protect doors in accordance with manufacturer's recommendations to prevent damage, wetting, soiling and deterioration.
- C. Comply with AWI Section 1300-S-8 recommendations for care and handling at the site. Store doors inside the building, flat in a dry well-ventilated area.

1.05 QUALITY ASSURANCE

- A. Quality Grade: Materials and fabrication shall be "custom grade" in accordance with "Quality Standard Illustrated," of the AWI conforming to the following sections:

1. Section 300: Standing and running trim.
2. Section 1700: Installation of architectural woodwork.

B. Performance Grade WDMA I.S.1-A: Standard Duty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer: Provide pre-hung wood doors as manufactured by one of the following subject to the requirements.

1. MASONITE.
2. JELD-WEN.
3. SIMPSON DOOR COMPANY.
4. TRUSTILE.

2.02 INTERIOR FLUSH DOORS – SOLID CORE

A. Description:

1. Faces: Hardboard MDF of MDO facings. Facings are to be bonded to stiles, rails and core forming a structural attachment.
 - a. Prime for field painting.
 - b. Wood Veneer: Match existing
2. Core: Composite particleboard
3. Stiles and Rails: Engineered wood or MDF.
4. Thickness: 1 ¾"
5. Construction: 3-Ply minimum.

2.03 FRAMES, TRIM AND ACCESSORIES

A. Frames:

1. Frame: Wood jambs to be fabricated as a flat jamb with doorstop applied or 2-piece split jamb. Hinge jamb preparations for Double door units shall include preparations for ball catch located at the top of door on both door panels designed to strike into the head jamb

B. Wood Casing Trim - Painted Finish: In accordance with AWI 300, "Custom" Grade, and AWI 100, Grade I, except no checks will be allowable on visible surfaces. Plain sliced poplar. Well seasoned and kiln dried. Moisture content at time of fabrication shall not exceed 12%. Trim in areas where existing trim remains shall match size

C. Hardware: 4" (3) standard weight radius mortise hinges.

2.04 FABRICATION

- A. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with NFPA80 final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.
- B. Vertical edge of door to be square, beveled both sides or lock stile only. Coordinate edge preparation.
- C. Individually package doors at factory with manufacturer's standard packaging or wrapping for delivery to job site.

PART 3 EXECUTION

3.01 INSPECTION

- A. Examine substances, rough openings and installation conditions. Do not proceed with wood door installation until unsatisfactory conditions have been corrected.
- B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 INSTALLATION

- A. Condition doors to average prevailing humidity in installation area before hanging.
- B. Install doors in accordance with manufacturer's installation instructions. Job fit doors and prepare to receive hardware. Bevel 1/8" in 2" at strike edges for clearance in arc of swing.
- C. Hang doors straight, plumb and square securely anchored into position. Adjust doors to provide uniform clearance and to contact stops uniformly. Remove and replace doors and frames which are warped, bowed or otherwise damaged.
- D. Install finish carpentry materials and products plumb, level, true and straight with no distortion. Shim as required using concealed shims. Install to a tolerance of 1/8" in 8'-0" for plumb and level, and with 1/16" maximum offset in flush adjoining surfaces, 1/8" maximum offsets in revealed adjoining surfaces.
 - 1. Install with minimum number of joints possible; using full-length pieces (from maximum length of lumber available) to the greatest extent possible. Stagger joints in adjacent and related members. Cope at returns, miter at corners and comply with Quality Standards for joinery.

3.03 PROTECTION

- A. Protect installed doors from soiling, staining and damage until final acceptance.
- B. Repair or replace doors damaged beyond acceptable repair as directed by the

Architect.

END OF SECTION

SECTION 08 36 13

SECTIONAL DOORS

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Section includes:
 - 1. Steel sectional overhead doors, motor operated.
 - 2. Operating hardware, tracks and supports.
 - 3. Electric operators and controls.
 - a. Wireless remote controls.

1.02 RELATED SECTIONS

- A. Lock Cylinder: Section 08 71 10.
- B. Electrical: Division 26.

1.03 REFERENCES

- A. American National Standards Institute (ANSI)
 - 1. ANSI/DASMA 102 Specifications for Sectional Overhead Type Doors (ANSI A216.1 published in National Garage Door Manufacturers Association Bulletin 102).
- B. American Society for Testing and Materials (ASTM)
 - 1. ASTM A653: Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 2. ASTM B221: Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod, and Wire

1.04 SYSTEM DESCRIPTION

- A. Design Requirements
 - 1. Furnish sectional overhead doors that comply with ANSI/DASMA 102.
 - 2. Wind Loading: Design and reinforce sectional overhead doors to comply with ANSI/DASMA 102 criteria for wind loading.

1.05 SUBMITTALS

- A. Shop Drawings: Fully dimensioned and detailed drawings showing complete installation with components, materials and finishes, and accessories indicated.

- B. Samples for Color Selection: Submit samples of door manufacturer's full range of metal finish colors on 4" x 6" piece of standard base metal.
- C. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- D. Quality Control Submittals
 - 1. Certificates: For review and approval, submit manufacturer's written certificates indicating that doors comply with specified design criteria of ANSI/DASMA 102.
 - 2. Installer Qualifications: For review and approval, submit installer's written statement of compliance with installation experience requirement.

1.06 QUALITY ASSURANCE

- A. Provide each sectional overhead door as a complete unit produced by one manufacturer, including frames, sections, brackets, guides, tracks, counterbalance mechanisms, motor operator, controls, hardware and installation accessories to suit openings and allowable headroom.
- B. Provide sectional overhead door units by one manufacturer for entire project.
- C. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
- D. Installer Qualifications: Authorized representative of the manufacturer with minimum five years documented experience.
- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.07 WARRANTY

- A. Provide manufacturer's standard 2-year product warranty covering door sections.
- B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Warranty Period: 10 years.

PART 2 PRODUCTS

2.01 RESIDENTIAL GRADE STEEL DOOR SECTIONS

- A. Construct door sections including face sheets and frames from zinc-coated (galvanized), cold-rolled, commercial steel (CS) sheet, complying with ASTM A653, minimum G60 coating designation.
- B. Door Assembly:
 - 1. 24 or 25 gauge one layer steel construction
 - 2. Tongue-and-groove/shiplap section joints
 - 3. Replaceable bottom weatherseal in a corrosion-resistant retainer
 - 4. Nylon rollers are smooth and quiet.
 - 5. Galvanized steel hinges
- C. Reinforce sections with reinforcement, as required to stiffen door and for wind loading. Provide galvanized steel bars, struts, trusses, or strip steel, formed to depth and bolted or welded in place.
- D. Provide reinforcement for hardware attachment.
- E. Fabricate sections so finished door assembly is rigid and aligned, with tight hairline joints and free of warp, twist, and deformation.
- F. Door Finish:
 - 1. Baked-Enamel or Powder-Coated Finish: Color and gloss as selected by Architect from manufacturer's full range .
 - 2. Finish of Interior Facing Material: Finish as selected by Architect from manufacturer's full range .
- G. Basis of Design: CLOPAY Classic

Other Manufacturers: Subject to compliance with requirements, provide doors by OVERHEAD DOOR COMPANY, HAAS, COOKSON, WAYNE DALTON or ARM-R-LITE.

2.02 ACCESSORIES

- A. Hardware: Provide duty, rust-resistant hardware, with galvanized, cadmium plated, or stainless steel fasteners, to suit type of door.

2.03 ELECTRIC DOOR OPERATOR

- A. General: Provide electric door operator assembly of size and capacity recommended and provided by door manufacturer; complete with electric motor and factory-prewired motor controlsremote control stations and accessories required for proper operation.

- B. Door Operator Type: Chain Drive Wi-Fi Garage Door Opener with Integrated Bluetooth Technology. 1/2 Horsepower AC, 1,625 RPM, automatic thermal protection, permanent lubrication
- C. Mechanics
 - 1. Steel chassis, T-rail and trolley, full chain drive mechanism (16:1 gear reduction and adjustable door arm)
 - 2. Auto-force adjustment for changing weather and environmental conditions
 - 3. Electronic limits for easy setup
 - 4. AC Wi-Fi logic board with built-in surge suppressor (for replacement logic boards, order part 050ACTB)
- D. Power: 120V AC, 60 Hz voltage, 2.7A current rating, UL® Listed, 4' power cord
- E. Speed: 7" per second upward, 7" per second downward
- F. Lighting: Max. 2 100-watt lightbulbs; Solid-state light delay; Adjustable time; Enhanced CFL (compact fluorescent) compatible, max. 26 watts.
- G. Controls
 - 1. Provide momentary-contact, 3-button control station labeled "open", "close" and "stop" installed at location shown.
 - 2. Provide remote control units to operate door.

PART 3 EXECUTION

3.01 INSPECTION

- A. Installer must examine the supporting structure and the conditions under which the work is to be performed and notify the General Contractor in writing of conditions which are detrimental to proper and timely completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

3.02 INSTALLATION

- A. Install door and operating equipment complete with necessary hardware, tracks, anchors, inserts, hangers and equipment supports in accordance with drawings and manufacturer's instructions and recommendations.

3.03 FIELD ADJUSTMENT

- A. Upon completion of installation including the work by other trades, test and adjust doors to operate easily, free from warp, twist or distortion.

END OF SECTION

SECTION 08 53 13

VINYL WINDOWS

PART 1 GENERAL

1.01 SCOPE

- A. Provide exterior vinyl single hung windows.
 - 1. Glass and glazing of the various window systems.
 - 2. Anchors, fasteners, flashings, trim and accessories to complete the work.
- B. Work includes removal of existing windows, preparation of existing substrates and flash new window to existing construction.

1.02 RELATED SECTIONS

- A. Sealant: Section 07 92 00.

1.03 QUALITY ASSURANCE

- A. Standards: Comply with the applicable provisions of American Architectural Manufacturers Association (AAMA) "Voluntary Specifications for Aluminum and Poly (Vinyl Chloride) (PVC) Prime Windows and Glass Doors, AAMA 101".
- B. Reference Standards: Wherever the following abbreviations are shown herein, they shall refer to the corresponding standard:
 - 1. AAMA: American Architectural Manufacturers Association.
 - 2. ASTM: American Society for Testing and Materials.
- C. Manufacturer: Minimum 5 years experience in manufacture of heavy intermediate steel windows similar to type required for this project.
- D. Existing Conditions: Installer shall visit project site and measure each opening slated for installation of new sash. Size of unit to be reinstalled into existing opening shall be determined by installer and manufacturer based on actual field conditions.
- E. Certification: All windows to be National Fenestration Rating Council (NFRC) certified.
- F. All windows to be Energy Star-rated

1.04 SUBMITTALS

- A. Submit the following in accordance with the General Conditions and Section 01 33 23.
 - 1. Submit manufacturer's product data and installation instructions. Submit shop drawings for fabrication and installation of windows. Include elevations and detail sections of every typical member.
 - 2. Submit finish samples.

1.05 SAMPLE INSTALLATION

- A. Provide sample installations at 2 locations (1 at siding and 1 at brick) to determine acceptability of installation methods and quality of workmanship. Adjustments in materials and methods may be required by the Owner for compliance with the intent of the Contract Documents and existing opening conditions.
- B. Once the approval process is complete, the approved sample installation, modified as needed, will represent minimum installation quality for the work.
- C. Sample installation can be used in the finished work, when approved as such by the Owner.
- D. Window unit used for sample installation to be selected by Owner.

1.06 WARRANTY

- A. Warranty for all work in this Section to operate properly and be weathertight for the standard manufacturer's warranty.
- B. Provide Contractor's guarantee for all work under this Section to be free from defects of workmanship for a period on one year.

PART 2 PRODUCTS

2.01 HUNG WINDOW

- A. Manufacturer: Drawings and specifications are based on SIMONTON Series 5500 Reflections windows.
 - 1. Other Manufacturers: Vinyl windows by others are acceptable provided the type and performance are an acceptable match as approved by the OWNER prior to bid opening. These additionally approved manufacturers will be included by Addendum. An unacceptable pattern or color match is reason for disapproval of product and manufacturer. No substitutions will be considered after bid opening.
- B. Type: Units complying to AAMA 101 for R50 specifications.
 - 1. Design Pressure (Performance Class): 40 psf.

2. Structural Test Pressure (Design Pressure x 1.5): 75 psf.
3. Water Resistance Test Pressure - ASTM E547: 7.5 psf.

C. Frame and Window

1. Member: Main frame and window members designed specifically for manufacturers of vinyl windows using hollow extrusions of rigid PVC.
 - a. Mullions: Factory mullied.
2. Minimum Wall Thickness:
 - a. Main Frame: .062".
 - b. Fixed Meeting Rail: .07".
3. Main Frame Corners: Welded construction.
4. Glazing: Extruded snap-in type PVC bead, allowing exterior glazing. Units to accept minimum 3/4 inch thick insulating glass.
5. Weatherstripping: Provide around entire perimeter of all operating sash.
6. Screens:
 - a. Aluminum Frames: Manufacturer's standard aluminum alloy complying with SMA 1004 or SMA 1201. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.
 - 1) Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet.
 - b. Base Bid: 18-by-16 mesh fiberglass fabric, roll formed aluminum frame, finish to match window. Comply with ASTM D 3656.

D. Hardware

1. Counterbalancing Mechanism: Complying with AAMA 902, concealed, of size and capacity to hold sash stationary at any open position.
2. Locks and Latches: Allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only.
3. Limit Devices: Limit devices designed to restrict sash opening. Provide at 2nd floors.
 - a. Limit clear opening to 4 inches

E. Colors: As selected by Architect from manufacturer's standard colors.

F. Flexible Flashing: Provide as required.

1. Material: Polyethylene sheet backed rubberized asphalt membrane, 40 mils thick. Provide primer as recommended by membrane manufacturer.
2. Manufacturers: Bituthene Ice and Water Shield by W.R. GRACE; Polyken 640 Underlayment Membrane by POLYKEN TECHNOLOGIES; Polyguard Deck Guard by POLYGUARD PRODUCTS; Weather Watch by GAF; Winterguard by CERTAINTEED.

G. Flashings and Trims: Types and thickness recommended by manufacturer for opening conditions and substrates encountered.

- A. Factory glaze sash.
- B. General: Low E coated clear insulated, preassembled units consisting of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space and complying with ASTM E774 for performance classification indicated as well as with other requirements specified for thermal glass characteristics, air space, sealing system, sealant, non metallic spacer material, corner design and desiccant.
- C. Glass Type: Type I, Class 1 for clear glass, Quality q³, conforming to ASTM C1036. Provide tempered at operating units and where required by codes.
 - 1. U Value: <0.30
 - 2. SHGC: <0.3

PART 3 EXECUTION

3.01 INSPECTION

- A. Examine substrates, supporting structure and installation conditions. Do not proceed with window or door erection until unsatisfactory conditions have been corrected.
- B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.
- C. Verify size of window openings prior to fabrication of windows.

3.02 INSTALLATION

- A. General
 - 1. Do not install component parts which are observed to be defective, including warped, bowed, dented, abraded, and broken members. Remove and replace members which have been damaged during installation or thereafter before time of acceptance.
 - 2. Do not cut or trim component parts during erection, in a manner which would damage finish, decrease strength or result in a visual imperfection of a failure in performance of the work.
- B. Install windows and doors in accordance with the manufacturer's specifications for the installation of window components and final shop drawings.
- C. Install component parts level, plumb, true to line and with uniform joints and reveals. Secure to structure with non-staining and non-corrosive shims, anchors, fasteners, spacers and fillers. Use erection equipment which will not mar or stain finished surfaces, and will not damage component parts.

- D. Assembly and Anchorage: Anchor component parts securely in place by bolting or other permanent mechanical attachment system which will comply with performance requirements and permit movements as required.
- E. Set sill members in a bed of sealant compound or with joint fillers or gaskets to provide weathertight requirements. Do not seal drainage holes (slots).

3.03 CLEANING AND PROTECTION

- A. Protect glass from breakage immediately upon installation, by attachment of streamers to framing held away from glass.
 - 1. Do not apply markings of any type on surfaces of glass.
- B. Immediately before acceptance of the work, clean the window thoroughly, inside and out.

END OF SECTION

SECTION 087100

DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware
2. Electronic access control system components

B. Section excludes:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:

1. Division 01 "General Requirements" sections for Allowances, Alternates, Owner Furnished Contractor Installed, Project Management and Coordination.
2. Division 06 Section "Rough Carpentry"
3. Division 06 Section "Finish Carpentry"
4. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
5. Division 08 Sections:
 - a. "Metal Doors and Frames"
 - b. "Flush Wood Doors"
 - c. "Stile and Rail Wood Doors"
 - d. "Interior Aluminum Doors and Frames"
 - e. "Aluminum-Framed Entrances and Storefronts"
 - f. "Stainless Steel Doors and Frames"
 - g. "Special Function Doors"
 - h. "Entrances"
6. Division 26 "Electrical" sections for connections to electrical power system and for low-voltage wiring.
7. Division 28 "Electronic Safety and Security" sections for coordination with other components of electronic access control system and fire alarm system.

1.02 REFERENCES

A. UL LLC

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Keying Systems and Nomenclature
4. Installation Guide for Doors and Hardware

C. NFPA – National Fire Protection Association

1. NFPA 70 – National Electric Code
2. NFPA 80 – 2016 Edition – Standard for Fire Doors and Other Opening Protectives
3. NFPA 101 – Life Safety Code
4. NFPA 105 – Smoke and Draft Control Door Assemblies
5. NFPA 252 – Fire Tests of Door Assemblies

D. ANSI - American National Standards Institute

1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
2. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
3. ANSI/BHMA A156.28 - Recommended Practices for Keying Systems
4. ANSI/WDMA I.S. 1A - Interior Architectural Wood Flush Doors
5. ANSI/SDI A250.8 - Standard Steel Doors and Frames

1.03 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 Submittal Procedures.
2. Prior to forwarding submittal:
 - a. Review drawings and Sections from related trades to verify compatibility with specified hardware.
 - b. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.

B. Action Submittals:

1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
 - a. Wiring Diagrams: For power, signal, and control wiring and including:

- 1) Details of interface of electrified door hardware and building safety and security systems.
 - 2) Schematic diagram of systems that interface with electrified door hardware.
 - 3) Point-to-point wiring.
 - 4) Risers.
3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated and tagged with full description for coordination with schedule.
 - a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.
4. Door Hardware Schedule:
 - a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.
 - b. Submit under direct supervision of a Door Hardware Institute (DHI) certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI.
 - c. Indicate complete designations of each item required for each opening, include:
 - 1) Door Index: door number, heading number, and Architect's hardware set number.
 - 2) Quantity, type, style, function, size, and finish of each hardware item.
 - 3) Name and manufacturer of each item.
 - 4) Fastenings and other pertinent information.
 - 5) Location of each hardware set cross-referenced to indications on Drawings.
 - 6) Explanation of all abbreviations, symbols, and codes contained in schedule.
 - 7) Mounting locations for hardware.
 - 8) Door and frame sizes and materials.
 - 9) Degree of door swing and handing.
 - 10) Operational Description of openings with electrified hardware covering egress, ingress (access), and fire/smoke alarm connections.
5. Key Schedule:
 - a. After Keying Conference, provide keying schedule that includes levels of keying, explanations of key system's function, key symbols used, and door numbers controlled.
 - b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
 - c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.

- d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
- e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
- f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.

C. Informational Submittals:

1. Provide Qualification Data for Supplier, Installer and Architectural Hardware Consultant.
2. Provide Product Data:
 - a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
 - b. Include warranties for specified door hardware.

D. Closeout Submittals:

1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
 - a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
 - b. Catalog pages for each product.
 - c. Final approved hardware schedule edited to reflect conditions as installed.
 - d. Final keying schedule
 - e. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
 - f. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.

E. Inspection and Testing:

1. Submit written reports to the Owner and Authority Having Jurisdiction (AHJ) of the results of functional testing and inspection for:
 - a. Fire door assemblies, in compliance with NFPA 80.
 - b. Required egress door assemblies, in compliance with NFPA 101.

1.04 QUALITY ASSURANCE

A. Qualifications and Responsibilities:

1. Supplier: Recognized architectural hardware supplier with a minimum of 5 years documented experience supplying both mechanical and electromechanical door hardware similar in quantity, type, and quality to that indicated for this Project. Supplier to be recognized as a factory direct distributor by the manufacturer of the primary materials with a warehousing facility in the Project's vicinity. Supplier to have on staff, a certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.

2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.
3. Architectural Hardware Consultant: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
 - a. For door hardware: DHI certified AHC or DHC.
 - b. Can provide installation and technical data to Architect and other related subcontractors.
 - c. Can inspect and verify components are in working order upon completion of installation.
 - d. Capable of producing wiring diagram and coordinating installation of electrified hardware with Architect and electrical engineers.
4. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

B. Certifications:

1. Fire-Rated Door Openings:
 - a. Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction.
 - b. Provide only items of door hardware that are listed products tested by UL LLC, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.
2. Smoke and Draft Control Door Assemblies:
 - a. Provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105
 - b. Comply with the maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.
3. Electrified Door Hardware
 - a. Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.
4. Accessibility Requirements:
 - a. Comply with governing accessibility regulations cited in "REFERENCES" article 087100, 1.02.D3 herein for door hardware on doors in an accessible route. This project must comply with all Federal Americans with Disability Act regulations and all Local Accessibility Regulations.

C. Pre-Installation Meetings

1. Keying Conference
 - a. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:

- 1) Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 - 2) Preliminary key system schematic diagram.
 - 3) Requirements for key control system.
 - 4) Requirements for access control.
 - 5) Address for delivery of keys.
2. Pre-installation Conference
 - a. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - b. Inspect and discuss preparatory work performed by other trades.
 - c. Inspect and discuss electrical roughing-in for electrified door hardware.
 - d. Review sequence of operation for each type of electrified door hardware.
 - e. Review required testing, inspecting, and certifying procedures.
 - f. Review questions or concerns related to proper installation and adjustment of door hardware.
 3. Electrified Hardware Coordination Conference:
 - a. Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping
- B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer's original packaging.
- C. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
- D. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
- E. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.
- F. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.06 COORDINATION

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.

- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

1.07 WARRANTY

- A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within published warranty period.
 - 1. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.
 - 2. Warranty Period: Beginning from date of Substantial Completion, for durations indicated in manufacturer's published listings.
 - a. Mechanical Warranty
 - 1) Locks
 - a) Commerical: 10 years
 - b) Residential: Limited Lifetime
 - 2) Exit Devices
 - a) 10 years
 - 3) Closers
 - a) 25 years

1.08 MAINTENANCE

- A. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.
- B. Turn over unused materials to Owner for maintenance purposes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. The Owner requires use of certain products for their unique characteristics and project suitability to ensure continuity of existing and future performance and maintenance standards. After investigating available product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: "No Substitute."

1. Where "No Substitute" is noted, submittals and substitution requests for other products will not be considered.
- B. Approval of alternate manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category are only to be considered by official substitution request in accordance with section 01 25 00.
- C. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.
- D. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

A. Fabrication

1. Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. provide screws according to manufacturer's recognized installation standards for application intended.
 2. Finish exposed screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
 3. Provide concealed fasteners wherever possible for hardware units exposed when door is closed. Coordinate with "Metal Doors and Frames", "Flush Wood Doors", "Stile and Rail Wood Doors" to ensure proper reinforcements. Advise the Architect where visible fasteners, such as thru bolts, are required.
- B. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.
1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

2.03 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Ives 5BB series
2. Acceptable Manufacturers and Products:
 - a. Hager BB1191/1279 series
 - b. McKinney TB series

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. Provide five knuckle, ball bearing hinges.
3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
 - a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
 - b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
 - a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
5. 2 inches or thicker doors:
 - a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
6. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
7. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
8. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
 - a. Steel Hinges: Steel pins
 - b. Non-Ferrous Hinges: Stainless steel pins
 - c. Out-Swinging Exterior Doors: Non-removable pins
 - d. Out-Swinging Interior Lockable Doors: Non-removable pins
 - e. Interior Non-lockable Doors: Non-rising pins
9. Provide hinges with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component. Provide mortar guard for each electrified hinge specified.

2.04 CONTINUOUS HINGES

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Select
 - b. Roton

B. Requirements:

1. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
2. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.

3. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
4. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
5. On fire-rated doors, provide aluminum geared continuous hinges classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
6. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
7. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

2.05 FLUSH BOLTS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco

B. Requirements:

1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

2.06 COORDINATORS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco

B. Requirements:

1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors, provide bar-type coordinating device, surface applied to underside of stop at frame head.

2. Provide filler bar of correct length for unit to span entire width of opening, and appropriate brackets for parallel arm door closers, surface vertical rod exit device strikes, or other stop mounted hardware. Factory-prepared coordinators for vertical rod devices as specified.

2.07 CYLINDRICAL LOCKS – GRADE 1

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Schlage ND series
2. Acceptable Manufacturers and Products:
 - a. Sargent 11-Line
 - b. Corbin-Russwin CL3100 series

B. Requirements:

1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3-hour fire doors.
2. Indicators: Where specified, provide escutcheon with lock status indicator window on top of lockset rose:
 - a. Escutcheon height (including rose) 6.05 inches high by 3.68 inches wide.
 - b. Indicator window measuring a minimum 3.52-inch by .60 inch with 1.92 square-inches of front facing viewing area and 180-degree visibility with a total of .236 square-inches of total viewable area.
 - c. Provide snap-in serviceable window to prevent tampering. Lock must function if indicator is compromised.
 - d. Provide messages color-coded with full text and symbol, as scheduled, for easy visibility.
 - e. Unlocked and Unoccupied message will display on white background, and Locked and Occupied message will display on red background.
3. Cylinders: Refer to "KEYING" article, herein.
4. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2-inch latch throw. Provide proper latch throw for UL listing at pairs.
5. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
6. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
7. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
8. Provide electrified options as scheduled in the hardware sets.
9. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.
 - a. Lever Design: RHO

2.08 CYLINDRICAL LOCKS – GRADE 2

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Schlage ALX series
2. Acceptable Manufacturers and Products:
 - a. Sargent 7-Line
 - b. Corbin-Russwin CL3800 series

B. Requirements

1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 2, and UL Listed for 3-hour fire doors with a minimum cycle life of 1 million.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2-inch latch throw. Provide 3/4" latch throw for UL listing at pairs.
4. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
5. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
6. Provide a minimum of 5 points of lever engagement between the cassette spindle and lever shank to prevent lever sag.
7. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
8. Plug-n-Play – Provide modular lockset allowing lock functions to be created for 7 typical functions by inserting/installing parts into the exterior of a fully assembled chassis
9. Reconfigurable Chassis - Provide modular lockset that allows the function to be reconfigured by removing external components from the chassis
10. Lever Trim: Solid cast levers and wrought roses on both sides.
 - a. Lever Design: RHO

2.09 TUBULAR LOCKS – GRADE 2

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Schlage F series
2. Acceptable Manufacturers and Products:
 - a. Sargent DL series
 - b. Dormakaba QTL200 series

B. Requirements:

1. Provide tubular locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 2, Grade 2 and ANSI/BHMA A156.39 Residential Grade AAA, and UL Listed for 3-hour fire doors.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide locks with standard 2-3/8 inches (60 mm) adjustable to 2-3/4 inches (70 mm) backset with 1/2-inch (13 mm) latch throw. Provide 2-3/4 inches (70 mm) backset, unless 2-3/8 inches (60 mm) is required by door or frame detail or noted otherwise.

4. Provide locksets that fit standard 2-1/8 inches (54 mm) diameter bore without use of thru bolts.
5. Door Thickness: Locksets adjustable to fit in 1-3/8 inches (35 mm) or 1-3/4 inches (44 mm) door thickness.
6. Provide standard T-strikes unless extended lip strikes are necessary to protect trim.
7. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.
 - a. Lever Design: ELA

2.10 DEADBOLTS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Schlage B600/B700/B800 Series
2. Acceptable Manufacturers and Products:
 - a. Corbin-Russwin DL3000 Series
 - b. Sargent 480 Series

B. Requirements:

1. Provide grade 1 deadbolt series conforming to ANSI/BHMA A156.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide deadbolts with standard 2-3/4 inches (70 mm) backset. Provide 2-3/8 inches (60 mm) where noted or if door or frame detail requires. Provide deadbolt with full 1-inch (25 mm) throw, constructed of steel alloy.
4. Provide manufacturer's standard strike.
5. Lock Status Indicator Trim: Where specified, provide escutcheon with lock status indicator window.
 - a. Escutcheon height 4.125 inches, width 2.54 inches. Projection 1.32 inches on thumbturn side and 1.28 inches on cylinder side.
 - b. Unlocked and Unoccupied message will display on white background, and Locked and Occupied message will display on red background.
 - c. Provide snap-in serviceable window to prevent tampering. Lock must function if indicator is compromised.
 - d. Indicator window to provide 180-degree visibility.

2.11 EXIT DEVICES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Von Duprin 78/75A series
2. Acceptable Manufacturers and Products:
 - a. Precision 2100 Series
 - b. Dormakaba 9000 Series

B. Requirements

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware with manufacturer's approved strikes.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements. No plastic inserts are allowed in touchpads.
4. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect. Touchpad must extend a minimum of one half of door width.
5. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
6. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
7. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
8. Provide electrified options as scheduled.
9. Top latch mounting: double- or single-tab mount for steel doors, face mount for aluminum doors eliminating requirement of tabs, and double tab mount for wood doors.
10. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

2.12 CYLINDERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Schlage Everest 29 T
2. Acceptable Manufacturers and Products:
 - a. No Substitute

B. Requirements:

1. Provide cylinders/cores compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset; manufacturer's series as indicated. Refer to "KEYING" article, herein.
2. Provide cylinders in the below-listed configuration(s), distributed throughout the Project as indicated.
 - a. Patented Restricted: cylinder with interchangeable core with patented, restricted keyway.
3. Patent Protection: Cylinders/cores requiring use of restricted, patented keys, patent protected.
4. Nickel silver bottom pins.

2.13 CYLINDERS

A. Manufacturers:

1. Scheduled Manufacturer and Product:
 - a. InstaKey
2. Acceptable Manufacturers and Products:
 - a. No Substitute

B. Requirements:

1. Provide 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. Refer to "KEYING" article, herein.

2.14 KEYING

A. Scheduled System:

1. Existing factory registered system:
 - a. Provide cylinders/cores keyed into Owner's existing factory registered keying system. Comply with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

B. Requirements:

1. Construction Keying:
 - a. Replaceable Construction Cores.
 - 1) Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
 - a) 3 construction control keys
 - b) 12 construction change (day) keys.
 - 2) Owner or Owner's Representative will replace temporary construction cores with permanent cores.
2. Permanent Keying:
 - a. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
 - 1) Master Keying system as directed by the Owner.
 - b. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
 - c. Provide keys with the following features:
 - 1) Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
 - 2) Patent Protection: Keys and blanks protected by one or more utility patent(s).
 - d. Identification:
 - 1) Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.

- 2) Identification stamping provisions must be approved by the Architect and Owner.
- 3) Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
- 4) Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
- 5) Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
- e. Quantity: Furnish in the following quantities.
 - 1) Permanent Control Keys: 3.
 - 2) Master Keys: 6.
 - 3) Change (Day) Keys: 3 per cylinder/core that is keyed differently
 - 4) Key Blanks: Quantity as determined in the keying meeting.

2.15 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. LCN 4050A series
2. Acceptable Manufacturers and Products:
 - a. Falcon SC70A series
 - b. Norton 7500 series

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with cast aluminum cylinder.
3. Closer Body: 1-1/2-inch (38 mm) diameter with 11/16-inch (17 mm) diameter heat-treated pinion journal and full complement bearings.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and all weather requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and back check.
7. Pressure Relief Valve (PRV) Technology: Not permitted.
8. Provide stick on templates, special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.16 DOOR TRIM

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco

B. Requirements:

1. Provide push plates, push bars, pull plates, pulls, and hands-free reversible door pulls with diameter and length as scheduled.

2.17 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco

B. Requirements:

1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes plates 2 inches (51 mm) less width of door on single doors, pairs of doors with a mullion, and doors with edge guards. Size plates 1 inch (25 mm) less width of door on pairs without a mullion or edge guards.
3. At fire rated doors, provide protection plates over 16 inches high with UL label.

2.18 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturers:
 - a. Glynn-Johnson
2. Acceptable Manufacturers:
 - a. Rixson
 - b. Sargent

B. Requirements:

1. Provide overhead stop at any door where conditions do not allow for a wall stop or floor stop presents tripping hazard.

2.19 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide concave type where lockset has a push button or thumbturn.
2. Where a wall stop cannot be used, provide universal floor stops.
3. Where wall or floor stop cannot be used, provide overhead stop.
4. Provide roller bumper where doors open into each other and overhead stop cannot be used.

2.20 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Zero International
2. Acceptable Manufacturers:
 - a. Reese
 - b. Legacy

B. Requirements:

1. Provide thresholds, weather-stripping, and gasketing systems as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
4. Size thresholds 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width unless otherwise specified in the hardware sets or detailed in the drawings.

2.21 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives

2. Acceptable Manufacturers:

- a. Burns
- b. Trimco

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.

2.22 ROLLER LATCHES

A. Manufacturers:

1. Scheduled Manufacturer:

- a. Ives

2. Acceptable Manufacturers:

- a. Burns
- b. Trimco

B. Requirements:

- 1. Provide roller latches with 4-7/8 inches (124 mm) strike at single doors to fit ANSI frame prep. If dummy levers are used in conjunction with roller latch mount roller latch at a height as to not interfere with proper mounting and height of dummy lever.
- 2. Provide roller latches with 2-1/4 inches (57 mm) full lip strike at pair doors. Mount roller in top rail of each leaf per manufacturer's template.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 - 2. Custom Steel Doors and Frames: HMMA 831.
 - 3. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S. 1A
 - 4. Installation Guide for Doors and Hardware: DHI TDH-007-20
- B. Install door hardware in accordance with NFPA 80, NFPA 101 and provide post-install inspection, testing as specified in section 1.03.E unless otherwise required to comply with governing regulations.
- C. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
- D. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
- E. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- F. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- G. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
- H. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.
- I. Lock Cylinders:
 - 1. Install construction cores to secure building and areas during construction period.
 - 2. Replace construction cores with permanent cores as indicated in keying section.
 - 3. Furnish permanent cores to Owner for installation.
- J. Wiring: Coordinate with Division 26, ELECTRICAL and Division 28 ELECTRONIC SAFETY AND SECURITY sections for:
 - 1. Conduit, junction boxes and wire pulls.
 - 2. Connections to and from power supplies to electrified hardware.
 - 3. Connections to fire/smoke alarm system and smoke evacuation system.
 - 4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
 - 5. Connections to panel interface modules, controllers, and gateways.
 - 6. Testing and labeling wires with Architect's opening number.
- K. Continuous Hinges: Re-locate the door and frame fire rating labels where they will remain visible so that the hinge does not cover the label once installed.

- L. Door Closers & Auto Operators: Mount closers/operators on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers/operators so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.
- M. Overhead Stops/Holders: Mount overhead stops/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.
- N. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.
- O. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
- P. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
- Q. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- R. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- S. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

3.03 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. Spring Hinges: Adjust to achieve positive latching when door can close freely from an open position of 30 degrees.
 - 2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
 - 3. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.04 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.

- B. Clean operating items per manufacturer's instructions 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.

3.05 DOOR HARDWARE SCHEDULE

- A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.
- B. Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application.
- C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.
- D. Hardware Sets:

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Hardware Group No. 01

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PASSAGE SET	ALX10 RHO	626	SCH
1	EA	OH STOP	100S	630	GLY
1	EA	SURFACE CLOSER	4050A DEL REG OR PA AS REQ	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

VERIFY/COORDINATE PREPS ON EXISTING DOORS AND FRAMES. PROVIDE FIELD MODIFICATIONS AND/OR FILLERS TO EXISTING DOORS AND FRAMES AS NECESSARY TO ACCEPT NEW SPECIFIED HARDWARE. SUBMIT FOR APPROVAL, A DETAILED LIST OF REQUIRED MODIFICATIONS PRIOR TO PERFORMING.

Hardware Group No. 02

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	PRIVACY LOCK W/ OUTSIDE INDICATOR	ND40S RHO OS-OCC	626	SCH
1	EA	SURFACE CLOSER	4050A DEL REG OR PA AS REQ	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

VERIFY/COORDINATE PREPS ON EXISTING DOORS AND FRAMES. PROVIDE FIELD MODIFICATIONS AND/OR FILLERS TO EXISTING DOORS AND FRAMES AS NECESSARY TO ACCEPT NEW SPECIFIED HARDWARE. SUBMIT FOR APPROVAL, A DETAILED LIST OF REQUIRED MODIFICATIONS PRIOR TO PERFORMING.

Hardware Group No. 03

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	ENTRANCE LOCK	ALX53T RHO	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	OH STOP	100S	630	GLY
			*PROVIDE WHERE DOOR DOES NOT OPEN INTO WALL		
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

VERIFY/COORDINATE PREPS ON EXISTING DOORS AND FRAMES. PROVIDE FIELD MODIFICATIONS AND/OR FILLERS TO EXISTING DOORS AND FRAMES AS NECESSARY TO ACCEPT NEW SPECIFIED HARDWARE. SUBMIT FOR APPROVAL, A DETAILED LIST OF REQUIRED MODIFICATIONS PRIOR TO PERFORMING.

Hardware Group No. 04

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
1	EA	ENTRANCE LOCK	ALX53T RHO	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	OH STOP	100S	630	GLY
1	EA	SURFACE CLOSER	4050A DEL REG OR PA AS REQ	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	SET	GASKETING	429AA-S	AA	ZER
1	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	65A	A	ZER

DOORS REQUIRE SPECIAL 3/8 INCH UNDERCUT FOR ADA TYPE THRESHOLD.

Hardware Group No. 05

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	ALX80T RHO	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	OH STOP	100S	630	GLY
			*PROVIDE WHERE DOOR DOES NOT OPEN INTO WALL		
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

VERIFY/COORDINATE PREPS ON EXISTING DOORS AND FRAMES. PROVIDE FIELD MODIFICATIONS AND/OR FILLERS TO EXISTING DOORS AND FRAMES AS NECESSARY TO ACCEPT NEW SPECIFIED HARDWARE. SUBMIT FOR APPROVAL, A DETAILED LIST OF REQUIRED MODIFICATIONS PRIOR TO PERFORMING.

Hardware Group No. 06

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	ALX80T RHO	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4050A DEL REG OR PA AS REQ	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

VERIFY/COORDINATE PREPS ON EXISTING DOORS AND FRAMES. PROVIDE FIELD MODIFICATIONS AND/OR FILLERS TO EXISTING DOORS AND FRAMES AS NECESSARY TO ACCEPT NEW SPECIFIED HARDWARE. SUBMIT FOR APPROVAL, A DETAILED LIST OF REQUIRED MODIFICATIONS PRIOR TO PERFORMING.

Hardware Group No. 07

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
1	EA	STOREROOM LOCK	ALX80T RHO	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	OH STOP	100S	630	GLY
1	EA	SURFACE CLOSER	4050A DEL REG OR PA AS REQ	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	SET	GASKETING	429AA-S	AA	ZER
1	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	65A	A	ZER

DOORS REQUIRE SPECIAL 3/8 INCH UNDERCUT FOR ADA TYPE THRESHOLD.

VERIFY/COORDINATE PREPS ON EXISTING DOORS AND FRAMES. PROVIDE FIELD MODIFICATIONS AND/OR FILLERS TO EXISTING DOORS AND FRAMES AS NECESSARY TO ACCEPT NEW SPECIFIED HARDWARE. SUBMIT FOR APPROVAL, A DETAILED LIST OF REQUIRED MODIFICATIONS PRIOR TO PERFORMING.

Hardware Group No. 08

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
2	EA	CONST LATCHING BOLT	FB51P/FB61P (AS REQ'D)	630	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	EA	STOREROOM LOCK	ALX80T RHO	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	COORDINATOR	COR X FL (MB AS REQ'D)	628	IVE
2	EA	OH STOP	100S	630	GLY
2	EA	SURFACE CLOSER	4050A DEL REG OR PA AS REQ	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	SET	GASKETING	429AA-S	AA	ZER
1	EA	ASTRAGAL	OVERLAPPING ASTRAGAL BY DR. MANUFACTURER *PROVIDE TYPE AS REQ'D TO PROVIDE LATCH PROTECTION		B/O
2	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	65A	A	ZER

DOORS REQUIRE SPECIAL 3/8 INCH UNDERCUT FOR ADA TYPE THRESHOLD.

VERIFY/COORDINATE PREPS ON EXISTING DOORS AND FRAMES. PROVIDE FIELD MODIFICATIONS AND/OR FILLERS TO EXISTING DOORS AND FRAMES AS NECESSARY TO ACCEPT NEW SPECIFIED HARDWARE. SUBMIT FOR APPROVAL, A DETAILED LIST OF REQUIRED MODIFICATIONS PRIOR TO PERFORMING.

Hardware Group No. 09

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	640	IVE
1	EA	PANIC HARDWARE	CD-78-L-NL-06	313	VON
1	EA	RIM CYLINDER	20-057 ICX	613	SCH
1	EA	MORTISE CYLINDER	20-061 ICX X K510-730 XQ11-948 36-083 36-082-037	613	SCH
2	EA	FSIC CORE	23-030 EV29 T	606	SCH
1	EA	OH STOP	100S	613	GLY
1	EA	SURFACE CLOSER	4050A DEL REG OR PA AS REQ	695	LCN
1	EA	PA MOUNTING PLATE	4050A-18PA SRT	695	LCN
1	EA	BLADE STOP SPACER	4050A-61 SRT	695	LCN

VERIFY/COORDINATE PREPS ON EXISTING DOORS AND FRAMES. PROVIDE FIELD MODIFICATIONS AND/OR FILLERS TO EXISTING DOORS AND FRAMES AS NECESSARY TO ACCEPT NEW SPECIFIED HARDWARE. SUBMIT FOR APPROVAL, A DETAILED LIST OF REQUIRED MODIFICATIONS PRIOR TO PERFORMING.

Hardware Group No. 10

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY	628	IVE
1	EA	PANIC HARDWARE	CD-7847-EO	626	VON
1	EA	PANIC HARDWARE	CD-7847-NL-OP-110MD	626	VON
1	EA	RIM CYLINDER	20-057 ICX	626	SCH
2	EA	MORTISE CYLINDER	20-061 ICX XQ11-948 (BLOCKING RING AS REQ'D)	626	SCH
3	EA	FSIC CORE	23-030 EV29 T	626	SCH
2	EA	90 DEG OFFSET PULL	8190EZHD 12" O	630-316	IVE
2	EA	OH STOP	100S	630	GLY
2	EA	SURFACE CLOSER	4050A DEL REG OR PA AS REQ	689	LCN
2	EA	PA MOUNTING PLATE	4050A-18PA	689	LCN
2	EA	BLADE STOP SPACER	4050A-61	689	LCN
1	EA	RAIN DRIP	142AA	AA	ZER
2	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	65A	A	ZER

DOORS REQUIRE SPECIAL 3/8 INCH UNDERCUT FOR ADA TYPE THRESHOLD.

PERIMETER WEATHER, AND MEETING STYLE SEALS PROVIDED BY ALUMINUM SECTION.

VERIFY/COORDINATE PREPS ON EXISTING DOORS AND FRAMES. PROVIDE FIELD MODIFICATIONS AND/OR FILLERS TO EXISTING DOORS AND FRAMES AS NECESSARY TO ACCEPT NEW SPECIFIED HARDWARE. SUBMIT FOR APPROVAL, A DETAILED LIST OF REQUIRED MODIFICATIONS PRIOR TO PERFORMING.

Hardware Group No. U1

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	HINGE BY PRE-HUNG DOOR MFR.		
1	EA	PASSAGE SET	F10 ELA 16-200	626	SCH
1	EA	SGL CYL DEADBOLT	B660BDC	626	SCH
1	EA	INTERCHANGEABLE CORE	INSTA-KEY CORE AS REQUIRED	626	INS
1	EA	DOOR STOP	060 OR 70 AS REQ'D	F26D	IVE
1	EA	WEATHERIZATION PRODUCTS	SEALS AND THRESHOLD BY PRE-HUNG DOOR MFR.		
1	EA	VIEWER	U698	626	IVE
			PROVIDE (2) AT TYPE A UNITS		

Hardware Group No. U2

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	HINGE	HINGE BY PRE-HUNG DOOR MFR.		
1	EA	PASSAGE SET	F10 ELA 16-200	626	SCH
1	EA	SGL CYL DEADBOLT	B660BDC	626	SCH
1	EA	INTERCHANGEABLE CORE	INSTA-KEY CORE AS REQUIRED	626	INS
1	EA	DOOR STOP	060 OR 70 AS REQ'D	F26D	IVE
1	EA	WEATHERIZATION PRODUCTS	FIRE RATED SEALS BY PRE-HUNG DOOR MFR.		

VERIFY/COORDINATE PREPS ON EXISTING DOORS AND FRAMES. PROVIDE FIELD MODIFICATIONS AND/OR FILLERS TO EXISTING DOORS AND FRAMES AS NECESSARY TO ACCEPT NEW SPECIFIED HARDWARE. SUBMIT FOR APPROVAL, A DETAILED LIST OF REQUIRED MODIFICATIONS PRIOR TO PERFORMING.

Hardware Group No. U3

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	HINGE	HINGE BY PRE-HUNG DOOR MFR.		
1	EA	SGL CYL DEADBOLT	B660BDC	626	SCH
1	EA	INTERCHANGEABLE CORE	INSTA-KEY CORE AS REQUIRED	626	INS
1	EA	DOOR STOP	060 OR 70 AS REQ'D	F26D	IVE
1	EA	WEATHERIZATION PRODUCTS	SEALS AND THRESHOLD BY PRE-HUNG DOOR MFR.		

VERIFY/COORDINATE PREPS ON EXISTING DOORS AND FRAMES. PROVIDE FIELD MODIFICATIONS AND/OR FILLERS TO EXISTING DOORS AND FRAMES AS NECESSARY TO ACCEPT NEW SPECIFIED HARDWARE. SUBMIT FOR APPROVAL, A DETAILED LIST OF REQUIRED MODIFICATIONS PRIOR TO PERFORMING.

Hardware Group No. U4

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	HINGE BY PRE-HUNG DOOR MFR.		
1	EA	PRIVACY LOCK	F40 ELA 16-200	626	SCH
1	EA	DOOR STOP	060 OR 70 AS REQ'D	F26D	IVE
3	EA	SILENCER	SR64/SR65 AS REQ'D	GRY	IVE

Hardware Group No. U5

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	HINGE BY PRE-HUNG DOOR MFR.		
1	EA	PASSAGE SET	F10 ELA 16-200	626	SCH
1	EA	DOOR STOP	060 OR 70 AS REQ'D	F26D	IVE
3	EA	SILENCER	SR64/SR65 AS REQ'D	GRY	IVE

VERIFY/COORDINATE PREPS ON EXISTING DOORS AND FRAMES. PROVIDE FIELD MODIFICATIONS AND/OR FILLERS TO EXISTING DOORS AND FRAMES AS NECESSARY TO ACCEPT NEW SPECIFIED HARDWARE. SUBMIT FOR APPROVAL, A DETAILED LIST OF REQUIRED MODIFICATIONS PRIOR TO PERFORMING.

Hardware Group No. U6

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	HINGE BY PRE-HUNG DOOR MFR.		
2	EA	ROLLER LATCH	RL30	626	IVE
2	EA	SINGLE DUMMY TRIM	F170 ELA	626	SCH
2	EA	DOOR STOP	060 OR 70 AS REQ'D	F26D	IVE

VERIFY/COORDINATE PREPS ON EXISTING DOORS AND FRAMES. PROVIDE FIELD MODIFICATIONS AND/OR FILLERS TO EXISTING DOORS AND FRAMES AS NECESSARY TO ACCEPT NEW SPECIFIED HARDWARE. SUBMIT FOR APPROVAL, A DETAILED LIST OF REQUIRED MODIFICATIONS PRIOR TO PERFORMING.

Hardware Group No. U7

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	SET	BYPASS DOOR HDW	118F SERIES	628	JOH
2	EA	FLUSH PULL	222	B26D	IVE

Hardware Group No. U8

Provide each RU door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR

ALL REQUIRED HARDWARE BY OVERHEAD DOOR MANUFACTURER

BID 5/12/2026

END OF SECTION

SECTION 09 29 00

GYPSUM WALLBOARD

PART 1 GENERAL

1.01 SCOPE

- A. Provide gypsum board systems consisting of wall board, trim and accessories. Work includes:
 - 1. Gypsum drywall wall board.
 - 2. Moisture and Mold Resistant, Glass-Mat Gypsum Wallboard
 - 3. Edge trim, corner beads, fasteners, joint treatment materials and other accessories required for a complete installation.

1.02 QUALITY ASSURANCE

- A. Gypsum Board Systems: Comply with ASTM C840 "Recommended Specifications for Application and Finishing of Gypsum Board", and as specified.
- B. Reference Standards: Wherever the following abbreviations are used herein they shall refer to the corresponding standard:
 - 1. ASTM: American Society for Testing and Materials.
 - 2. GA: Gypsum Association.
 - 3. FS: Federal Specification.
- C. Guarantee: Submit written guarantee stating that cracks, delaminations or other imperfections in the drywall work which may develop within a period of 2 years from date of acceptance will be repaired at no cost to the Owner.

1.03 SUBMITTALS

- A. Submit manufacturer's product data and installation instructions for each gypsum board system component.
- B. Special Environmental Requirements: Submit the following in accordance with Section 01 81 13).
 - 1. Local/Regional Materials
 - a. Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.

- b. Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
- c. Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
- d. Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in manufacturer's original, unopened labeled containers.
- B. Store, protect and handle materials in accordance with manufacturer's recommendations to prevent damage, soiling and deterioration.
- C. Protect adjoining surfaces against damage and soiling.

1.05 JOB CONDITIONS

- A. Coordinate installation sequencing with work of other trades.
- B. Verify completion of other work, including that of other trades, that will be concealed by gypsum drywall construction before installation of wallboard.

PART 2 PRODUCTS

2.01 GYPSUM BOARD

- A. General: Comply with ASTM C1396.
 - 1. Use products that were extracted, processed and manufactured within 500 miles of the project for a minimum of 50%, based on cost, of the building materials' value.
- B. Moisture and Mold Resistant, Glass-Mat Gypsum Wallboard:
 - 1. ASTM C1396 (Section 5) and applicable sections ASTM C1658.
 - 2. Type X.
 - 2. Edges: Tapered.
 - 3. Thickness: 1/2 inch.
 - 4. Acceptable products: Basis of design is e²XP Interior Extreme by National Gypsum. Other acceptable product include DensArmor Plus Firecode (Type X) by GEORGIA-PACIFIC or equal by other gypsum board manufacturers listed in 2.01A.
 - 5. Water Absorption: ASTM C473, the average water absorption for panels is not greater than 5 percent by weight after two-hour immersion.

- 6. Resistance to Mold Growth: ASTM D3273, "Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber," the panel score was 10.
- 7. Use in bathrooms.
- D. Standard Board: 1/2" thick unless otherwise indicated. Tapered edges. Use at all locations except those indicated to receive a specific type of board.

2.02 ACCESSORIES

- A. Fasteners: Drywall screws and metal framing screws per manufacturer's instructions and recommendations for type and size, based on construction and conditions involved.
- B. Trim
 - 1. Corner Beads - Outside, Square Corners: 1-1/4 inch x 1-1/4 inch heavy gauge galvanized steel or vinyl, perforated.
 - a. Metal: BEADEX MANUFACTURING; UNIMAST; DALE INDUSTRIES; listed gypsum board manufacturers.
 - b. Vinyl: VINYL TECH; VINYL CORP.
 - 2. Corner Beads - Outside, Non-square Corners: BEADEX B-1 Splay Flexible Corner or equal. Concealed metal; two galvanized continuous strips laminated with paper trim; for application without mechanical fasteners.
 - 3. Exposed Edges (Casing Beads): L-shaped trim, size to suit wallboard.
 - a. Metal: UNIMAST 200-B; BEADEX; DALE INDUSTRIES; listed gypsum board manufacturers.
 - b. Vinyl: VINYL CORP. SB; VINYL TECH.
 - 4. Control Joints
 - a. Metal: Roll formed zinc, tape protected 1/4" wide x 7/16" deep control slot. UNIMAST No. 093; BEADEX; DALE INDUSTRIES; listed gypsum board manufacturers.
 - b. Vinyl: VINYL CORP. No. CVJ-16; VINYL TECH. Tape protected 3/16" wide x 7/16" deep control slot.
- C. Reinforcing Tape: Width to adequately cover joint.
- D. Joint Taping Compound: Designed for bonding tape to wallboard and coating corner beads and fasteners.
- E. Joint Topping Compound: Designed to sand smooth and feather well for finished surface.
- F. Additional Items: All additional accessories to complete work including nails and anchors to secure frames to walls and floors.

PART 3 EXECUTION

3.01 GENERAL

- A. Comply with the requirements of ASTM C840 "Standard Specification for the Application and Finishing of Wallboard", unless otherwise specified or recommended by the manufacturer.

3.02 PREPARATION

- A. Maintain uniform building temperature range not less than 55 degrees F., for 24 hours before, during and after gypsum panel installation and joint finishing treatment.
- B. Provide adequate lighting and ventilation during installation and joint finishing treatment.

3.03 INSPECTION

- A. Examine substrates and installation conditions. Do not proceed with gypsum wallboard work until unsatisfactory conditions have been corrected.
- B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.04 FRAMING INSTALLATION

- A. Install metal framing for walls and ceilings/soffits receiving gypsum wallboard finish.
 - 1. See Section 09100, Metal Support Systems, for materials and methods of installation.

3.05 GYPSUM BOARD INSTALLATION

- A. General
 - 1. Pre-installation Conference: Before start of gypsum board installation, meet at the project site with the Architect and installers of related work, including work requiring openings, access panels, support, similar integrated requirements and mechanical and electrical trades. Review potential interferences and conflicts and coordinate layout and sequencing requirements for proper installation and integration of the work.
 - a. Do not proceed with gypsum board installation until framing, bracing and other supports for subsequently applied work have been installed, reviewed and accepted by the Architect.
 - b. Do not install gypsum board until work concealed by gypsum board has been installed.
- B. Application
 - 1. Install gypsum board face side out. Do not install imperfect, damaged or

damp boards.

2. Butt boards together for a light contact at edges and ends with not more than 1/16 open space between boards. Do not force into place.
3. Locate either edges or end joints over supports. Position boards so that both tapered edge joints abut. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.
4. Attach gypsum board to framing and blocking as required for additional support at openings and cutouts.
5. Floating Construction: Install gypsum board with "floating" internal corner construction, unless isolation of the intersecting board is indicated.
6. In addition to compliance with the standards, comply with specific requirements indicated for each type of arrangement of gypsum wallboard system shown. Space fasteners in accordance with manufacturer's recommendations and complying with referenced standards.
 - a. Walls and Partitions: Apply sheets horizontally or vertically. Provide maximum sheet lengths to minimize end joints with edges or ends over supports. In two layer applications, stagger joints of second layer from joints of first layer.
 - b. Cut and install panels to eliminate vertical joints in corners of door frames to ceiling.
 - c. Make cutouts to fit within wall plate, register and grille flanged. All cutouts made by knife or saw.
 - d. Make angles and corners clean, true, plumb and square; walls plumb, flat and straight and ceilings flat and level.
 - e. Ceilings: Apply gypsum board on ceilings, before application on walls and partitions. Install in direction and manner to minimize end joints. Stagger end joints over supports. In two layer applications, stagger joints of second layer from joints of first layer.

3.06 TRIM AND ACCESSORIES

- A. Install corner beads at external corners of gypsum wallboard work. Use longest practical lengths.
- B. Install edge trim wherever edge of gypsum board would be exposed or semi-exposed.
 1. Provide beaded trim to receive joint compound at all gypsum wallboard work.
 2. Provide L-type trim where work is abutted to other work and Kerf-type where work is kerfed to receive kerf leg.
 3. Provide U-type trim where edge is exposed, revealed, gasketed or sealant filled, including expansion joints.
- C. Control Joints
 1. Install control joints to isolate gypsum board surfaces as recommended in ASTM C840. Verify locations with Architect prior to installation. Generally

locate joints as follows when:

- a. Ceiling or partition abuts a structural element, dissimilar wall or partition or other vertical penetration.
- b. Construction changes within the plane of ceiling or wall.
- c. Wall dimensions exceed 30'-0".
- d. Ceiling dimensions exceed 50' in either direction with perimeter relief; 30'-0" without relief.
- e. Exterior soffits exceed 20'-0" in either direction; align with window mullions, when applicable.
- f. Wings of "L", "U", and "T"-shaped ceiling areas are joined.

3.07 FINISHING

- A. Comply with manufacturer's instructions for mixing, handling and application of materials.
 1. Apply treatment at joints both directions, at flanges of trim accessories, penetrations of gypsum board, fastener heads, surface defects and elsewhere indicated.
 2. Apply in manner that will result in each of these items being concealed when applied decoration has been completed.
- B. Prefill open joints of more than 1/16" with special chemical-hardening type bedding compound, before bedding joint tape.
- C. Apply joint tape at joints between gypsum boards, except where trim accessories are indicated.
- D. Do not use topping compound for bedding joint tape.
- E. Apply joint compound for the final coat of joint treatment, unless specifically recommended by the manufacturer for that use.
- F. Leave all exposed interior surfaces smooth and even, ready for painting.

3.08 ADJUST AND CLEAN

- A. Nail Pop
 1. Repair nail pop by driving new nails approximately 1-1/2" from nail pop and reseal nail.
 2. When paper face is punctured, drive new nail or screw approximately 1-1/2" from defective fastener and remove defective fastener. Fill damaged surface with compound.
- B. Ridging
 1. Do not repair ridging until condition has fully developed: approximately 6 months after installation or one heating season.

2. Sand ridges to reinforcing tape without cutting through tape.
 3. Fill concave areas on both sides of ridge with topping compound.
 4. After fill is dry, blend in topping compound over repaired area.
- C. Fill cracks with compound and finish smooth and flush.

END OF SECTION

SECTION 09 30 00

TILE

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Extent of tile work is shown on drawings and schedules, and as specified herein.
- B. Types of tile work required including the following:
 - 1. Ceramic wall and floor tile
 - 2. Backer board.
- C. Section also includes:
 - 1. Metal edge/transition strips installed as part of tile installations.

1.02 RELATED SECTIONS

- A. Sealant: Section 07 92 00.

1.03 QUALITY ASSURANCE

- A. Manufacturer: Provide tile of each type produced by a single manufacturer. Provide materials obtained from one source for each type and color of tile, grout, and setting materials.
- B. Installer: A firm with not less than 5 years experience in installing tile in applications similar to those required for this work.
- C. Ceramic Tile Manufacturing Standard: TCA 137.1. Furnish tile complying with Standard Grade requirements unless indicated otherwise.
- D. Proprietary Materials: Handle, store, mix and apply proprietary setting and grouting materials in compliance with manufacturer's instructions.
- E. Installer to verify locations of all flexible joints required by the provisions of this section, by the recommendations of TCA, and by the recommendations of the related manufacturers. See Article 3.06.
 - 1. Joint locations may or may not be indicated on the drawings.
- F. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation

schedules, and other requirements specified.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's technical information and installation instructions for materials required. Include certifications and other data to show compliance with these specifications.
- B. Samples: Submit manufacturer's color charts consisting of actual tiles or sections of tiles showing full range of colors available, for each type of tile specified. Include samples of grout and accessories requiring color selection. Submit full size sample for each type of trim, accessory and color. Submit samples of metal edge strip.

1.05 PRODUCT HANDLING

- A. Deliver packaged materials and store in original containers with seals unbroken and labels intact until time of use, in accordance with manufacturer's instructions.

1.06 JOB CONDITIONS

- A. Maintain environmental conditions and protect work during and after installation in accordance with referenced standards and manufacturer's printed recommendations.

PART 2 PRODUCTS

2.01 CERAMIC TILE

- A. Ceramic Wall Tile, Floor Tile and Base: Standard grade, impervious porcelain ceramic tile conforming to ANSI 137.1. Provide trim pieces as required.
 - 1. Basis of Design: Manufacturer, Styles and Colors: As indicated on the drawings.
 - 2. Other Acceptable Manufacturers: Ceramic tile manufactured by other manufacturers will be considered if materials meet the requirements of the Basis of Design and the sizes and colors are an acceptable match as approved by the Architect

2.02 MORTAR, GROUT AND ACCESSORIES

- A. Source: Setting mortar and grout to be from same manufacturer.
 - 1. Adhesives, Epoxies, Mortar and Grout Manufacturers: CUSTOM BUILDING PRODUCTS, BOSTIK, MAPEI, LATICRETE, BOSTIC, TEC (H.B. FULLER) and BONSAI AMERICAN.
 - a. Manufacturer's listed under the following applications are for basis of design. Equal products by above listed manufacturers are acceptable.

- B. General - All Adhesives, Epoxies, Mortar and Grout: See Tile Installation Systems in Part 3 of this Section.
- C. Modified Dry Set Cement Mortar - Thin Set: Factory mixed mortar of Portland cement/sand, field gauged with undiluted latex admixture. Conform to ANSI A118.4, Latex-Portland Cement Mortar. Provide type suitable for "medium-set" for tiles with a dimension larger than 15".
 - 1. Provide one of the following:
 - a. BOSTIK, Durabond D-50 or D-60.
 - b. MAPEI, Keraflex Super.
 - c. CUSTOM BUILDING PRODUCTS, ProLite Tile and Stone Mortar
 - d. LATICRETE, 255 MultiMax.
 - 2. Thinset Mortar for Glass Tile: Complies with ANSI A118.4 and A118.11.
 - a. BOSTIC Glass-Mate Glass Tile Mortar with Admixture Product 425TM Multi-Purpose Acrylic Latex Admixture.
 - b. CUSTOM BUILDING PRODUCTS, VersaBond Professional Thin Set Mortar
 - c. MAPEI: Adisilex P10 Mosaic & Glass Tile mixed with Keraply Latex additive
 - d. Equal by LATICRETE
- D. Dry-Set Mortar - Thin Set: Mixture of Portland cement with sand and latex, water imparting additive. Conform to ANSI A118.1, Standard Dry-Set Cement Mortar.
 - 1. May be used in lieu of Modified Dry Set Cement Mortar for ceramic floor and wall tile.
- E. Grout - Ceramic Tile (ANSI A118.7): Integrally colored, sanded (unless otherwise indicated), polymer modified cement type, factory prepared (premixed) grout. Color as selected by Architect.
 - 1. Provide one of the following:
 - a. BOSTIC, Ceramic Tile Grout with BOSTIK 425 Acrylic-Latex Admixture.
 - b. TEC (H.B. FULLER), TEC Power Grout.
 - c. MAPEI, Ultracolor Plus FA.
 - d. LATICRETE, Permacolor Grout.
 - e. CUSTOM BUILDING PRODUCTS, Prism
 - 2. Colors: As selected by Architect.
 - 3. Provide unsanded grout for glass tile and tile joints less than 1/8" wide.
- F. Metal Edge Trim: L-shape, height to match tile and setting-bed thickness; stainless steel, ASTM A666, 300 Series. SCHLUTER, CERAMIC TOOL COMPANY, BLANKE

- G. Grout Sealer: Low VOC, penetrating type as recommended by grout manufacturer that does not change color or appearance of grout.
- H. Crack Isolation (Anti-Fracture) Membrane: Fabric-Reinforced, Modified-Bituminous Sheet: Self-adhering, modified-bituminous sheet with fabric reinforcement facing; 0.040-inch nominal thickness. ANSI A118.12.
 - 1. Products: Provide one of the following:
 - a. MAPEI CORPORATION; Mapeguard CI with Primer HM.
 - b. NATIONAL APPLIED CONSTRUCTION PRODUCTS, INC.; Strataflex.
 - c. POLYGUARD; Tileguard.
 - d. CUSTOM BUILDING PRODUCTS, Crack Buster Pro.

2.03 TILE BACKER BOARD

- A. Provide one of the following types in maximum lengths available to minimize end-to-end butt joints.
 - 1. Nominal 1/2" thick acrylic coated glass mat gypsum backer board: ASTM C 1178.
 - 2. Nominal 1/2" thick Fiber-Cement Backer Board: ASTM C 1288.
 - 3. Nominal 1/2" thick cementitious board with fiberglass mesh reinforcements conforming to the requirements of ANSI A118.9 or ASTM C 1325.
- B. Manufacturers: U.S. GYPSUM; GEORGIA PACIFIC, CUSTOM BUILDING PRODUCTS, NATIONAL GYPSUM COMPANY; JAMES HARDIE; CERTAINTEED.
 - 1. Provide coated screws, type as recommended by board manufacturer.
 - 2. Joint Treatment Tape: Type as recommended by board manufacturer.

PART 3 EXECUTION

3.01 INSPECTION

- A. Examine surfaces to receive tile, setting beds and accessories before tile installation for the following:
 - 1. Defects or conditions adversely affecting quality and execution of the installation.
 - 2. Deviations beyond allowable tolerances of surfaces to receive tile.
 - 3. Do not proceed with installation work until unsatisfactory conditions are corrected.
- B. Conditions of surfaces to receive tile.
 - 1. Surfaces to be firm, dry, clean, and free of oily or waxy films or curing compounds.
 - 2. Grounds, anchors, plugs, hangers, bucks, electrical, plumbing and HVAC

work in or behind tile to be installed prior to proceeding with tile work.

3.02 PREPARATION

- A. Prepare surfaces to receive tile as required to achieve proper bond and as recommended by the Tile Council of America.
 - 1. See Section 01 73 00 for additional floor preparation requirements.
- B. Fill cracks, low areas and pits in concrete with self-leveling fill of type recommended by tile manufacturer for substrate conditions encountered.
- C. Lightly grind concrete subfloors with a terrazzo grinder to remove trowel marks, slab curl at saw cut joints or other surface irregularities or high spots which will telegraph to the flooring surface.
- D. Sawcut or grind transition areas to install tile flush with adjacent finished floor materials.
- E. Clean surfaces in a manner suitable for proper installation. Verify that slabs are free of curing membranes, oil, grease, wax, dust and other materials deleterious to tile installation.
- F. Primers or other preparations required or recommended in accordance with manufacturer's instructions.

3.03 TILE BACKERBOARD

- A. Location: Provide tile backerboard on metal stud walls as a substrate for ceramic tile products specified herein which are located where indicated.
- B. Install in strict accordance with manufacturer's recommendations and ANSI A108.11, Interior Installation of Cementitious Backer Units.
 - 1. Butt ends and edges of adjacent panels.
 - 2. Attach with screws spaced at 6 inch centers on perimeter and field.
 - a. Maintain minimum 1/2 inch from screws to panel edge.
 - b. At wainscot or similar location where tile terminates in same plane of wall, shim tile backerboard flush with adjacent wall board. Provide shims continuous along face of studs.
 - 3. Locate control and expansion joints in same locations as substrate and where required by wall tile.
 - 4. Apply glass mesh tape, or type recommended by board manufacturer, over joints. Embed tape in setting material indicated for specified tile finish.

3.04 INTERIOR WALL TILE INSTALLATION - SYSTEMS

- A. Prepare surfaces, fit, set or bond, grout, and clean in accordance with Tile Council of America, "Handbook for Ceramic Tile Installation", 2019 Edition; and as follows:

- C. Thin Set - Stud Walls - Over Tile Backerboard: TCA W244, dry-set mortar bond coat or latex Portland cement bond coat and grout.

1. Tile: ANSI A108.5.
2. Grout: ANSI A108.10.
3. Backerboard
 - a. Joint Preparation: Fill joints completely with setting mortar and embed 2 inch wide coated fiberglass tape into skim coat of same mortar.
 - b. Apply setting mortar in one layer, troweling skim coat with trowel's flat edge and then texturing with appropriate notched trowel. Troweling equipment must be appropriate for type of tile work and in good condition.

- D. Thin Set - Stud Walls - Over Gypsum Board: TCA W243, dry-set mortar bond coat or latex Portland cement bond coat and grout.

1. Tile: ANSI A108.5.
2. Grout: ANSI A108.10.

- D. Thin Set - Solid Back-Up Walls (concrete, CMU, etc.): TCA W202, dry-set mortar bond coat or latex Portland cement bond coat and grout.

1. Tile: ANSI A108.5.
2. Grout: ANSI A108.10.

3.05 INTERIOR FLOOR TILE INSTALLATION - SYSTEMS

- A. Prepare surfaces, fit, set or bond, grout, and clean in accordance with Tile Council of America, "Handbook for Ceramic Tile Installation", 2019 Edition; and as follows:

- B. Thin Set: TCA design F113, latex Portland cement mortar and grout or dry-set mortar and grout.

1. Tile: ANSI A108.5.
2. Grout: ANSI A108.10.

- C. Thin Set, Adhesive: TCA F116; organic adhesive and grout.

1. Tile: ANSI A108.4.
2. Grout: ANSI A108.10.

3.06 TILE INSTALLATION - PROCEDURES

- A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods, specified in tile installation schedules,

and apply to types of setting and grouting materials used.

1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:
- B. All tiles are to be subjected to thermal cycling prior too installation.
- C. Extend tile work into recesses and under or behind equipment and fixtures, to form a complete covering without interruptions, except as otherwise shown. Terminate work neatly at obstructions, edges and corners without disrupting pattern or joint alignments.
- D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures and other penetrations so that plates, collars or covers overlap tile.
- E. Placement Methods: Install tile using the hereinbefore specified setting beds and grouts.
- F. Jointing Pattern: Unless otherwise shown, lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls and trim are same size. Layout tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting.
1. Avoid tile layout with less than half width tiles at room/area perimeters, unless otherwise indicated on the floor layout drawings. Notify Construction Manager if layout not achievable per layout indicated on the drawings. Do not continue in room/area in question until approved by the Associate.
 2. Provide uniform joint widths, unless otherwise shown.
 - a. Ceramic Mosaic Tile: 1/16 inch.
 - b. Quarry Tile: 1/4 inch
 - c. Large format Floor Tile: 1/8 inch.
 - d. Glazed Wall Tile: 1/16 inch.
 3. Multiple Tile Face Size: Where indicated tile pattern contains multiple tile face sizes, coordinate with Architect to provide uniform joint with size.

3.07 FLEXIBLE JOINTS

- A. Locate flexible joints (expansion, control and isolation joints) prior to tile installation. See Quality Assurance in Part 1 herein.
- B. Provide flexible joints as specified herein, unless more stringent requirements are indicated on drawings. Provide as specified, regardless if not indicated on drawings.
- C. Joint to be continuous from face of tile to bottom of setting bed or leveling bed. Reinforcing to be discontinued at joint. Install continuous joint filler material in joint

from setting or leveling bed to a point below face of tile adequate for proper placement of backing rod and sealant.

- D. Joint Design: TCA design EJ171 as applicable. See Section 07 92 00 for sealant. Provide at the following locations:
 - 1. Other locations where indicated.
 - 2. Vertical Surfaces
 - a. Directly over joints in wall substrate including cold joints, construction joints, control joints and expansion joints.
 - b. At changes in substrate material.
 - c. Where tile work abuts restraining surfaces such as perimeter walls, curbs, columns, pipes, etc.
 - d. Where indicated.
- E. Curing: Cure tile floor, base, and wall installations in accordance with manufacturer's recommendations, TCA recommendations, and in accordance with ANSI requirements.
- F. Metal Edge Strips: Provide metal edge strips at openings without thresholds, and where exposed edges of tile floors meet other materials.
 - 1. Except as otherwise indicated, where trim is located across door openings, locate trim on the door side in line with the edge of the door stop, terminating at the rabbet.

3.08 REPAIR, CLEAN AND PROTECT

- A. Repair, or remove and replace chipped, damaged or otherwise defective work to the satisfaction of the Architect.
- B. Cleaning: Upon completion of placement and grouting, clean all tile surfaces so that they are free of foreign matter.
 - 1. Use methods and materials as recommended by tile manufacturer.
 - 2. Replace tiles that cannot be satisfactorily cleaned.
- C. Grout Sealer: Apply silicone grout sealer to grout joints according to grout sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer from joints and from tile faces by wiping with soft cloth.
- D. Protection: When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with Kraft paper or other heavy covering during construction period to prevent damage and wear.
 - 1. Prohibit foot and wheel traffic from using tiled floors for at least 3 days after grouting is completed.

2. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION

SECTION 09 65 00

RESILIENT FLOORING

PART 1 GENERAL

1.01 WORK INCLUDED

A. Provide resilient flooring as shown and specified. Work includes:

1. Luxury vinyl flooring
2. Base.
3. Rubber treads
4. Sheet vinyl.
5. Adhesives and accessories to complete the work.

1.02 QUALITY ASSURANCE

- A. Provide each type of resilient flooring and base material produced by one manufacturer, including recommended adhesives and leveling compounds.
- B. Provide each type resilient flooring and base material from same production run. Colors shall be uniform throughout.
- C. Slip Retardant Performance: Unless a greater performance is specified under a specific product, all floor materials must have a minimum static coefficient of friction of 0.6.

1.03 SUBMITTALS

- A. Submit manufacturer's product data and installation instructions for each type of resilient flooring, base and accessory required.
- B. Samples
1. Tiles: Submit full sized samples of each type, color and pattern required to illustrate the full range of color variations.
 2. Base: Provide 6" lengths of each type and color.
 3. Sheet Flooring: Manufacturer's standard sample size, but not less than 6" x 9" of each type, color and pattern required to illustrate the full range of color variations.
 - a. Heat Welding Bead: Manufacturer's standard sample size, but not less than 9" long of each color.
 4. Stair Treads: 6" lengths of each type and color.
- C. Submit manufacturer's certification that resilient flooring furnished complies with

required fire test performance and has been tested and meets indicated requirements.

- D. Submit manufacturer's written instructions for recommended maintenance practices for each type of resilient flooring, base and accessory material required.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in manufacturer's original, unopened labeled containers.
- B. Store, protect, and handle resilient flooring materials in accordance with manufacturer's recommendations to prevent damage, soiling and deterioration.
- C. Store materials in areas to receive resilient flooring for a minimum of 48 hours before installation.

1.05 PROJECT CONDITIONS

- A. Maintain uniform room temperature range not less than 70 degrees F., in areas to receive resilient flooring for minimum 48 hours before installation and 48 hours after installation.
- B. Provide adequate lighting and ventilation during installation and clean-up.
- C. Protect adjoining surfaces from damage and soiling.

PART 2 PRODUCTS

2.01 RESILIENT FLOORING MATERIALS

- A. Luxury Vinyl Tile: ASTM F1700, Class 3, Type B embossed surface as applicable. Plank sizes x 1/8" thick with .020" wear layer, manufactured without asbestos.
 - 1. Thickness: 2.5mm with 20 mil wear layer.
 - 2. Finish: Urethane with UV coating
 - 3. Colors, Patterns and Manufacturers
 - a. Basis of Design: As indicated
 - 4. Certification: FloorScore
- B. Sheet Vinyl: ASTM F1303 Type 1 Grade 3 Class C
 - 1. Thickness: 55 mil with nominal wear layer thickness 10 mils
 - 2. Colors, Patterns and Manufacturers: Basis of Design: As indicated

2.02 BASE

- A. Vinyl Base: Complying with ASTM F1861, Type TV, Group 1, 4" high, 1/8" gage. Provide long length rolls and job formed corners. Standard top set cove (Style B) at resilient and other hard surface flooring and straight toeless (Style A) at all

carpeted floors.

2.03 STAIR ACCESSORY MATERIALS

- A. Stair Treads and Risers: Homogeneous, rubber treads with textured finish complying with ASTM F2169.

2.04 ACCESSORIES

- B. Leveling Compound: Non-staining latex modified, Portland cement based type, compatible with flooring, as provided or recommended by the flooring manufacturer.
- C. Adhesives: Acrylic polymer waterproof, stabilized type as recommended by the resilient flooring and base manufacturer to suit material and substrate conditions.
 - 1. VOC Content: The volatile organic compound (VOC) content of adhesives shall not exceed the limits defined in Rule #1168 "Adhesive and Sealant Applications" of the South Coast Air Quality Management District (SCAQMD), of the State of California.
 - 2. Basis of Design: Powerhold 6373 Premium Universal High-Tack Adhesive
- D. Resilient Edge/Transition Strips: Provide rubber or stainless steel transition strips by the following manufacturers.
 - 1. Resilient-to-Carpet: Rubber. Colors as selected by Architect.
 - a. ROPPE, #56
 - b. JOHNSONITE/TARKETT, CTA-XX-H
 - c. VPI FLOORING, ACC12
 - 2. Resilient-to-Concrete: Stainless steel
 - a. SCHLUTER Reno U; stainless steel
 - b. GREAT LAKES TILE PRODUCTS; Reducer.
 - c. BLANKE CORP.; Reducer Trim.
 - 3. Where transition types are required for conditions other than those listed above, provide rubber type from the manufacturers listed to create a smooth transition or termination.
- E. Cleaning and Polishing Materials: Polish and neutral cleaner as recommended by the floor material manufacturer.
- F. Existing Adhesive Remover: Non-toxic type; similar to De-Sol-It by ORANGE-SOL or equal by NAPIER ENVIRONMENTAL TECHNOLOGIES, INC., or CITRUS KING.

PART 3 EXECUTION

3.01 INSPECTION

- A. Examine substrates and installation condition. Do not proceed with resilient

flooring work until unsatisfactory conditions have been corrected.

- B. Subfloor surfaces shall be smooth, level, at the required finish elevation, and within the tolerances specified in Section 03 30 00.
- C. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 PREPARATION

- A. Prepare substrates according to floor manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install flooring until it is the same temperature as the space where it is to be installed.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by flooring.

3.03 INSTALLATION

- A. Install resilient flooring and accessories with adhesive in strict compliance with the manufacturer's recommendations. Butt tightly to vertical surfaces, thresholds, nosings and edgings. Scribe around obstructions and to produce neat joints, laid tight, even and straight. Extend flooring into toe spaces, door reveals and into closets and similar openings.
- B. Tile Flooring
 - 1. Lay tile flooring with joints tight, in true alignment and parallel to walls of rooms and corridors.
 - 2. Lay tile symmetrically about centerlines of space, without pattern or borders. Adjust layout to avoid use of cut widths less than one-half tile at room perimeter.
 - 3. Match tile for color by using manufactured and packaged sequence.
 - 4. Broken, cracked, or deformed tiles are not acceptable.
 - 5. Immediately after installation, thoroughly roll tile with a 150 lb. sectional roller until a firm, uniform bond has been obtained.
- C. Edge Strips: Place tightly butted to flooring and secure with adhesive. Install at edges of flooring which would otherwise be exposed.
- D. Base
 - 1. Install at walls, column, casework and other permanent fixtures as

scheduled. Install in as long of lengths as practicable. Tightly bond base to backing throughout length of each piece, with continuous contact at horizontal and vertical surfaces.

2. Provide terminal base ends beveled and toes rounded.
3. On masonry surfaces or other similar irregular surface, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.

3.04 CLEANING AND PROTECTION

- A. Prohibit traffic on floor finish for 48 hours after installation.
- B. After flooring has set, clean thoroughly. Remove excess adhesive or other surface blemishes from flooring, using neutral type cleaners as recommended by the flooring manufacturer.
- C. Perform initial maintenance according to latest edition of manufacturer's maintenance manual and the following:
- D. Protect installed flooring from damage and staining with heavy duty non-staining Kraft paper or other covering at all traffic lanes. Protect completed work from traffic and damage until final acceptance.

END OF SECTION

SECTION 09 68 00

CARPETING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Carpet, installation and all glue, edge guards and accessories necessary for the installation.
- B. Work includes preparation of subsurfaces, cleaning, and protection of finished carpet.

1.02 QUALITY ASSURANCE

- A. Installer: Firm with not less than 5 years of carpeting experience similar to work of this Section.
 - 1. Work not in compliance with the manufacturer's recommended standards and procedures shall be promptly corrected at the Contractor's expense.
- B. Manufacturer: Firm (carpet mill) with not less than 5 years of production experience with similar types specified in this section; and whose published product data clearly indicates compliance of product with requirements of this Section.
- C. General Standard: "Carpet Specifiers Handbook" by The Carpet and Rug Institute; for definitions of terminology not otherwise defined herein, and for general recommendations and information.
- D. Fire Performance Characteristics: Provide carpet that is identical to that tested for the following fire performance requirements, according to test method indicated, by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Flammability - ASTM D2859: Passing Methanine Pill Test.
 - 2. Critical Radiant Flux - ASTM E684: Not less than 0.45 watts per square centimeter.
 - 3. Smoke Density - ASTM E84: 450 or less.

1.03 REFERENCE STANDARDS

- A. Carpet: Comply with the local building authority for flame spread and smoke contribution requirements and tested in accordance with ASTM E84.

1.04 SUBMITTALS

A. Samples

1. Tile: Submit 4" x 12" samples of each color and pattern selected.
2. Accessories: 12" long sample of each type exposed edge stripping and accessory item.

- B. Product Data: Provide for all items. Include, product data covering carpet construction, physical characteristics, durability, resistance to fading, and flame resistance characteristics.

1.05 PRODUCT DELIVERY AND STORAGE

- A. Deliver carpeting materials in original mill protective wrapping, and store inside protected from weather, moisture and soiling.
- B. Investigate and resolve access restrictions, including elevator capacity, entrances and accessibility, to assure proper delivery and installation of materials.
- C. Protect materials against damage of any kind. Damaged products, including soiled fabrics, will be rejected.

1.06 MAINTENANCE

- A. Manufacturers: Provide three (3) copies of maintenance schedules, describing programmed maintenance procedures, including general maintenance, preventative maintenance, spot removal, traffic lane maintenance and overall cleaning.
- B. Operational Service: Provide manufacturer's take-back program service for carpet installed in project. Service shall reclaim materials for recycling and/or reuse. Service shall not landfill or burn reclaimed materials.

1.07 WARRANTY

- A. Special Project Warranty: Submit a written warranty, executed by the Contractor, Installer and the Manufacturer, agreeing to repair or replace carpeting which fails in materials or workmanship within the specified warranty period. This warranty shall be in addition to and not a limitation of other rights the Owner may have against the Contractor under the Contract Documents.

1. Warranty period is two years after date of substantial completion.

- B. Carpet manufacturer's material wear warranty: Ten years.

1.08 EXTRA MATERIALS

- A. Provide quantity of full-width carpet equal to 5 percent of amount installed. In addition, turn over to Owner all usable scraps of carpet.
- B. Deliver extra carpet materials to Owner's designated storage space, properly packaged with protective covering and identified with labels describing contents.

PART 2 PRODUCTS

2.01 CARPET

- A. Manufacturers, Styles and Colors
 - 1. Basis of Design: Manufacturers, styles and colors as indicated on the drawings.
 - 2. Other Acceptable Manufacturers: Carpet manufactured by other manufacturers will be considered if materials meet the requirements of the Basis of Design and the color and style are acceptable matches as approved by the Architect.

2.02 ACCESSORIES

- A. Carpet Edge Guard: Non-metallic type. Extruded or molded vinyl or rubber of size and profile indicated. Color as selected by Architect.
- B. Seaming Cement: Hot-melt seaming adhesive or similar product recommended by carpet manufacturer, for taping seams and buttering cut edges at backing to form secure seams and prevent pile loss at seams.
- C. Miscellaneous Materials: As recommended by manufacturer of carpet and other carpeting accessory products; selected by installer to meet project circumstances and requirements.
- D. Leveling Materials and Crack Fill: Non-staining latex cementitious type, compatible with carpet adhesive, as recommended by the flooring manufacturer.

PART 3 EXECUTION

3.01 PREPARATION

- A. Installer must examine substrates for moisture content and other conditions under which carpeting is to be installed, and notify Contractor in writing of conditions detrimental to proper completion of the work.
 - 1. Do not proceed until unsatisfactory conditions have been corrected.
- B. Comply with CRI 2011 and with carpet manufacturer's written installation instructions for preparing substrates indicated to receive carpet installation.

- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Broom or vacuum clean substrates to be covered immediately before product installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Proceed with installation only after unsatisfactory conditions have been corrected.
- E. Sequence carpeting with other work so as to minimize possibility of damage and soiling of carpet during remainder of construction period.

3.02 INSTALLATION

- A. Install in accordance with recommendations of the manufacturers of materials and Carpet and Rug Institute's methods specified in CRI 2011. Carpet manufacturer's current installation instructions shall be kept at job site and be followed explicitly.
 - 1. Comply with manufacturer's recommendations for installation of carpet; maintain uniformity of carpet direction and lay of pile, unless otherwise indicated.
- B. Use edge molding where carpet terminates under doors and along edge of carpet where it abuts another floor material. Fasten edge moldings securely to the floor with glue manufactured for this specific purpose.
- C. Roll entire area lightly to eliminate air pockets and ensure uniform bond.

3.03 CLEANING AND PROTECTION

- A. Protect installed carpet to comply with CRI 2011 and carpet manufacturer recommendations.
- B. Remove debris, sorting pieces to be saved from scraps to be disposed. Keep premises free and clear of waste material in connection with carpet work.
- C. Vacuum carpet using commercial machine with face-beater element. Remove spots and replace carpet where spots cannot be removed.
- D. Advise Contractor of protection methods and materials needed to ensure that carpeting will be without deterioration or damage at time of substantial completion.
- E. Provide adequate protection for adjacent equipment, furnishings and materials.
- F. When entering, passing through, or working in any space in the building that contains finished materials, maintain proper protection for floors, walls, ceilings, fixtures, etc. Repair or replace damaged adjoining work as directed by the Architect at no additional cost to the Owner.

END OF SECTION

SECTION 09 91 00

PAINTING

PART 1 GENERAL

1.01 SCOPE

A. Work Included

1. Surface preparation and painting or finishing of all interior and exterior exposed items and surfaces except as otherwise indicated. Work includes, but is not necessarily limited to, the following:
 - a. Walls, ceilings and soffits.
 - 1) Gypsum board
 - 2) Precast concrete
 - b. Wood trim, casework and millwork as required.
 - c. Exposed ferrous metal, interior and exterior railings.
 - d. Exposed sheet metal, ductwork, conduit and piping in finished spaces.
 - e. Concrete floor
 - f. Other items noted or specified.
2. Surface preparation, priming and coats of paint specified are in addition to shop priming and surface treatment specified under other sections of the work.

B. Surface Preparation

1. It is the intention of this specification that new substrates will be ready for decoration as specified herein except for normal construction dust and soiling.
2. Surfaces and materials installed by other trades are required to be acceptable for work specified under Part 3, Surface Preparation. Specifically, new surfaces to be clean, sound, free from loose particles, dirt, loose mortar and grease.
3. Existing Surfaces: Unless otherwise specified, provide all surface preparation required for decoration.

1.02 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

- C. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

1.03 QUALITY ASSURANCE

- A. Application: Performed only by skilled, experienced painters.
- B. Provide lead free prime and finish coatings. All top coatings shall be mold and mildew resistant.
- C. Coordination: Provide finish coats compatible with prime paints used. Review other specification sections to ensure compatibility of total coating system with prime paints provided for the various substrates. Provide barrier coats over non-compatible primers or remove primer and reprime as required. Notify the Architect of anticipated problems using coating systems specified on substrates primed in accordance with other section requirements.
- D. Reference Specifications
 - 1. The following Society for Protective Coatings (SSPC) specifications are referenced by code number within this Section.

<u>Code</u>	<u>Method</u>
SP-1	Solvent Cleaning
SP-2	Hand Tool Cleaning

1.04 SUBMITTALS

- A. Submit a complete selection of manufacturer's color chips indicating color, texture and sheen for approval for each finish specified herein.
- B. Submit a complete schedule for identifying manufacturer and specific brand name or number of products proposed for finishing specified surfaces.
 - 1. Provide percent of solids by volume content data for each paint material.
 - 2. Provide paint label analysis and application instructions for each type paint.
- C. Provide the following quantities of paint of each type and color required for maintenance purposes. Provide original, unopened, labeled containers with color samples and a list of project use. Extra materials are not to be used for touch-up by Contractor.
 - 1. Metals and Wood: 2 gallons.
 - 2. Gypsum Board: 5 gallons.
 - 3. Concrete Masonry – Painted: 5 gallons
- C. Color/Finish Samples

1. After receiving color chips from the Contractor, the Architect will provide a complete schedule of colors and sheens desired.
2. Obtain schedule well in advance of commencing work and submit samples of specified finishes for approval.
3. Submit duplicate samples on the same kind of materials to which finishes will be applied. One half of the sample shall show the completed treatment and the other half shall show the successive steps, taken in producing the finish. When approved, samples will be so marked; one set will be retained by the Architect and one set will be returned for the painter's use.
4. No finishes shall be applied on the work until samples are approved. Approved samples shall be strictly duplicated in the work. Additional coatings, if required to reproduce approved samples, shall be applied without additional cost to the Owner.
5. Use representative colors when preparing samples for Architect's review.

D. Statement From Manufacturer

1. Contractor, in submitting the list of proposed subcontractors, shall include for approval, along with the name of the painting subcontractor, the names of the manufacturers whose materials the subcontractor proposes to use in the work.
2. Following tentative approval of the subcontractor and the materials manufacturers, notify the manufacturers, in writing, that the specifications require the manufacturers to submit to the Architect, a statement by a corporate officer of the manufacturer that coatings scheduled by the Architect are proper for the intended use and that the manufacturer's representative will be available to advise the Architect and the Contractor regarding applications of all coatings.

E. Close-Out Material List: Provide a list of all paint and coating materials used on the project. Include manufacturer, product number, color and room/location where used.

F. Special Environmental Requirements': Submit the following in accordance with Section 01 81 13:

1. Product Data: For painting and coatings, documentation indicating VOC Content

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver all materials on the job site in original, new, unopened packages and containers bearing the manufacturer's name and label, and the following information:

1. Name or title of material.
2. Manufacturer's stock number and date of manufacture.
3. Manufacturer's name.

4. Contents by volume, for major pigment and vehicle constituents.
 5. Thinning instructions.
 6. Application instructions.
 7. Color name and number.
- B. Store, protect and handle materials in accordance with manufacturer's recommendations to prevent damage and deterioration. Store paint materials at minimum of 50° F.
- C. Maintain paint material storage space as clean, non-hazardous and orderly. Place waste and soiled paint rags in tightly covered metal containers; safely dispose of at end of each working day. Take every precaution to avoid fire hazards and spontaneous combustion. Provide acceptable type of fire extinguisher immediately adjacent to paint storage area.

1.06 PROJECT CONDITIONS

- A. Coordinate painting and finishing work with other trades to ensure adequate illumination, ventilation and dust-free environment during application and drying of paint and finish treatments.
- B. Maintain uniform interior building temperature of minimum 50° F for 24 hours before, during and continuously for 48 hours after painting.
- C. Do not apply coatings when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- D. Provide adequate ventilation as required for specified paint and finish treatment materials in spaces scheduled. Maintain for time periods recommended by material manufacturer to provide proper drying.
- E. Provide adequate illumination on surfaces to be finished. Maintain a minimum 80 foot candle lighting level measured mid-height at substrate surface.
- F. Protect adjoining surfaces against damage or soiling.
- G. Maintain work in neat and orderly condition, promptly removing empty containers, wrappings, soiled rags, waste and rubbish from site.
- H. Material Safety Data Sheets (MSDS): Provide documents available to Owner's Representative and construction personnel at the job site. Comply with MSDS requirements.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Paint: Brands of paint and stain are specified in "Paint and Material Finish Schedule," only to establish a standard of quality. Other paint brands and

manufacturers such as BENJAMIN MOORE; AKZO NOBEL (GLIDDEN PROFESSIONAL and DEVOE COATINGS); MARTIN SENOUR; PPG; PRATT AND LAMBERT; PORTER; CORONADO PAINT COMPANY, SHERWIN WILLIAMS are acceptable upon proof of satisfactory experience records for the intended use and compliance with specified VOC content.

1. Colors: As indicated on drawing; colors not indicated to be as selected by Architect.

2.02 MATERIAL GENERAL

- A. VOC Content: The volatile organic compound (VOC) content of adhesives shall not exceed the limits defined in Rule #1113 of the South Coast Air Quality Management District (SCAQMD), of the State of California.
- B. Material Compatibility
 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

2.03 ACCESSORY MATERIAL

- A. Application Equipment: Not required to be new, but shall be adequate for the work and workmanship required herein.
- B. Accessories: Provide all required ladders, scaffolding, drop cloths, masking, scrapers, tools, dusters and cleaning solvents as required to perform the work and achieve the results specified herein.
- C. Secondary products not specified by name (i.e. turpentine, thinners, mineral spirits, fillers, linseed oils, etc.) shall be "best grade" or "first line" products.
 1. Filler material shall be woodworker's option of material that can be tinted and worked so as to match adjacent wood surfaces.

2.04 EXTERIOR PAINT AND FINISH MATERIAL SCHEDULE

- A. Apply paint and finish materials to substrate surfaces indicated. Apply touch-up prime coats in addition to shop-applied prime coats. Provide additional job site prime coats when indicated.
- B. Metals - Ferrous: Galvanized and Shop Primed (Semi-Gloss).
 1. SW

- a. Finish: S-W Direct-to-Metal DTM Acrylic Semi-Gloss Coating, B66-200. Two (2) coats.
 - 2. PPG
 - a. Finish: Pitt-Tech Plus Interior/Exterior Semi-Gloss DTM Industrial Enamel 90-1210 Series. Two (2) coats.
 - 3. GLIDDEN PROFESSIONAL
 - a. Finish: Ultra-HideDurus Exterior Acrylic Semi-Gloss #2416 Series; Two (2) coats.
 - 4. Galvanized Metals: Provide pretreatment as specified herein.
- C. Metal – Ferrous: Unprimed (Semi-Gloss).
- 1. SW
 - a. Primer: DTM Acrylic Primer B66W1. One (1) coat.
 - b. Finish: S-W Direct-to-Metal DTM Acrylic Semi-Gloss Coating, B66-200. Two (2) coats.
 - 2. PPG
 - a. Primer: Pitt-Tech Plus Interior/Exterior DTM Industrial Primer 90-912 Series. One (1) coat.
 - b. Finish: Pitt-Tech Plus Interior/Exterior Semi-Gloss DTM Industrial Enamel 90-1210 Series. Two (2) coats.
 - 3. GLIDDEN PROFESSIONAL
 - a. Primer: Devflex 4020 Direct to Metal Primer; One (1) coat.
 - b. Finish; Devoe Coatings Devflex 4216HP High Performance Acrylic Semi-Gloss 4216L Series. Two (2) coats.

D. Painted and Pre-painted Concrete Masonry

- 1. Surface Preparation: Wash and clean surfaces of chalk, dirt, grease, loose items, loose paint, mill scale and other deleterious materials.
- 2. SW
 - a. Primer: Acrylic Conditioner Loxon A24W100 series.
 - b. Finish: Exterior Semi-Gloss Latex A-100. Two coats at 2.8 mils dft per coat

2.05 INTERIOR PAINT AND FINISH MATERIALS SCHEDULE

- A. Apply paint and finish materials to substrate surfaces indicated. Apply touch-up prime coats in addition to shop-applied prime coats. Provide additional job site prime coats when indicated.
- B. Gypsum Board – Walls.
 - 1. SW
 - a. Primer: ProMar 200 Zero VOC Interior Latex Primer B28W2600 Series.
 - b. Finish: ProMar 200 Zero VOC Interior Latex Eg-shel B20 Series Two (2) coats.

2. PPG
 - a. Primer: SpeedHide Interior Latex Primer 6-2 Series.
 - b. Finish: Speedhide Zero 6-4310XI Series; latex eggshell. Two (2) coats.
 3. GLIDDEN PRO
 - a. Primer: Lifemaster No VOC Interior Primer 9116-1200. One (1) coat.
 - b. Finish: Lifemaster No VOC Interior Latex Eggshell Paint 9300 Series. Two (2) coats.
 4. Surfaces: Gypsum board wall surfaces.
- C. Gypsum Board and Previously Painted Precast – Ceilings/Soffits.
1. SW
 - a. Primer: ProMar 200 Zero VOC Interior Latex Primer B28W2600 Series.
 - b. Finish: ProMar 200 Zero VOC Interior Latex Flat B30 Series . Two (2) coats.
 2. PPG
 - a. Primer: SpeedHide Interior Latex Primer 6-2 Series.
 - b. Finish: Speedhide Zero 6-4110XI Series; latex flat. Two (2) coats.
 3. GLIDDEN PRO
 - a. Primer: Lifemaster No VOC Interior Primer 9116-1200. One (1) coat.
 - b. Finish: Lifemaster No VOC Interior Latex Flat Paint 9100 Series. Two (2) coats .
 4. Surfaces: Ceilings, soffits, bulkheads
- D. Wood - Painted.
1. SW
 - a. Primer: Premium Wall & Wood Primer B28W8111. One (1) coat at minimum 1.6 mil dft. 38% to 42% solids; VOC 90 g/L.
 - b. Finish: ProMar 200 Zero VOC Interior Latex Semi Gloss B31 Series Two (2) coats at minimum 1.6 mil dft per coat. 38% to 42% volume solids; VOC 0 g/L.
 2. PPG
 - a. Primer: Seal Grip Interior/Exterior 100% Acrylic Universal Primer/Sealer 17-921 Series. One (1) coat at minimum 1.5 mils dft. 37% to 41% solids; VOC 89 g/L.
 - b. Finish: Speedhide Interior EnamelLatex Semi-Gloss. Two (2) coats at minimum 1.3 mil dft per coat. 35% to 39% volume solids; VOC 0 g/L.
 3. GLIDDEN PRO
 - a. Primer: Lifemaster No VOC Interior Primer 9116-1200. One (1) coat.
 - b. Finish: Lifemaster No VOC Interior Latex Semi-Gloss Paint 9200 Series. Two (2) coats.

E. Metals - Ferrous: Shop Primed and Unprimed.

1. SW
 - a. Primer: S-W Pro Industrial Pro-Cryl Primer, B66-310 Series
 - b. Finish: S-W Direct-to-Metal DTM Acrylic Semi-Gloss Coating, B66-200. Two (2) coats.
2. PPG
 - a. Primer: Pitt-Tech DTM Acrylic Primer 90 Series. One (1) coat.
 - b. Finish: Pitt-Tech Plus Int/Ext Semi-Gloss DTM Industrial Enamel 90-1210 Series. Two (2) coats.
3. GLIDDEN PROFESSIONAL
 - a. Primer; Devco Coatings Devflex 4020PF Direct to Metal Primer/Finish 4020.
 - b. Finish: Devflex 4216 Int/Ext Acrylic Latex Semi-gloss Enamel. Two (2) coats.
4. Surfaces: Railings, ferrous metal surfaces.

F. Concrete Floors:

1. SW
 - a. Porch and Floor Enamel, 107.41. 2 coats.

PART 3 EXECUTION

3.01 INSPECTION

- A. Examine substrate surfaces and installation condition. Report condition(s) that might affect proper application.
- B. Do not proceed with painting work until unsatisfactory conditions have been corrected.
- C. Initial application of paint to a surface constitutes acceptance of existing conditions and responsibility for satisfactory performance.
- D. Examine specification sections of other trades and their provisions regarding painting. Surfaces left unfinished shall be painted or finished as part of the work of this Section unless specifically noted otherwise.

3.02 SURFACE PREPARATION

- A. General
 1. Broom clean and remove excess dust before painting is started in any area.
 2. Broom cleaning is not permitted after operations have begun in a specific area.
 3. Surfaces shall be clean, dry and adequately protected from dampness.
 4. Surfaces shall be free of any foreign materials that will adversely affect

adhesion or appearance of applied coating.

5. Remove any mildew and neutralize the surface prior to applying coating.

B. Existing Surfaces Scheduled for Painting or Finishing

1. Condition, clean, sand, prime, seal and prepare existing surfaces for application of finish materials specified. Provide only finish coats over existing surfaces except where condition of existing surfaces or type of existing surface requires priming and sealing.
2. Remove loose, blistered, scaled, or crazed finish to bare base material.
3. At conditions where new work adjoins existing work, prepare existing surface extending to the nearest break in the plane of the surface.

C. Wood - Painted

1. Prime and backprime interior finish wood products, before their installation, with interior wood prime paint.
2. Sandpaper to smooth and even surface, dust off.
3. Countersink nails.
4. Remove resin with scrapers, sandpaper, mineral spirits or turpentine.
5. Apply shellac or knot sealer to all knots, pitch and resinous sapwood, allow to dry thoroughly prior to priming.
6. After priming, putty all nail holes, cracks, open joints and other defects, sand smooth and dust off. Color putty to match primer; if putty is not compatible with finish, spot prime puttied areas.

D. Gypsum Board

1. Fill minor irregularities with spackling paste.
2. Sand to smooth level surface and dust off.
3. Avoid raising nap of paper.

E. Concrete Masonry and Concrete

1. Remove splatters, dust and dirt by brushing or water washing with clear water.
2. Remove misplaced mortar.
3. Cracks, abrasions and other defects shall be cut out, patched flush, and sanded smooth and sealed before applying prime coat.
4. Existing Surfaces
 - a. Surfaces with minor loose or blistered paint: Remove loose, flaking, and blistered paint; clean as specified. Fill surface cracks with approved latex base filler. Apply primer-sealer over bare substrate and filled cracks.
 - b. Multi-coated surfaces with major loose or blistered paint requiring complete paint removal: Remove paint down to bare substrate using chemicals, pressure methods, or other acceptable methods. Fill contraction and structural cracks with self-bonding filler or elastomeric sealant worked well into the cracks to prevent leaks,

then wipe excess materials from the surface. Apply a latex base or other acceptable prime and fill material to fill all defects and holes, wipe excess material off surface; let filler material dry for 24 hours minimum before applying primer.

3.03 APPLICATION

A. General

1. Only skilled mechanics shall be used.
2. Apply all paint in strict accordance with the manufacturer's instructions. Data sheets take precedence over these specifications if more restrictive.
3. Do not apply until preceding coat is dry to manufacturer's recommendations.
4. Do not apply to any surface unless it is thoroughly dry.
5. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes if moisture content of surface is greater than recommended by manufacturer.
6. Do not use material that has exceeded the pot life stated by the manufacturer.
7. Apply to the following workmanship requirements:
 - a. Neat appearance of finished surfaces.
 - b. Absence of ridges, sags, runs, drops, laps, unnecessary brush marks, holidays, air bubbles and excessive roller stipple.
 - c. Thorough mixing of paint and limited use of thinners.
 - d. Uniformity of film thickness.
 - e. Proper drying time between coats.
 - f. Protection of unpainted and finished surfaces.
8. Coverage and hide shall be complete. When color or undercoats show through final coat, recoat until the paint film is of uniform finish, color, appearance, and coverage, at no additional cost to Owner.
9. Edges of paint or finish adjoining other materials or colors shall be sharp and clean without overlapping.

B. Methods

1. Application may be by roller, brush, spray or other approved means.
2. When utilizing spraying, be careful not to use methods which will affect other trades work in adjacent areas.

C. Mixing

1. Mechanically mix before use.
2. Agitate during application as required.
3. Do not tint or shade in field unless permitted by Architect.

D. Thinning

1. Dilute only as required to achieve suitable application viscosity.

2. Use only type and amount recommended by manufacturer.
- E. Approvals: Do not apply succeeding coat of paint until previous coat has been inspected and written approval is given.
- F. Electrical Conduits
1. Do not paint any electrical conduit or boxes unless they are exposed and abutting a surface that is to be painted or stained.
 2. Conduits and boxes to be painted shall be given a coat of galvanizing pretreatment followed by the paint system for the adjoining surface.
- G. Protection of Surfaces
1. Provide covers, drop cloths and masking to protect unpainted surfaces previously finish painted. Use special care in protecting electrical and mechanical items which may be damaged by the painting operations (i.e., overspray and solvents that might damage the internals of the item).
 2. If possible, remove items not to be painted such as hardware, accessories, electrical plates, lighting fixtures and/or trim, mechanical grilles and louvers and similar items in contact with painted surfaces.
 3. Use caution when painting exterior work to avoid wind carrying overspray, drippings, etc., onto adjacent structures, facilities and vehicles.
 4. Following completion of painting, reinstall removed items by workmen skilled in the trade involved and remove all covers, masking and drop cloths.

END OF SECTION

SECTION 10 28 13

TOILET ACCESSORIES

PART 1 GENERAL

1.01 SCOPE

- A. This section covers all toilet accessories. Extent of each type of accessory is indicated on the drawing and specified herein.
- B. Included are accessories for:
 - 1. Residential Unit Bathrooms.
 - 2. Community Center Toilet Rooms
- C. Coordinate toilet partition mounted items with partition manufacturer for proper fastener reinforcements.

1.02 QUALITY ASSURANCE

- A. Provide each type of products of one manufacturer.
- B. Stamped names or labels on exposed faces of units not permitted.

1.04 SUBMITTALS

- A. Submit manufacturer's product data and installation instructions for each type of toilet accessory required.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Delivery accessory items in manufacturer's original, unopened packaging.
- B. Store and handle materials in accordance with manufacturer's recommendations. Protect against soiling, damage and wetting.

1.06 PROJECT CONDITIONS

- A. Furnish anchoring devices and inserts for installation of toilet accessories. Coordinate delivery of items which must be set or built into other work.
- B. Provide setting drawings, templates and instructions for installation of anchorage devices.

PART 2 PRODUCTS

2.01 UNIT ITEMS

- A. Medicine Cabinet: JENSEN / AMERICAN PRIDE Horizon # 940M22R1 Recessed Mount. Provide only if new medicine cabinet required
 - 1. Size: 15" x 19" tub.
 - 2. Door: mirrored

- B. Shower Curtain Rod: MOEN CSR2165
 - 1. Location: All bathing fixtures.

- C. Handicap Bars: MOEN Home Care 8900
 - 1. Diameter: 1-1/2 inch.
 - 2. Material: Stainless steel, standard satin finish.
 - 3. Fasteners: Concealed.
 - 4. Style and Length
 - a. As indicated; where not indicated provide 42" long horizontal and 18" vertical bars.
 - b. Provide both horizontal and vertical bars in conformance with ANSI A117.1, 604, 608 and 609.

- D. Toilet Paper Holder: MOEN Mason YB8099
 - 1. Single Roll - post
 - 2. Finish: Chrome

- E. Towel Bar: MOEN Mason YB8098 and YB8094
 - 1. Finish: Chrome
 - 2. Size: 18", 24" as indicated.

- F. Robe Hook: MOEN Mason YB8003
 - 1. Finish: Chrome
 - 2. Type: Concealed attached wall mounted

- H. Towel Ring: MOEN YB8086
 - 1. Finish: Chrome
 - 2. Height: 7.18 Inches

2.02 PUBLIC TOILET ITEMS

- A. Toilet Paper Holder: ADA compliant, open controlled.

1. Double Roll: BOBRICK B-265.
 - a. Type: Surface Mount.
 - b. Finish: Chrome plated
- B. Soap Dispenser - ADA compliant Vertical Tank Type: BOBRICK 818615
 1. Type: Surface mounted, liquid dispenser.
 2. Material: Stainless Steel, 20 ga., type 304.
 3. Finish: Satin.
 4. Capacity: 40 oz.
- C. Handicap Bars: BRADLEY Series 812
 1. Diameter: 1-1/2 inch.
 2. Material: Stainless steel, standard satin finish.
 3. Fasteners: Concealed.
 4. Style and Length
 - a. As indicated; where not indicated provide 42" long horizontal and 18" vertical bars.
 - b. Provide both horizontal and vertical bars in conformance with ANSI A117.1, 604, 608 and 609.
- D. Paper Towel Dispenser: BOBRICK-262
 1. Type: Surface mount with lockable hinged front cover.
 2. Capacity: 525 multi or 400 C-fold towels.
 3. Material: Stainless steel, 22 ga., type 304.
 4. Finish: Satin.
- E. Sanitary Napkin Disposal: BOBRICK B-270.
 1. Type: Surface mounted on toilet partition. Cover lifts up for disposal of sanitary napkins and for servicing container.
 2. Material: Stainless steel, satin finish.
- F. Robe/Towel Hook: BOBRICK B-211
 1. Type: Wall mounted, exposed fastener.
 2. Material: Brass cast with satin nickel-plated finish.
- G. Mirrors
 1. Standard Framed Type: BOBRICK Model B-290.
 - a. Frame: Stainless steel angle, theft resistant concealed fasteners.
 - b. Glass: Annealed
 - c. Size: 18" wide x 36" high, unless otherwise indicated or scheduled on the drawings.
- H. Infant Changing Table

1. Description: Surface mount, fold down type. Stainless steel clad concave molded polyethylene changing surface with safety strap. Folds up flat against wall when not in use. Provide with integral sanitary liner holder.
 - a. Sanitary Liners: Provide 2 cases (approximately 2,800) disposable liners.
2. Manufacturer Koala Bear Kare Horizontal Baby Changing Station KB110-SSWM by KOALA CORPORATION or equal by other manufacturers listed in Article 2.01.

2.03 SCHEDULE OF ACCESSORIES

- A. Location, quantity and mounting height of accessories as indicated on drawings.

PART 3 EXECUTION

3.01 INSPECTION

- A. Installer: Examine substrates, previously installed inserts anchorages necessary for mounting of accessories and other conditions under which installation is to occur.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions using fasteners which are appropriate for substrate and recommended by manufacturer of unit. Install units and plumb and level, firmly anchored in positions indicated.
- B. Provide concealed fasteners wherever possible of types required for substrate conditions encountered.
- C. Upon completion of installation, adjust each accessory unit for proper operation and clean exposed surfaces.

END OF SECTION

SECTION 10 56 23

WIRE SHELVING

PART 1 GENERAL

1.01 DESCRIPTION

- A. Provide wall mounted wire shelving as specified herein and indicated on the drawings.

1.02 SUBMITTALS

- A. Submit manufacturer's product data and layout drawings.

1.03 DELIVERY, STORAGE AND HANDLING

- A. Deliver shelving items in manufacturer's original unopened shipping cartons.
- B. Protect materials from damage during storage and handling and after installation.

PART 2 PRODUCTS

2.01 WIRE SHELVING

- A. Material: All ventilated wire storage shelving shall be constructed of Grade C-1008 bright, basic, cold-drawn steel wire with average tensile strength of 100,000 psi. All steel wire shall be resistance welded at intersections of cross deck wires spaced at 1" increments and trimmed smooth.
- B. Finish:
 - 1. Material shall be cleaned and covered with an iron phosphate coating to ensure proper bond with finish coat.
 - 2. Finish all ventilated wire shelving with baked-on non-toxic and epoxy coating. Finish coat shall consist of a continuous 3-5 mil epoxy-polyester
 - 3. Spacing: Typical 1"
 - a. Pantry ½".
- C. Size and Quantity: As indicated on drawings.
- D. Provide all required wall uprights, shelf brackets, shelves, hardware and fasteners to achieve the following capacities:

Open to open
length total weight lbs.

1 ft.	75
2 ft.	130
3 ft.	135
4 ft.	160
5 ft.	175

Wall to wall	
<u>length</u>	<u>total weight lbs.</u>
1 ft.	105
2 ft.	150
3 ft.	180
4 ft.	220
5 ft.	250

- E. Surface Mount Shelf Supports: Heavy duty double slotted supports.
 - 1. Standards: Unless otherwise indicated 72 inches high, maximum 30 inch spacing.
 - 2. Brackets: Unless otherwise indicated, 4 per standard.
- F. Basis of Design: RUBBERMAID Ventilated Wire Shelving System
 - 1. Linen: Linen and clothing shelves
 - 2. Free Slide: Closet with clothes hanger
 - 3. Tight Mesh: Kitchen / Pantry
- G. Other Acceptable Manufacturers: Wire shelving manufactured by other manufacturers will be considered if materials meet the requirements of the Basis of Design and the types and sizes are an acceptable match as approved by the Architect prior to bid opening.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Locate as indicated on drawings.
- B. Clean and adjust before acceptance.

END OF SECTION

SECTION 11 31 00

APPLIANCES

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Provide the following appliances where indicated on drawings for following areas:

1. Community Center Kitchen

Refrigerator/Freezer
Countertop Microwave

2. Residential Typical Units

Refrigerator/Freezer
Range
Range Hood

3. Residential Type A Units

Refrigerator/Freezer
Range
Range Hood

1.02 RELATED SECTIONS

- A. Electrical Rough-In: Included under Electrical Contract, Division 26.

1.03 SUBMITTALS

- A. Manufacturer's Product Data: Submit for all items in accordance with the General Conditions.
- B. Documentation of Energy Star rated appliances for all items as required.

PART 2 PRODUCTS

2.01 GENERAL

- A. Rating: All refrigerators, and clothes washers and dryers shall be Energy Star-rated.
- B. Refrigerators in ANSI Type A units, ADA common areas must be vertical side-by-side type; or of the over under type and meet the following requirements: Have at

least 50 percent of the freezer compartment shelves, including the bottom of the freezer below 54 inches AFF; and, have 100 percent of the freezer controls below 54 inches AFF. Freezers with less than 100 percent of the storage within an accessible reach range must be self-defrosting.

- C. Manufacturers listed are to establish a standard of acceptable quality and basis of design. Dimensions of basis of design products are critical for compliance with ADA/ANSI and UFAS requirements and casework layouts as indicated in drawings. Except where no substitution is indicated, similar products by other manufacturers listed below are acceptable provided they are an acceptable match in performance, characteristics and exact dimensions. All proposed substitutions to be approved by Architect.

1. KENMORE
2. KITCHEN AID
3. AMANA
4. WHIRLPOOL
5. MAYTAG
6. FRIGIDAIRE
7. GENERAL ELECTRIC (GE)

PUBLIC

COMMUNITY ROOM

APPLIANCE	MFR	MODEL #	FINISH	ADA COMPLIANT	ENERGY STAR RATED	SIZE/TYPE
REFRIGERATOR/ FREEZER	GE	GNE27JGMBB	black		Yes	French-door, bottom freezer, 27 cu. ft., icemaker
COUNTERTOP MICROWAVE	GE	PCWK22U1WBB	black	Yes	Yes	Countertop model, 2.2 cu. ft.

- ADA-COMPLIANT CONTROLS REQUIRED FOR COMMUNITY CENTER KITCHEN
- ADA-COMPLIANT WHEN INSTALLED WITH CONTROLS <48" MAX HEIGHT AND PROPER PARALLEL-APPROACH CLEARANCES

LAUNDRY ROOM

APPLIANCE	MFR	MODEL #	FINISH	ADA COMPLIANT	ENERGY STAR RATED	SIZE/TYPE
WASHER	-	-	-	Yes	Yes	Provided by Owner
DRYER	-	-	-	Yes	Yes	Provided by Owner

- ADA-COMPLIANT CONTROLS REQUIRED FOR LAUNDRY ROOM EQUIPMENT
- ADA-COMPLIANT WHEN INSTALLED WITH CONTROLS <48" MAX HEIGHT AND PROPER PARALLEL-APPROACH CLEARANCES

RESIDENTIAL UNITS**TYPICAL UNIT**

APPLIANCE	MFR	MODEL #	FINISH	ADA COMPLIANT	ENERGY STAR RATED	SIZE/TYPE
REFRIGERATOR/ FREEZER	GE	GTE18GTNRBB	Black	N/A	Yes	Top-freezer, 17.5 cu. ft., no icemaker kit
RANGE	GE	JBS60DKBB	Black	N/A	N/A	5.3 cu. ft., electric, free-standing
RANGE HOOD	Broan	F403023	Black	N/A	~~Yes~~ No	30" under-cabinet, ducted

TYPE A UNIT

APPLIANCE	MFR	MODEL #	FINISH	ADA COMPLIANT	ENERGY STAR RATED	SIZE/TYPE
REFRIGERATOR/ FREEZER	GE	GTE17GTNRBB	Black	Yes	Yes	Top-freezer, 16.6 cu. ft., no icemaker kit, upfront controls
RANGE	GE	JD630DTBB	Black	Yes	N/A	4.40 cu. ft., electric, drop-in, front controls, self-clean
RANGE HOOD	Broan	F403023	Black	Yes	~~Yes~~ No	Install switch within accessible reach range, 30" under-cabinet, ducted

- ADA-COMPLIANT CONTROLS REQUIRED FOR TYPE A UNITS
- ADA-COMPLIANT WHEN INSTALLED WITH CONTROLS <48" MAX HEIGHT AND PROPER PARALLEL-APPROACH CLEARANCES

2.02 ACCESSORIES

- A. 3 ft. pigtail cord and plug for ranges, dishwashers and food waste disposals.
- B. Anti-tip brackets for all free-standing ranges.

PART 3 EXECUTION**3.01 INSTALLATION**

- A. Install all items in accordance with manufacturer's instructions.
- B. Provide all required accessories and fasteners to ensure a complete functioning installation.

END OF SECTION

SECTION 12 21 13

HORIZONTAL LOUVER BLINDS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Provide and install materials, and all related accessories required for complete vinyl mini-blind installation on all windows indicated on drawings to receive blinds.

1.02 WORK SPECIFIED IN OTHER SECTIONS

- A. Wood Blocking: Section 06 10 50

1.03 REFERENCE STANDARDS

- A. WCMA A100.1 - Safety of Corded Window Covering Products; Window Covering Manufacturers Association. (ANSI/WCMA A101.1)

1.04 SUBMITTALS

- A. Product Data: Provide data indicating physical and dimensional characteristics and operating features.
- B. Shop Drawings: Indicate opening sizes, tolerances required, method of attachment, clearances, and operation.
- C. Samples: Submit two samples, minimum 18 inch long illustrating slat materials and finish, color, cord type and color.

1.05 PROJECT CONDITIONS

- A. Coordinate the work with window installation and placement of concealed blocking to support blinds.
- B. Store, handle, protect and install blinds in accordance with the manufacturer's instructions and recommendations.
- C. Take field measurements to determine sizes required.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Subject to compliance with the specified requirements, provide one of the

following:

1. HUNTER DOUGLAS;
2. LEVOLOR CONTRACT;
3. GRABER (SPRINGS WINDOW FASHIONS)

2.02 BLINDS AND COMPONENTS

- A. **Materials Blinds:** Vinyl horizontal slat louvers hung from full-width headrail with full width bottom rail; manual control of raising and lowering by cord with full range locking; blade angle adjustable by control wand; complying with WCMA A100.1.
- B. **Vinyl Slats:**
1. Width: 1".
 2. Thickness: Minimum 0.08".
 3. Colors: As selected.
- C. **Slat Support:** Woven polypropylene cord, ladder configuration.
- D. **Head Rail:** Pre%finished, formed box, with end caps; internally fitted with hardware, pulleys, and bearings for operation; same depth as width of slats
- E. **Bottom Rail:** Pre%finished, formed with top side shaped to match slat curvature; with end caps. Color: Same as headrail.
- F. **Lift Cord:** Braided nylon; continuous loop.
1. Free end weighted.
 2. Color: As selected.
- G. **Control Wand:** Extruded solid plastic; hexagonal shape.
1. Non-removable type.
 2. Length of window opening height less 3 inches.
 3. Color: clear.
- H. **Headrail Attachment:** Wall brackets.
- I. **Accessory Hardware:** Type recommended by blind manufacturer.

2.03 FABRICATION

- A. Fabricate blinds to fit within openings with uniform edge clearance of 3/8 inch.
- B. At openings requiring multiple blind units, provide separate blind assemblies with space of 1/4" between blinds, located at window mullion centers.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install blinds in accordance with manufacturer's instructions and recommendations.
- B. Tolerances
 - 1. Maximum Variation of Gap at Window Opening Perimeter: ¼".
 - 2. Maximum Offset From Level: 1/8".
- C. Replace any bent or damaged slats or other defective items prior to installation.
- D. Install level and of proper length and width to fit all windows designated to be treated.
- E. Adjust for smooth operation.
- F. Clean blind surfaces just prior to occupancy.

END OF SECTION

SECTION 12 32 00

MANUFACTURED WOOD CASEWORK

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Provide base and wall cabinets as indicated.

1.02 RELATED SECTIONS

- A. Countertops: Section 06 40 00.

1.03 SUBMITTALS

- A. Product Data: Submit manufacturer's/fabricator's data and installation instructions for each type of casework unit.
- B. Samples: Submit samples of specified finishes.
- C. Shop Drawings
 - 1. Submit shop drawings for casework showing plans, elevations, ends and cross sections.
 - 2. Show details and location of anchorages and fitting to floors, walls and base.
 - 3. Include layout of units with relation to surrounding walls, doors, windows and other building components.

1.04 QUALITY ASSURANCE

- A. Fabricator qualifications: A firm specializing in the fabrication of millwork with a satisfactory record of performance on projects of comparable size and quality. Fabricator shall be acceptable to the Architect.
- B. Installation: Performed only by experienced skilled finish carpenters.
- C. Quality Grade: Materials and fabrication shall be "custom grade" in accordance with "Quality Standard Illustrated," of the AWI conforming to the following sections:
 - 1. Section 200: Plywood and particleboard.
 - 2. Section 400: Casework.

1.04 REFERENCE

- A. All manufactured factory-finished cabinets shall comply with ANSI/KCMA A161.1. All cabinets must bear the identification of the cabinet manufacturer. All cabinets to be NKCA certified and labeled, with labels in place at time of installation and inspection.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Protect casework during delivery, storage and handling to prevent damage, soiling and deterioration.
- B. Do not deliver casework until concrete, masonry and other similar wet work has been completed and is thoroughly dry, outside door openings are permanently watertight, exterior windows are glazed and, in case of temperature dropping below 60 degrees F., until temporary heating and ventilating systems are in operation.
- C. Store casework in dry, well-ventilated spaces with constant minimum temperature of 60 degrees F., and maximum relative humidity of 55%.

1.06 PROJECT CONDITIONS

- A. Provide and maintain a constant temperature and humidity before, during and after installation as required to maintain optimum moisture content of installed materials.
- B. Obtain measurements and verify dimensions and details before proceeding with finish carpentry.

PART 2 PRODUCTS

2.01 CABINETS

- A. Manufacturer
 - 1. Basis of Design: Drawings and specifications are based on REGENT CSBINETS Extreme Construction Series.
 - 1. Style: Squire Maple Doors – Shaker Style with Veneer Flat Panel and Square Edge Profile. Standard Overlay.
 - 2. Other manufacturers are acceptable for review after compliance with the project Substitution requirements. In addition, submittals requesting substitutions must also include a physical sample of similar casework types and material.
- B. Provide complete factory assembled and finished components.
 - 1. Provide wall and base cabinets with standard accessories.
 - 2. Provide matching filler panels and end panels where indicated or required.

B. General: All composite wood products will be compliant with California 93120.

C. Materials

1. Wall and base cabinets shall be of same construction; outside appearance must be the same; construction type must have face frames.
2. Provide solid lumber and exterior grade plywood with veneer core for all cabinets.
3. All parts touching floor to be pressure treated solid lumber.
4. Provide all fillers, moldings and trims required to assure a neat, accurate job fit.

D. Components and Fabrication

1. Face Frames: 3/4" thick kiln dried solid hardwood; stiles and rails to be 1-1/2" wide; mullions to be 3" wide.
2. Wall and Base Sides: 1/2" Nominal plywood with light maple laminate interior and designated laminated exterior.
3. Backs: 1/2" plywood with light maple laminate.
4. Wall Tops and Bottoms: 1/2" Nominal plywood with light maple laminate, hot melt glued into dados on all four sides.
5. Shelves: 3/4" Nominal - Edgebanded
6. Doors and Drawer Fronts: Style as selected by Architect; 3/4" thick, solid hardwood.
7. Base Bottoms: 1/2" plywood with light maple laminate interiors. Bottoms are hot melt glued into dados on all four sides.
8. Drawers: 5/8" Solid Dovetail Drawers with four sided construction and captive 1/4" Nominal matching plywood bottom.
9. Hardware
 - a. Drawer Slides: 75 pound capacity, epoxy coated metal side rails.
 - b. Hinges: 6-way adjustable hinges, heavy duty, self closing, and concealed within the cabinet door and frame
10. Construction Rails I-Beam 1/2" Nominal plywood. Rails to be hot melt glued into face frame, sides, and cabinet back.

E. Adhesive: Low-VOC, FS MMM-A-125C, Type II, water- and mold-resistant; complying with required VOC regulations.

1. VOC Content: The volatile organic compound (VOC) content of adhesives shall not exceed the limits defined in Rule #1168 "Adhesive and Sealant Applications" of the South Coast Air Quality Management District (SCAQMD), of the State of California.

F. Finish

1. Factory finish consisting of stain, sealer and top coats, lightly sanded between applications. Provide sealer and top coats oven dried.
2. Cabinet Colors: As selected by Architect from manufacturer's standard colors.

PART 3 EXECUTION

3.01 INSTALLATION

A. General

1. Install plumb, level, true and straight with no distortions so that doors and drawers will fit openings properly and be accurately aligned.
2. Shim as required using concealed shims.
3. Where casework abuts other finished work, scribe and apply filler strips for accurate fit with concealed fasteners.
4. Where possible, assemble units into one integral unit with joints flush, tight and uniform. Align similar adjoining doors and drawers to a tolerance of 1/16".
5. Anchor cabinet units securely in place with concealed (when doors and drawers are closed) fasteners, anchored into structural support members of wall construction. Comply with manufacturer's instructions and recommendations for support of unit.
6. Adjust casework and hardware so that doors and drawers are centered in openings and operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

B. Base Cabinets

1. Fasten each individual cabinet to floor at toe space, with fasteners spaced at 24" on center.
2. Bolt continuous cabinets together.
3. Secure individual cabinets with not less than 2 fasteners into floor, where they do not adjoin other cabinets.

C. Wall Cabinets

1. Verify that wood blocking has been installed at required locations.
2. Bolt continuous cabinets together.
3. Secure individual cabinets with not less than 2 fasteners into wall (wood blocking), where they do not adjoin other cabinets.

3.02 CLEANING AND PROTECTION

A. Repair or remove and replace defective work as directed upon completion of installation.

1. Patch surfaces damaged by installation to prior condition as approved or replace damaged units as directed.

B. Clean shop-finished surfaces, touch-up as required, and remove or refinish damaged or soiled areas, as acceptable to Architect.

1. Dust cabinet interiors. Clean exterior surfaces to original condition.

END OF SECTION

SECTION 12 56 51

FURNITURE, FURNISHINGS AND ACCESSORIES

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Provide all labor, materials and transportation necessary for the complete installation of all furniture, furnishings and accessories indicated on the drawings or specified herein or both.

1.02 SUBMITTALS

- A. Shop Drawings: For each item, submit manufacturer's product data in accordance with the General Conditions.
- B. Samples: Submit color chips and fabric samples for Architect's color verification or selection.
- C. Maintenance Instructions: Submit three copies of manufacturer's recommended maintenance instructions, including information needed for removal of common stains.

1.03 DELIVERY AND INSTALLATION

- A. Protect furniture and accessories during delivery, storage and handling to prevent damage, soiling and deterioration.
- B. Shipment of furniture and accessory items may be made directly to building site in cases where prior approval of Architect has been obtained and the building is ready for furniture installation. Furniture Contractor is responsible for knowing when his merchandise is to arrive and must have available all labor and equipment for unloading and handling.
- C. Delivery must be in accordance with the Progress Schedule developed by this Contractor in cooperation with the other Contractors and Owner as provided for under Article 4 of the General Conditions.
- D. Contractor is responsible for temporary storage of all furniture and accessory items until time for delivery and installation.
- E. Particular care must be taken by furniture Contractor when handling equipment and furniture during installation so as not to damage existing building, carpet and shelving.

1.04 DAMAGED ITEMS

- A. Furniture Contractor is responsible for all damage to items provided under this contract up to the time of acceptance by the Owner, whether this damage results during shipment from manufacturer, delivery to site, placement, or through

carelessness or malicious mischief or whatever reason, and final payment will be made only for undamaged items. Contractor shall replace all damaged items or parts of assembled or manufactured items as soon as discovered.

- B. Nominal touch-up or repair of painted finishes will be permitted if done in accordance with the manufacturer's recommended procedures for such repair and the end results, in the opinion of the Architect, appears as good as new. Repairs must return item to original appearance and function.

PART 2 PRODUCTS

2.01 FURNITURE, FURNISHINGS AND ACCESSORIES

- A. See the following documents.

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Placement shall be made in accordance with the locations indicated on the drawings. When conditions require adjustment of placement, the Architect will determine or approve alternate placement.
- B. Placement and installations shall be performed by mechanics skilled in the requirements of that type of work.
- C. Upon completion of the work, all furniture and accessories shall be fully assembled with moveable parts operating properly.
- D. Installation shall be in accordance with the requirements, standards and procedures of the product manufacturer.

END OF SECTION



PRODUCT SPECIFICATION

Project Name / Number: **The Meadows RAD Renovation / 18076.04**

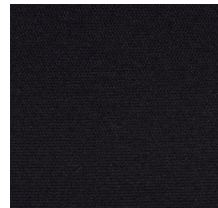
August 14, 2025

Plan Tag: **C1**
 Item Name: Task Chair
 Style/Series: Focus 2.0
 Product #: 1123 BK2 Y/e3 AR6 FG4 CS6 CH1
 MB BT1 BC1 MC1 FC1 YCC01 LA1 KD
 Dimensions: 27.5" W x 26" D x 39" H (adj.)
 Finishes: Black Mesh, Black Frame

Manufacturer: SitOnIt Seating
 Rep: BLG / Lauren Carbaugh
 Tel: 614.787.5795
 E: Lauren@blgreps.com

Upholstery Mfg.: Maharam (Graded-in)
 Pattern: Messenger 26-0070014-0109
 Color: 029 Onyx
 COM Yardage/Sq. Ft.:

Description: Focus 2.0 Task Chair
 Mesh Highback, Multi-Adjustable Arms,
 Enhanced Syncro with Seat Depth Adjustment,
 5-Star Nylon Base, Standard Cylinder,
 Hard Floor and Carpet Casters



PRODUCT IMAGE MAY NOT REFLECT EXACT SPECIFICATIONS

Room/Quantity: Open Office (2)
 Rental Office (1)

Total Quantity: **3**



PRODUCT SPECIFICATION

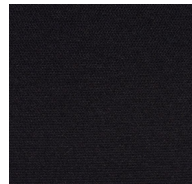
Project Name / Number: **The Meadows RAD Renovation / 18076.04**

August 14, 2025

Plan Tag:	C2	Manufacturer:	SitOnIt Seating
Item Name:	Side Chair	Rep:	BLG / Lauren Carbaugh
		Tel:	614.787.5795
Style/Series:	Focus	E:	Lauren@blgreps.com
Product #:	564 1 A130 FG4 C12 B1 MC1 AC		
Dimensions:	24.5" W x 26" D x 34" H		
Finishes:	Black Mesh, Black Frame		

Upholstery Mfg.: Maharam (Graded-in)
 Pattern: Messenger 26-0070014-0109
 Color: 029 Onyx
 COM Yardage/Sq. Ft.:

Description: Focus Side Chair with Casters
 Mesh Back, Four Legs with Casters
 Fixed Loop Arms
 Hard Floor and Carpet Casters
 300 lb Weight Capacity
 Stacks 4 High



PRODUCT IMAGE MAY NOT REFLECT EXACT SPECIFICATIONS

Room/Quantity: Open Office (4)
 Conference Room (12)

Total Quantity: **16**



PRODUCT SPECIFICATION

Project Name / Number: **The Meadows RAD Renovation / 18076.04**

August 14, 2025

Plan Tag: **D1L**
 Item Name: Desk and Return - Left
 Style/Series: Genoa
 Product #: G3060SPR,CXX,~,~,AG3,~,~STD
 w/ G2048FL,CXX,~,~,3MP,~,~STD
 Dimensions: 30" D x 72" W x 29" H
 48" W x 20" D x 29" H

Manufacturer: Global Furniture Group
 Rep: Gina Frazier
 Tel: 614.325.5888
 E: gfrazier@globalfurniture.com

Finishes:
 Plastic Laminate: TBD

Upholstery Mfg.:
 Pattern:
 Color:
 COM Yardage/Sq. Ft.:

Description: Global Genoa Series Laminate Desk
 with Single Pedestal (Right) with Single
 Pedestal (Left) Return
 Box/File both Desk and Return
 Grommet Left in Desk and Center
 in Return
 Desk and Return to be keyed alike
 Laminate TBD



PRODUCT IMAGE MAY NOT REFLECT EXACT SPECIFICATIONS

Room/Quantity: Open Office (1)

Total Quantity: **1**



PRODUCT SPECIFICATION

Project Name / Number: **The Meadows RAD Renovation / 18076.04**

August 14, 2025

Plan Tag: **D1R**
 Item Name: Desk and Return - Right
 Style/Series: Genoa
 Product #: G3060SPL,CXX,~,~,AG3,~,~STD
 w/ G2048FR,CXX,~,~,3MP,~,~STD
 Dimensions: 30" D x 72" W x 29" H
 48" W x 20" D x 29" H

Manufacturer: Global Furniture Group
 Rep: Gina Frazier
 Tel: 614.325.5888
 E: gfrazier@globalfurniture.com

Finishes:
 Plastic Laminate: TBD

Upholstery Mfg.:
 Pattern:
 Color:
 COM Yardage/Sq. Ft.:

Description: Global Genoa Series Laminate Desk
 with Single Pedestal (Left) with Single
 Pedestal (Right) Return
 Box/File both Desk and Return
 Grommet Right in Desk and Center
 in Return
 Desk and Return to be keyed alike
 Laminate TBD



PRODUCT IMAGE MAY NOT REFLECT EXACT SPECIFICATIONS

Room/Quantity: Open Office (1)
 Rental Office (1)

Total Quantity: **2**



PRODUCT SPECIFICATION

Project Name / Number: **The Meadows RAD Renovation / 18076.04**

August 14, 2025

Plan Tag: **F1**
 Item Name: Lateral File - Four Drawer
 Style/Series: 1900 Plus Series
 Product #: 1936P-4F12,W401,~STD,~GLO,BLK,~STD
 Dimensions: 36" W x 19.25" D x 51.89" H

Manufacturer: Global Furniture Group
 Rep: Gina Frazier
 Tel: 614.325.5888
 E: gfracier@globalfurniture.com

Finishes: Black BLK 1
 Frame:
 Plastic Laminate:

Upholstery Mfg.:
 Pattern:
 Color:
 COM Yardage/Sq. Ft.:

Description: Global 1900 Plus Series
 4-Drawer Lateral File
 36" W x 19.25" D x 51.89" H
 Standard Paint - BLK 1 - Black
 12.25" H Drawers
 Counterweight Balance - Standard



PRODUCT IMAGE MAY NOT REFLECT EXACT SPECIFICATIONS

Room/Quantity: Rental Office (1)

Total Quantity: **1**



PRODUCT SPECIFICATION

Project Name / Number: **The Meadows RAD Renovation / 18076.04**

August 14, 2025

Plan Tag: **MB1**
 Item Name: Marker Board
 Style/Series: Glass Dry Erase Board
 Product #: H-7180
 Dimensions: 4' W x 3' H

Manufacturer: ULINE
 Rep:
 Tel: 262.612.4200
 E:

Finishes: Magnetic White
 Frame: Frameless
 Plastic Laminate:

Upholstery Mfg.:
 Pattern:
 Color:
 COM Yardage/Sq. Ft.:

Description: Glass Dry Erase Board
 4' W x 3' H
 Tempered glass, magnetic
 Includes 4 markers, tray and mounting hardware
 Includes 4 rare earth magnets



PRODUCT IMAGE MAY NOT REFLECT EXACT SPECIFICATIONS

Room/Quantity: Open Office (2)
 Rental Office (1)

Total Quantity: **3**



PRODUCT SPECIFICATION

Project Name / Number: **The Meadows RAD Renovation / 18076.04**

August 14, 2025

Plan Tag: **MB2**
 Item Name: Marker Board
 Style/Series: Glass Dry Erase Board
 Product #: H-7805
 Dimensions: 8' W x 4' H

Manufacturer: ULINE
 Rep:
 Tel: 262.612.4200
 E:

Finishes: Magnetic White
 Frame: Frameless
 Plastic Laminate:

Upholstery Mfg.:
 Pattern:
 Color:
 COM Yardage/Sq. Ft.:

Description: Glass Dry Erase Board
 8' W x 4' H
 Tempered glass, magnetic
 Includes 4 markers, tray and mounting hardware
 Includes 4 rare earth magnets



PRODUCT IMAGE MAY NOT REFLECT EXACT SPECIFICATIONS

Room/Quantity: Conference Room (1)

Total Quantity: **1**



PRODUCT SPECIFICATION

Project Name / Number: **The Meadows RAD Renovation / 18076.04**

August 14, 2025

Plan Tag: **S1**
Item Name: Shelf

Manufacturer: ULINE
Rep:
Tel: 262.612.4200
E:

Style/Series: Type 304
Product #: H5479

Dimensions: 36" W x 18" D x 72" H

Finishes: Stainless Steel

Upholstery Mfg.:

Pattern:

Color:

COM Yardage/Sq. Ft.:

Description: Uline Type 304 Stainless Steel Wire Shelving
4 adjustable shelves
Shelves adjust in 1" increments



PRODUCT IMAGE MAY NOT REFLECT EXACT SPECIFICATIONS

Room/Quantity: Rental Office (1)
Storage (2)
Storage (2)

Total Quantity: **5**



PRODUCT SPECIFICATION

Project Name / Number: **The Meadows RAD Renovation / 18076.04**

August 14, 2025

Plan Tag: **T1**
Item Name: Table

Style/Series: Zori
Product #: CYRS3060ARNBNNTBD
Dimensions: 30" D x 60" W x 29" H

Manufacturer: Enwork
Rep: BLG / Lauren Carbaugh
Tel: 614.787.5795
E: Lauren@blgreps.com

Finishes:
Frame: Black
Plastic Laminate: TBD

Upholstery Mfg.:
Pattern:
Color:
COM Yardage/Sq. Ft.:

Description: Enwork Zori Series
T-Leg Table - Flip Top w/ Locking Casters
30" D x 60" W x 29" H
PLam Top with 3mm Edge



PRODUCT IMAGE MAY NOT REFLECT EXACT SPECIFICATIONS

Room/Quantity: Conference Room (7)

Total Quantity: **7**



PRODUCT SPECIFICATION

Project Name / Number: **The Meadows RAD Renovation / 18076.04**

August 14, 2025

Plan Tag: **T2**
Item Name: Table

Style/Series: Zori
Product #: CYTSL302NNR with
CR2460ANTBD
Dimensions: 24" D x 60" W x 29" H

Manufacturer: Enwork
Rep: BLG / Lauren Carbaugh
Tel: 614.787.5795
E: Lauren@blgreps.com

Finishes:
Frame: Black
Plastic Laminate: TBD

Upholstery Mfg.:
Pattern:
Color:
COM Yardage/Sq. Ft.:

Description: Enwork Zori Series
T-Leg Table
24" D x 60" W x 29" H
PLam Top with 3mm Edge


PRODUCT IMAGE MAY NOT REFLECT EXACT SPECIFICATIONS

Room/Quantity: Open Office (1)

Total Quantity: **1**



PRODUCT SPECIFICATION

Project Name / Number: **The Meadows RAD Renovation / 18076.04**

August 14, 2025

Plan Tag:	TB1	Manufacturer:	ULINE
Item Name:	Tack Board	Rep:	
Style/Series:	Fabric Bulletin Board	Tel:	262.612.4200
Product #:	H-7809	E:	
Dimensions:	48" W x 36" H		
Finishes:	Fabric w/ Aluminum Frame		

Upholstery Mfg.:
 Pattern:
 Color:
 COM Yardage/Sq. Ft.:

Description: Uline Fabric Bulletin Board
 48" W x 36" H
 Aluminum frame with fabric
 face - uses push pins or magnets



PRODUCT IMAGE MAY NOT REFLECT EXACT SPECIFICATIONS

Room/Quantity: Open Office (2)
 Rental Office (1)
 Conference Room (1)

Total Quantity: **4**

PLUMBING SPECIFICATIONS

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SECTION 22 00 00

PLUMBING GENERAL

PART 1 GENERAL

1.01 REFERENCE

- A. Sections 22 00 00 through 22 06 00 (as included), for items of a general nature which apply to the Plumbing Contract, unless indicated otherwise herein.
- B. Sections 22 07 00 through 22 42 00 (as included), cover Plumbing work specifically.
- C. Applicable Division 1 and General Conditions terms and conditions (if any).
- D. Applicable construction codes, standards and guidelines for all Plumbing Contract elements, including but not limited to the following:
 - 1. City of Columbus Building Code, including Plumbing, Fuel Gas, Mechanical, handicap accessibility and energy conservation portions thereof.
 - 2. City of Columbus Board of Health.
 - 3. State of Ohio Environmental Protection Agency (E.P.A.).
 - 4. NFPA pamphlet no. 70, NATIONAL ELECTRIC CODE
 - 5. City of Columbus water utility provider.
 - 6. City of Columbus sewer utility authority.
 - 7. American National Standards Institute (ANSI) standards for materials and construction.
 - 8. American Society of Mechanical Engineers (ASME) standards for materials and construction.
 - 9. American Society of Sanitary Engineering (ASSE) standards for performance and testing.
 - 10. American Society for Testing and Materials (ASTM) standards for materials, construction and testing.
 - 11. American Water Works Association (AWWA) standards for materials, construction and disinfection procedures.

12. National Sanitation Foundation (NSF) standards for materials and construction.
13. Cast Iron Soil Pipe Institute (CISPI) standards for materials and construction.
14. Underwriter's Laboratories (UL) standards for materials and construction.
15. The manufacturer's installation guidelines and recommendations for individual items, elements and/or systems indicated herein.
16. The Owner's material and installation guidelines and/or standards.

1.02 SCOPE

- A. This Contractor shall furnish all labor, materials, tools, incidentals, details, etc., necessary to provide a complete, operational and approved Plumbing System, including but not limited to all items and elements described in the Plumbing Specification and shown on the Plumbing Drawings, and as required for coordination and/or interface with work under separate contract as indicated by complete construction documentation package.
- B. The Plumbing Contractor is responsible for satisfactorily addressing all review and inspection authorities' requirements and directives in regard to methods of installation necessary for final approval.

1.03 PERMITS AND FEES

- A. Unless directed otherwise by the General Conditions portion of project documentation, the Plumbing Contractor shall apply for and pay any review, inspection, permit, license, testing and/or other service fees required by all review/inspection/approval authorities in connection with the work under this Contract.
- B. Unless directed otherwise by the General Conditions portion of project documentation, the Plumbing Contractor shall apply for and pay any procurement, tap, capacity, metering, testing and/or other service fees required by all Utility Providers (Water, Gas, Storm, Sewer etc.) in connection with the work under this Contract. This shall include procurement, execution and return of any forms and/or applications required; and participation in individual, initial design/installation consultations with the providers if required.

1.04 PLUMBING UTILITY CONNECTIONS FOR ITEMS OR ELEMENTS NOT INCLUDED IN THE PLUMBING CONTRACT

- A. Provide Plumbing supply, waste, drain, vent, and any other piped utilities included for the project as required, as listed herein, and/or as shown on the Plumbing Drawings for items furnished and/or installed under separate contract requiring same. These items shall include, but not be limited to the following:

1. HVAC equipment; final connection (where applicable) by the HVAC Contractor.
 2. Owner provided items; final connection (where applicable) by the Plumbing Contractor.
 3. Kitchen Equipment; final connection (where applicable) by the Plumbing Contractor
- B. Rough-in Plumbing supply, waste, drain, vent, and any other piped utilities included for the project as required, as listed herein, and/or as shown on the Plumbing Drawings for all future items requiring same.
- 1.05 Concrete housekeeping and support pads for equipment in the Plumbing Contract are the responsibility of the Plumbing Contractor. Concrete pad construction to be in accordance with specifications provided in the General Contract for same.

PART 2 PRODUCTS

- 2.01 Where items/elements are indicated herein to be listed/approved, the intent of this specification is that said item/element shall be listed by all applicable material/construction standards, and subject to final approval (including methods of installation) by all review/inspection/approval authorities.
- 2.02 Unless indicated otherwise, all plumbing contract items/elements (pipe, fittings, valves, specialties, fixtures, equipment, etc.) materials, construction, performance, testing and methods of installation to be as listed/approved by all applicable material/construction/installation standards for same, and be in accordance with the requirements of all review/inspection/approval authorities. This includes, but is not limited to, the standards and authorities referenced in this specification. In the absence of such standards and/or requirements, the item/element manufacturer's recommendations, as confirmed by the Plumbing Contractor in advance, shall be followed.
- 2.03 Unless indicated otherwise, all Plumbing piping shall be in accordance with the following standards in regard to materials, construction, dimensions/tolerances, type of service/transmission medium (water, air, gas, etc,) and methods of installation (as applicable), and shall be so listed. Final approval for use is subject of the requirements of the review and inspection authorities:
- A. Steel pipe, steel, malleable and cast iron fittings and joining methods; per applicable ASTM/ANSI/ASME standards. In addition, where utilized for potable water service, all elements shall be per applicable NSF and ASTM A53 (for carbon steel) standards.
 - B. Ductile iron pipe, fittings and joining methods; per applicable ASTM/ANSI/ASME/AWWA/NSF standards.

- C. Plastic pipe, fittings and joining methods; per applicable ASTM/ANSI/ASME/AWWA/NSF standards.
 - D. Cast iron pipe, fittings and joining methods; per applicable ASTM/ANSI/ASME/CISPI standards.
 - E. Copper/copper alloy/brass pipe/tube, fittings and joining methods; per applicable ASTM/ANSI/ASME standards. In addition, where utilized for potable water service, all elements shall be per applicable NSF standards.
- 2.04 All Plumbing Contract items/elements shall have the manufacturer's mark or name and the quality of the product or identification of same cast, embossed, stamped or indelibly marked on each item/element in accordance with the standards under which they are accepted and approved per applicable code(s).
- 2.05 PLUMBING UTILITY CONNECTIONS PROVIDED FOR ITEMS OR ELEMENTS NOT INCLUDED IN THE PLUMBING CONTRACT
- A. Unless indicated otherwise, the Plumbing Contractor shall furnish and install all traps and stops (as applicable) as required for items furnished under separate contract. This includes items with connections by the Plumbing Contractor or with connections under separate contract.
 - B. Unless indicated otherwise, Fixture traps above floor slab connected to the sanitary waste system shall be cast brass P-traps with integral cleanout. P-traps below floor slab to be cast iron, less cleanout. See plans for sizes.
 - C. Unless indicated otherwise, Fixture traps connected to waste or drain systems other than the sanitary waste system shall be of same material and connection type as the associated piping system. P-trap or S-trap to be provided as indicated on plans.
 - D. Unless indicated otherwise, All waste and drain rough-ins for future shall terminate with a short nipple and cap and no trap.
 - E. Unless indicated otherwise, Supply rough-ins to be furnished with accessible shut-offs at connection points. Shut-offs at supply rough-ins for fixtures (sinks, lavatories, etc.) to be angle type compression stops. Shut-offs at supply rough-ins for equipment or other elements (HVAC, Food Service, etc.) to be in-line valves as specified for individual services. All supply rough-ins for future shall terminate with a short nipple and cap immediately downstream of the shut-off.
 - F. Unless indicated otherwise, where connection elements described herein are exposed in locations other than restricted access utility or maintenance areas, all metallic components to be furnished with a polished chrome finish. Wall or other structure piping penetrations at these locations to be provided with polished chrome finish escutcheons.

PART 3 EXECUTION

- 3.01 Where standards, codes or guidelines are referenced herein and throughout the Plumbing Contract documentation, including plans and specifications, the latest version/edition shall be applied, unless the Building Code references another version/edition, which shall take precedence.
- 3.02 Refer to project documentation furnished with the complete construction package in advance of work for overall coordination and verification of requirements at work of other trades relating to, interfacing with, and/or impacting work in the Plumbing Contract. This includes exact locations, quantities, physical sizes, rough-in details, pipe routing, connection sizes, etc., for items included both in the Plumbing Contract and under separate contract. Coordinate installation and interface requirements with the appropriate contractor(s) in advance of work.
- 3.03 Include any minor details, items and/or elements essential to necessary approvals and successful operation in addition to the items specified herein and shown on plans.
- 3.04 See general "PLUMBING NOTES" on plans for additional conditions and requirements relative to the Plumbing Contract.
- 3.05 Plumbing items and elements shall be installed with due regard to preservation of the strength of structural members and prevention of damage to walls, surfaces and other structures through installation, bearing support or subsequent usage of Plumbing items and elements. No framing or other support structure shall be cut, notched or bored in excess of limitations specified in the Building Code, or by the manufacturer of the framing or other support structure, as confirmed in advance of work by the Plumbing Contractor.

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END OF SECTION

SECTION 22 01 05

PLUMBING GENERAL PROVISIONS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Furnish all labor, materials, tools, incidentals and details necessary to provide a complete plumbing system, ready to operate, including but not limited to the items listed under the Plumbing Specification Indexes.
- B. Include any minor details essential to successful operation and any other items specified or shown on the Drawings.
- C. The Contractor is required to read the Specifications covering all branches of the work and will be held responsible for coordination of his work with work performed under all other Contracts.
- D. The Contractor is required to visit the site and fully inform himself concerning all conditions affecting the scope of his work. Failure to visit the site shall not relieve the Contractor from any responsibility in the performance of his Contract.
- E. The Contractor should feel free to contact the Architect immediately if there is any question regarding the meaning or intent of either Plans or Specifications, or if he notices any discrepancies or omissions in either Plans or Specifications.
- F. Other than minor adjustments shall be submitted to the Architect for approval before proceeding with the work.
- G. The Contractor shall submit on his letterhead, along with the Bid, the manufacturer's name and the names of all Subcontractors to whom he intends to sublet the work. If the Contractor fails to provide this information with the Bid, the Owner shall have the right to select the manufacturers and Subcontractors with no additional charge.
- H. Scheduling of all work performed by this Contractor shall be completely coordinated with the Construction Manager.
- I. This Contractor shall furnish to Architect a written description of procedure on this job including scheduling of the work to be done for his approval. This shall be submitted within 10 days after the Contract is awarded. There shall be six (6) copies.
- J. All material hoisting by trade involved.

- K. Arrangements for storage of tools and material, removal of debris, and interruptions of services shall be made with the Construction manager.
- L. Extreme care shall be taken to avoid interference and/or conflict with work of other trades. Consult with the Architect regarding any points where interference and/of conflict is likely to occur and follow dimensions carefully where given on the Drawings. Pay particular attention to minimum clear heights when indicated on the Drawings.
- M. It is mandatory that dust and debris be held to a minimum. This Contractor shall provide drop cloths, screens, curtains, etc., to protect all equipment and personnel from dust and dirt during the course of his work. All damage to existing construction or finishes shall be repaired by this Contractor upon removal of dirt and dust protection devices. All dirt, dust and other protection devices shall be approved by the Construction Manager before any work is started in the area involved.
- N. The Contractor, insofar as this Contract is concerned, shall at all times keep the premises and the building in a neat and orderly condition.
- O. At the completion of the project, this Contractor shall promptly clean up and remove from the site, all debris and excess materials.

1.02 DRAWINGS

- A. Consult all Contract Drawings which may affect the locations of any equipment, apparatus, piping and ductwork and make minor adjustments in location to secure coordination.
- B. Piping is schematic and exact locations shall be determined by structural and other conditions and verified in the field. This shall not be construed to mean that the design of the system may be changed, it refers only to the exact location of piping to fit into the building as constructed, and to coordination of all work with piping and equipment included under other Divisions of the Specifications.
- C. The layout shown on the Drawings is based on a particular make of equipment. If another make of equipment is used which requires modifications or changes of any description from the Drawings or Specifications, this Contractor shall be responsible for making all such modifications and changes, including those involving other trades, as a part of this Contract and the cost thereof shall be included in his Bid. In such case, the Contractor shall submit Drawings and Specifications showing all such modifications and changes prior to starting work, which shall be subject to the approval of the Architect.
- D. The Owner and Architect reserves the right to make minor changes in the location of piping and equipment up to the time of rough-in without additional cost to the Owner.
- E. Where certain grades and/or elevations are given on the Drawings, they have been obtained from the best information available; however, they are not

guaranteed. This Contractor MUST assume the full responsibility of verifying present elevations in the field and making any adjustments as may be necessary, all of which must be included in his Bid Price.

- F. Due to the scale of the Drawings, it is impossible to show all offsets and transitions which may be required. This Contractor shall carefully investigate the conditions affecting all work and shall furnish all elbows, fittings, transitions, etc., required to accomplish the desired result at no additional cost to the Owner.
- G. Install all work as close as possible to walls, ceilings, struts, members, etc., consistent with the proper space for covering, access, etc., so as to occupy the minimum of space.
- H. Actual dimensions shown on the Drawings and field dimensions shall take precedence over scaled dimensions.

1.03 PERMITS, INSPECTIONS AND CODES

- A. The Architect will obtain the general building permit. Any other permits required for the project will be obtained by the Contractor performing the work. Fees will be included in the bid price.
- B. Completed installations shall conform with all applicable Federal, State and Local Laws, Codes and Ordinances, including but not limited to the latest editions of the following:
 - 1. Ohio Building Code, State of Ohio.
 - 2. A.S.M.E. Pressure Piping Code - Section B31.1
 - 3. National Electrical Code, Bulletin No. 70, National Fire Protection Association.
 - 4. Life Safety Code, Bulletin No. 101, National Fire Protection Association.
- C. Nothing contained in the Plans and Specifications shall be construed to conflict with these laws, codes and ordinances and they are hereby made a part of these Specifications.

1.04 LEED for Homes

- A. The Plumbing System must comply with all requirements of the LEED for homes rating system. This includes, but is not limited to, efficiencies, power factors, insulation thickness, etc.

1.05 UTILITIES

- A. The Contractor shall investigate and locate all utilities prior to construction.
- B. Each Contractor is responsible for rerouting or replacing existing utilities where necessary to permit installation of his work.
- C. Support, protection and restoration of all existing utilities and appurtenances shall be the responsibility of the Contractor. The cost of this work shall be included in the price bid for the various items.
- D. The Contractor shall cause notice to be given to the Ohio Utilities Protection Service and to the Owners of underground utility facilities shown on the plans who are not members of a registered underground protection service in accordance with Section 153.64 of the Revised Code. The above mentioned notice shall be given at least 48 hours, excluding Saturdays, Sundays and legal holidays, prior to commencing work.
- E. The Contractor shall alert immediately the occupants of nearby premises as to any emergency that he may create or discover on or near such premises of the underground facility, any break or leak on its lines or any dent, gouge, groove or other damage.

1.06 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. This Contractor shall thoroughly instruct and supervise the Owner's Maintenance Personnel in the proper operation and maintenance of the mechanical system equipment. This Contractor shall be responsible for arranging for the instruction and supervision at a time convenient to the Owner and notifying the Architect of the time at least 48 hours in advance.

Instructions shall include the following:

- 1. Location of equipment and explanation of what it does.
 - 2. Reference to "Operating Instruction Manuals" for record and clarity.
 - 3. Coordination of written and verbal instruction so that each is understood by all personnel.
 - 4. Specific maintenance to be performed by the Owner.
- B. Furnish one (1) copy of the printed Operating and Maintenance Instructions for the Mechanical Systems for review. This Contractor shall furnish two (2) copies of the printed Operating and Maintenance Instructions for the Mechanical Systems and one copy on CD for review. Provide one hardcopy and one digital Adobe pdf set of As-Built drawings. Each copy shall be neat, legible and bound in a hard back 3-ring notebook. Instructions shall consist of the following items:

1. Manufacturer's maintenance manuals for each item of equipment furnished under this Contract. Manuals shall include such items as parts lists, detailed lubrication instructions, procedures for performing normal maintenance functions, preliminary trouble shooting procedures and wiring diagrams.
2. Complete wiring diagrams for the mechanical systems as actually wired diagrams for the mechanical systems as actually wired including control and interlock wiring.
3. Brief but complete instructions for start-up, shut- down and routine maintenance of each system.
4. Copy of corrected shop drawing for each item of equipment furnished under this Contract.
5. Maintenance binder will include: Product name, model number, serial number and manufacturer of all systems, sub-systems and products. Manufacturers written maintenance documentation. List all Trades with corresponding installation Contractor name, phone number and email. Manufacturers recommended maintenance/service schedule.
6. Warranty binder to include: List of all trades/products with corresponding installation contractor name, phone number and email. Contact person from each trade for warranty items and Emergency Service/After – hours Service. Written warranties for all products, equipment, systems and sub-systems.
7. Training: Training will take place prior to Owner acceptance. Training will cover al MEP's low voltage systems, entry systems and any specialty systems.
8. Title Page: Title of Project, address, date of submittal, name and address of Contractor, name of Architect.
9. Second Page: Index of Manual Contents.
10. First Section: A copy of each approved shop drawing and submittal with an index at the beginning of the section.
11. Second Section: A list of all equipment used on the project, together with supplier's name and address.
12. Manufacturer's maintenance manuals for each item of equipment furnished under this contract. Manuals shall include such items as parts list, detailed lubrication instructions, procedures for performing normal maintenance functions, preliminary trouble shooting procedures and wiring diagrams.
13. Complete wiring diagrams for the plumbing systems as actually wired including control and interlock wiring.

14. Brief but complete instructions for start-up, shut- down and routine maintenance of each system.
15. Routine and 24-hour emergency information:
 - a. Name, address and telephone number of servicing agency.
 - b. Include names of personnel to be contacted for service arrangements.
- C. Frame one (1) copy of brief start-up, shut-down and routine maintenance instructions and complete system wiring diagrams under glass and mount on the Equipment Room wall.

1.07 RECORD DOCUMENTS

- A. The Contractor shall keep an accurate record of all deviations from Contract Drawings and Specifications. He shall neatly and correctly enter in colored pencil any deviations on Drawings affected and shall keep the Drawings available for inspection. Extra sets of Drawings will be furnished for this purpose.
- B. At the completion of project and before final approval, make any final corrections to Drawings and certify to the accuracy of each print by signature and deliver same to Architect

1.08 SUPERVISION

- A. This Contractor shall have in charge of the work, on the job during construction, a competent superintendent experienced in the work installed under this Contract.

1.09 UNACCEPTABLE WORK AND OBSERVATION REPORTS

- A. Work shall be unacceptable when found to be defective or contrary to the Plans, Specifications, Codes specified or accepted standards of good workmanship.
- B. The Contractor shall promptly correct all work found unacceptable by the Architect and/or Construction Manager or the Owner whether observed before or after substantial completion and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting such unacceptable work, including compensation for the Architect's or the Construction Manager's additional services made necessary thereby.
- C. During the course of construction, the Architect will prepare "Observation Reports" with a list of items found to be in need of correction. All items listed shall be corrected by the Contractor. A space is provided on the form for the Contractor to note the completion of each item. All prior "Observation Report" items must be completed, the lists signed and returned to the Architect prior to making the final inspection. After the final list is issued, the same procedure will apply.

1.10 FINAL INSPECTION

- A. When the Contractor determines all work is completed and working properly per the Contract Documents, he shall request a "final" inspection by the Architect in writing. If more than one reinspection is required after this final inspection, the Contractor shall bear all additional costs including compensation for the Architect's additional services made necessary thereby.
- B. As part of the final checkout of the project, the Architect will be checking out the operation of the various systems. This Contractor shall provide such assistance as required (including manpower and tools) to start and stop the various systems, open and close valves etc. The Contractor (not the Architect) is responsible to turn on the systems and demonstrate they are operating properly.

1.11 GUARANTEE

- A. This Contractor is responsible for all defects, repairs and replacements in materials and workmanship, for a period of one (1) year after final payment is approved by the Architect.

PART 2 PRODUCTS

Not Applicable.

PART 3 EXECUTION

Not Applicable.

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END OF SECTION

SECTION 22 05 10

MANUFACTURER'S DRAWINGS

PART 1 GENERAL

1.01 SCOPE

- A. The Contractor shall submit to the Engineer for review, within one week after date of contract, six (6) copies of manufacturer's drawings, wiring diagrams, or data. The Engineer will review Contractor's shop drawings and related submittals (as indicated below) with respect to the ability of the detailed work, when complete, to be a properly functioning integral element of the overall system designed by the Engineer. Before submitting a shop drawing or any related material to the Engineer, Contractor shall: review each such submission for conformance with the means, methods, techniques, sequences, and operations of construction, and safety precautions and programs incidental thereto, all of which are the sole responsibility of Contractor; approve each such submission before submitting it; and so stamp each such submission before submitting it. The Engineer shall assume that no shop drawing or related submittal comprises a variation unless Contractor advises Engineer otherwise via a written instrument which is acknowledged by Engineer in writing. The shop drawings and related material (if any) called for are indicated below:

Plumbing Contract

Plumbing fixtures and all trim
Drains and cleanouts
Domestic Hot Water Heaters
Showers
Sinks
Lav faucet
Water Closet Components
Pipe, valves, and special fittings
Pipe Insulation

- C. The Engineer shall return shop drawings and related materials with comments provided that each submission has been called for and is stamped by Contractor as indicated above. The Engineer shall return without comment material not called for or which has not been approved by the General Contractor.
- D. This Contractor shall furnish equipment shop drawings which will indicate power hook up and control connections as required for plumbing equipment. "Stock" wiring diagrams are NOT ACCEPTABLE.
- E. The HVAC Contractor is to provide sepias of sheet metal drawings for use in coordinating work of Plumbing, Fire Protection and Electrical with layout of air distributions system and related work. Lighting, ceiling grid and ceiling access doors will be shown lightly to verify coordination. HVAC Contractor to provide initial sepias within 60 days of award of contract. Each Prime Contractor is responsible for overlaying his work onto these sepias; for providing information

as to size, elevation and location proposed for all components; and for coordination of his work with that of other Contractors. Final resolution of all items to be determined at project meetings held by Lead Contractor.

- F. The manufacturer shall provide a statement on submittals that equipment furnished complies with the Energy Code. This previously relates to high efficiency motors, EER's, COP's, etc. If this is not done, submittals will be rejected.
- G. The Engineers review of manufacturer's drawings or schedules shall not relieve the Contractor from compliance with the requirements of the plans and specifications.

1.02 QUANTITIES

- A. Items may be referred to in singular or plural on Plans and Specifications. Contractor is responsible for determining quantity of each item.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

Not Applicable

PART 3 EXECUTION

Not Applicable

END OF SECTION

SECTION 22 05 13

ELECTRICAL WORK

PART 1 GENERAL

1.01 REFERENCE

- A. Section 22 01 05 - Paragraph 1.04 - OHIO ENERGY CODE
- B. Division 26 - ELECTRICAL

1.02 SCOPE

- A. This Contractor shall furnish all motors for his equipment. Motor starters, safety switches and wired junction boxes shall be furnished and installed by the Electrical Contractor except where specifically specified to be furnished with certain mechanical equipment.

1.03 WORK INCLUDED - This Contractor:

- A. All low voltage control wiring unless specified otherwise.
- B. 120 volt wiring required for mechanical equipment when not shown or specified elsewhere.

1.05 WORK INCLUDED - Electrical Contractor.

- A. All power wiring.
- B. Motor starters, contactors, and disconnects where noted under "PRODUCTS" below.

1.06 SHOP DRAWINGS:

- A. The Contractor shall furnish to the Electrical Contractor, equipment shop drawings which will indicate power hook-up and control connections as required for mechanical equipment. "Stock" Wiring Diagrams are Not Acceptable.

PART 2 PRODUCTS

- 2.01 Refer to Section 23 01 05 - Paragraph 1.04 for "Energy Code" requirements (Particularly power factor correction)
- 2.02 Refer to Division 23 - ELECTRICAL.
- 2.03 All motors 1/2 HP and larger shall be three phase; all motors, 1/3 HP and smaller shall be single phase unless specified otherwise.

- 2.04 All single-phase motors provided by this Contractor to have built-in thermal overload protection.
- 2.05 All motors furnished shall have copper windings and all motors five (5) horsepower and greater shall have factory installed lifting eyebolts. All motors shall conform to ANSI and NEMA standards.
- 2.06 Motor starters, contactors, and disconnects are provided and installed by the Electrical Contractor, unless part of packaged equipment furnished by this Contractor, or otherwise specified.
- 2.07 All motors used in variable speed applications shall be high efficiency type and shall be rated for use with variable frequency drives.

PART 3 EXECUTION

- 3.01 All wiring, conduits, etc., shall be in strict accordance with the requirements of the latest edition of the National Electrical Code and Division 26, Electrical specification.
- 3.02 All wiring, including low voltage wiring, shall be run in conduit.
- 3.03 Low voltage wiring may be size and type recommended by the Manufacturer and/or Temperature Control Contractor.

END OF SECTION

SECTION 22 05 16

SLEEVES AND COLLARS

PART 1 GENERAL

1.01 REFERENCE

- A. Section 22 05 21 - CUTTING AND PATCHING

1.02 SCOPE

- A. This Contractor shall furnish and install all sleeves for his work. Coordinate carefully with the General Contractor.
- B. Sleeves shall be provided through all new masonry construction. Sleeves are not required if holes are core drilled through existing walls.

PART 2 PRODUCTS

- 2.01 Sleeve material: Schedule 40 black steel pipe, machine cut, large enough to allow 1/4" clearance all around pipe (around pipe insulation or covering).

PART 3 EXECUTION

- 3.01 Sleeves in partitions to have length equal to the thickness of finished partitions. Sleeves in floors of finished areas to project 1/8" above finished floor. Sleeves in floors of non-finished areas to project 3" above finished floor. Fill space between pipe and sleeves into exposed areas with sealing compound. Ream all sleeves before installing.
- 3.02 Where pipes pass through fire rated walls or floors, the space between the pipe and sleeve shall be filled with packing to maintain fire integrity.
- 3.03 Sleeves to be set in forms before concrete is poured and in partitions at the time same are being built.
- 3.04 In exposed location, other than in Mechanical Equipment Rooms, bare pipe or insulated pipe shall be provided with chromium plated collars at floor, ceiling, and at partitions.
- 3.05 Cutting required of any masonry wall or floor after it is in place shall be done by core drilling.
- 3.06 Piping not allowed to bear on sleeves.
- 3.07 Sleeves shall be installed plumb and true to line, grade, and position.
- 3.08 Unused sleeves shall be plugged and finished to match adjacent surface.

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END OF SECTION

SECTION 220517

FIRESTOPPING

PART 1 GENERAL

1.01 SCOPE

- A. Each Contractor shall be responsible for firestopping around all openings for pipes, ducts, conduits, etc., installed by him at all fire walls and smoke walls. Firestopping shall be performed by an installer who has been trained by manufacturer, or manufacturer's representative, in the installation procedures based on published UL tested fire stop systems.

1.02 DEFINITIONS

- A. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in fire rated wall and floor assemblies.

1.03 REFERENCE

- A. Division 1 – General Conditions
- B. Division 3 – Concrete
- C. Division 4 – Masonry
- D. Division 9 – Finishes
- E. Section 22 05 16 – Sleeves and Collars

1.04 GENERAL REQUIREMENTS

- A. Test Requirements: ASTM E-814, "Standard Method of Fire Tests of Through Penetration Fire Stops" (July 1997).
- B. Underwriters Laboratories (UL) of Northbrook, IL runs ASTM E-814 under their designation of UL 1479 and publishes the results in their "FIRE RESISTANCE DIRECTORY" that is updated annually.
 - 1. UL Fire Resistance Directory:
 - a. Through-Penetration Firestop Devices (XHCR)
 - b. Fire Resistance Ratings (BXUV)
 - c. Through-Penetration Firestop Systems (XHEZ)
 - d. Fill, Voids, or Cavity Material (XHHW)
 - e. Forming Materials (XHKU)
- C. International Firestop Council Guidelines for Evaluating Firestop Systems Associating Judgments

- D. ASTM E-84, Standard Test Method for Surface Burning Characteristics of Building Materials.
- E. The Ohio Building Code (OBC)
- F. NFPA 101 - Life Safety Code

1.05 QUALITY ASSURANCE

- A. A manufacturer's direct representative (not distributor or agent) to be on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. This will be done per manufacturer's written recommendations published in their literature and drawing details.
- B. Firestop System installation must meet requirements of ASTM E-814 or UL 1479 tested assemblies that provide a fire rating equal to that of construction being penetrated.
- C. Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.
- D. Firestop Systems do not reestablish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.
- E. For those firestop applications that exist for which no UL tested system is available through a manufacturer, a manufacturer's engineering judgment derived from similar UL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineer judgment drawings must follow requirements set forth by the International Firestop Council (September 7, 1994).

1.06 SUBMITTALS

- A. Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of UL firestop systems to be used and manufacturer's installation instructions.
- B. Manufacturer's engineering judgment identification number and drawing details when no UL system is available for an application. Engineer judgment must include both project name and contractor's name who will install firestop system as described in drawing.
- C. Submit material safety data sheets provided with product delivered to job-site.

1.07 INSTALLER QUALIFICATIONS

- A. Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to

install manufacturer's products per specified requirements. A manufacturer's willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL label where applicable.
- B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.
- C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements.
- D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.
- E. Do not use damaged or expired materials.

1.09 PROJECT CONDITIONS

- A. Do not use materials that contain flammable solvents.
- B. Scheduling
 - 1. Schedule installation of CAST IN PLACE firestop devices after completion of floor formwork, metal form deck, or composite deck but before placement of concrete.
 - 2. Schedule installation of other firestopping materials after completion of penetrating item installation but prior to covering or concealing of openings.
- C. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.
- D. Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.
- E. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

PART 2 PRODUCTS

2.01 FIRESTOPPING, GENERAL

- A. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping

under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.

- B. Provide components for each firestopping system that is needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.

2.02 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with through penetration firestop systems (XHEZ) listed in Volume II of the UL Fire Resistance Directory, provide products of the following manufacturers as identified below:
 - 1. Hilti, Inc., Tulsa, Oklahoma, (800)879-8000
 - 2. Tremco Sealants & Coatings, Beachwood, Ohio, (216) 292-5000
 - 3. 3M Fire Protection Products, St. Paul, Minnesota, (612) 736-0203

2.03 MATERIALS

- A. Use only firestop products that have been UL 1479, ASTM E-814 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.
- B. Cast-in place firestop devices are installed prior to concrete placement for use with non-combustible and combustible plastic pipe (closed and open piping systems) penetrating concrete floors, the following products are acceptable:
 - 1. Hilti CP 680 Cast-In Place Firestop Device
 - 2. Fox Coupling, Inc. "Cast-In-Place Firestop Coupling".
 - 3. Proset Cast-In-Place Device
- C. Sealant or caulking materials for use with non-combustible items including steel pipe & copper pipe, the following products are acceptable:
 - 1. Hilti FS-ONE Intumescent Firestop Sealant
 - 2. 3M Fire Barrier CP25 or Firestop Sealant 2000
 - 3. Tremco Fyre Shield
- D. Sealant or caulking materials for use with sheet metal ducts, the following products are acceptable:
 - 1. Hilti CP 601S Elastomeric Firestop Sealant or CP 606 Flexible Firestop Sealant
 - 2. Tremco Fyre-Shield High Performance Ceramic Firestop Sealant
 - 3. 3M Fire Barrier CP25WB+ or 2000 Silicone Sealant

- E. Intumescent sealant or caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe and plastic pipe, the following products are acceptable:
 - 1. Hilti FS-ONE Intumescent Firestop Sealant
 - 2. 3M Fire Barrier CP25WB+
 - 3. Tremco Intumescent Acrylic or TremStop WBM
- F. Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems), the following products are acceptable:
 - 1. Hilti CP 642 and CP643 Firestop Collar, CP645 Wrap Strip
 - 2. Tremco TREMstop D Combustible Pipe Intumescent Device System and TremStop WS Wrap Strip
 - 3. 3M Ultra Plastic Pipe Device and Fire Barrier FS-195+ Wrap Strip
- G. Materials used for large size/complex penetrations made to accommodate multiple steel and copper pipes, the following products are acceptable:
 - 1. Hilti FS 635 Trowelable Firestop Compound and FS 657 FIRE BLOCK
 - 2. Tremco TremStop M Fire Rated Mortar and PS Pillows
 - 3. 3M Fire Barrier CS-195+ Composite Sheet
- H. Non curing, re-penetrable materials used for large size/complex penetrations made to accommodate multiple steel and copper pipes, the following products are acceptable:
 - 1. Hilti FS 657 FIRE BLOCK
 - 2. Tremco PS Firestop Pillows
 - 3. 3M CS Intumescent Sheet
- I. Provide a firestop system with an "F" Rating as determined by UL 1479 or ASTM E814. The F rating must be a minimum of one (1) hour but not less than the fire resistance rating of the assembly being penetrated.

PART 3 EXECUTION

3.01 PREPARATION

- A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
 - 1. Verify penetrations are properly sized and in suitable condition for application of materials.
 - 2. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.

3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
4. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
5. Do not proceed until unsatisfactory conditions have been corrected.

3.02 COORDINATION

- A. Coordinate location and proper selection of cast-in-place Firestop Devices with trade responsible for the work. Ensure device is installed before placement of concrete.
- B. Responsible trade to provide adequate spacing of field run pipes to allow for installation of cast-in-place firestop devices without interferences.

3.03 INSTALLATION

- A. Regulatory Requirements: Install firestop materials in accordance with UL Fire Resistance Directory.
- B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration joint materials.
 1. Seal all holes or voids made by penetrations to ensure an air and water resistant seal.
 2. Consult with the Owner' Representative and damper manufacturer prior to installation of UL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
 3. Protect materials from damage on surfaces subjected to traffic.

3.04 FIELD QUALITY CONTROL

- A. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas. All penetrations are to be labeled in accordance with the Architect's standard labeling system. The HVAC Contractor shall coordinate all fire stopping requirements with the Architect/Construction Manager prior to start of work.
- B. Keep areas of work accessible until inspection and approval have been completed.
- C. All fire stopping shall be inspected and approved by a licensed independent Consultant. All unapproved fire stopping products installed by this contractor will be removed and replaced at his expense.

- D. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.

3.05 ADJUSTING AND CLEANING

- A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.
- B. Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.

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END OF SECTION

SECTION 22 05 19

PIPING SPECIALTIES

PART 1 GENERAL

1.01 SCOPE

- A. Furnish and install all necessary piping specialties to include thermometers, gauges, pipe strainers, etc., for piping systems included under this Contract.

PART 2 PRODUCTS

- 2.01 Thermometers - Terice "Industrial Type" blue reading thermometer with blue organic fluid in a 9" cast aluminum case, front double- strength clear glass window, straight or angle pattern as required. Provide brass separable socket. Ashcroft, Marsh, Weiss or Palmer of the same type may be furnished at the Contractor's option. Ranges as shown on the Drawings.
- 2.02 Pressure Gauges - Weiss 4PGA-I, standard single spring, aluminum case, 4-1/2" diameter with gauge cock and pigtail. Range as indicated on the drawings. Terice, Marsh or Ashcroft of the same type may be furnished at the Contractor's option. Face to be glass, clear plastic faces are not acceptable.
- 2.03 Pete's Plug -
 - A. 1/4" MPT fitting to receive either a temperature or pressure probe, 1/8" O.D. fitting and caps shall be brass with valve core of Nordel, rated at 1000 psig.
 - B. Provide XL (extra long) type Pete's plug in insulated lines.
 - C. Sisco plugs may be furnished at the Contractor's option.
- 2.04 Strainers
 - A. All water lines - Sarco style IF-125 (flanged) or IT (threaded) 125 psig, Y-pattern, cast iron body with perforated brass screen for water. Threaded for 2-1/2" and smaller, flanged for 3" and larger.
 - B. Dunham-Bush, Armstrong, Trane, McAlear, Mueller, Metraflex, Wheatley or V. D. Anderson strainers may be furnished at the Contractor's option.
- 2.05 Flexible Vibration Joints
 - A. Expansion and vibration joint connections shall be Metraflex Metrasphere, Mason Industries sphere type, Minnesota Flexible Corporation, Mercer, Phoenix,

General Rubber Maxi-Joint Style 1015 or Wheatley single sphere of pipe sizes as shown on the Drawings, to be wire reinforced for pump suction and discharge mounting and designed for minimum of 200 psig working pressure and 220°F operating temperature.

- B. Body to be neoprene and nylon with steel flanges.
- C. Each joint to be furnished with tie rods.

- 2.06 Backflow preventor by the Plumbing Contractor in accordance with specification 22 11 00 - DOMESTIC WATER PIPING SYSTEM, and in accordance with the Division of Water specifications, including approved manufacturers and installation styles. Capacities as indicated on plans. Confirm installation requirements including dimensions, clearances, orientation, etc.

PART 3 EXECUTION

- 3.01 All specialties to be installed in accordance with manufacturer's recommendations.
- 3.02 Flexible vibration joints to be installed within tolerances specified by manufacturer.
- 3.03 Vent connection to backflow preventer shall be made by means of a fixed air gap. No direct connection will be permitted. Extend line to nearest floor drain.

END OF SECTION

SECTION 22 05 20

PAINTING

PART 1 GENERAL

1.01 REFERENCE

- A. Division 9 - FINISHES
- B. Section 22 05 53 - TAGGING AND CODING

1.02 SCOPE

- A. All steel supports shall be painted by this contractor per Division 9 requirements.
- B. Piping in exposed finished areas shall be painted by this contractor per Division 9 requirements. Mechanical room and shell space piping does not require paint.
- C. Factory finished equipment which has rusted or been damaged shall be cleaned at the completion of the project and rust spots and marred areas shall be refinished and restored to the original factory finish.
- D. Paint all fire protection piping in stairways.

PART 2 PRODUCTS

- 2.01 Paint shall meet requirements of Division 9 - Finishes

PART 3 EXECUTION

Not Applicable

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END OF SECTION

SECTION 22 05 21

CUTTING AND PATCHING

PART 1 GENERAL

Not Applicable

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

- 3.01 Cutting for openings, when necessary, shall be done by this Contractor with such tools and methods as to prevent unnecessary damage to surrounding areas or equipment.
- 3.02 The corners of all openings in poured concrete shall be core drilled to minimize overcutting.
- 3.03 Fill space in all areas where core drilled with packing where required to maintain fire rating. Openings shall be temporarily fire-stopped until permanent fire stopping is done.
- 3.04 All holes cut for the installation of piping, and equipment shall be neatly patched and refinished with the same materials as, and to match, adjacent surfaces, and damages thereto shall be repaired in kind and to match existing conditions by this Contractor.
- 3.05 Patching shall match adjacent/surrounding surfaces in kind and finish.
- 3.06 No structural member will be cut into without the expressed permission of the Architect and Structural Engineer.

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END OF SECTION

SECTION 22 05 22

FOUNDATIONS AND SUPPORTS

PART 1 GENERAL

1.01 SCOPE

- A. All concrete foundations and bases for plumbing equipment will be by the Plumbing contractor.
- B. This Contractor shall furnish welded steel frames and supports for all equipment requiring same. Furnish auxiliary steel as required for supporting pipes.
- D. The Plumbing Contractor shall provide concrete foundations for all exterior Plumbing pipe supports.

PART 2 PRODUCTS

- 2.01 All steel for frames and supports shall be standard weight black steel pipe or standard structural steel shapes.
- 2.02 All exterior frames and supports shall be galvanized.
- 2.03 Concrete for pads shall be a minimum of 6 bag mix per cubic yard with maximum slump of 4" and shall be air entrained 5 to 7% by volume.

PART 3 EXECUTION

- 3.01 Grind all sharp corners and projections on supporting steel after fabrication. All steel shall have one (1) coat of metal primer after fabrication. All steel supports exposed to the weather shall be finished with a heavy coat of bitumastic.

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END OF SECTION

SECTION 22 05 23

VALVES

PART 1 GENERAL

1.01 SCOPE

- A. Furnish and install all necessary valves for piping systems and equipment in the building required to provide proper shut off and balancing of systems included under this Contract.

PART 2 PRODUCTS

- 2.01 Check valves shall be Crane, Fairbanks, Watts, Jenkins, Nibco, Powell and shall all be by the same manufacturer.
- 2.02 Ball valves shall be as manufactured by Grinnell, Apollo, Watts. All ball valves to be by the same manufacturer.
- 2.03 Butterfly valves shall be as manufactured by Keystone, Center Line, Worcester, Watts, Grinnell, Jamesbury. All butterfly valves to be by the same manufacturer.
- 2.04 Valves in Water Lines:
 - A. Butterfly Valves
 - 1. 2-1/2" and larger size shall be cast or ductile iron valve. Furnish with lug pattern body, aluminum bronze disc, stainless steel stem, EPDM seat, extended neck for full 2" insulation, and positive shut off at 175 psig W.O.G. (2 1/2"-12") and 150 psi W.O.G. (14"-20"). Equal to Keystone Fig. AR-2. Butterfly valves not permitted for size 2" and smaller.
 - 2. 5" and smaller shall have minimum 10 position lever actuators, with positive latching and position indicator. Valves 6" and larger shall have worm gear actuator. Valves shown with chain on Drawings to be chain operated.
 - 3. Valves used on outlets of devices for balance purposes shall have an adjustable memory stop (position lock). A notched operator by itself is not considered a memory stop.
 - B. Ball Valves
 - 1. 2" size and smaller may be two-piece bronze body full port ball valve, screwed piping connections, union connection body, teflon seats, full port, blowout proof stem, adjustable packing gland, chrome plated bronze ball,

and lever handle labeled for service controlled. Rated for 150 S.W.P. and 400 WOG. Equal to Apollo 70-300 Series.

- C. Drain valves shall be ball valves as specified above with hose end connection and cap.
- D. Check Valves
 - 1. 3" and larger - iron body, bronze mounted, horizontal swing check with bronze disc, flanged, 125 lb. S.W.P.
 - 2. 2-1/2" and smaller - all bronze, horizontal swing check with bronze or TFE disc, screwed, 125 lb. S.W.P.
 - 3. Non-slam check valves at pumps only - 2-1/2" and larger shall be flanged, cast iron or semi-steel body, bronze trim, center guided lift check with bronze disc and stainless steel spring, 125 lb. S.W.P. 2" and smaller shall be screwed, bronze, cast iron or semi-steel body, bronze trim, center guided lift check with bronze or TFE disc and stainless steel or alloy spring, 125 lb. S.W.P.
 - 4. Clow, McAlear, Mueller or Metraflex non-slam check valves are acceptable manufacturers as well as previously listed manufacturers.

PART 3 EXECUTION

- 3.01 This Contractor shall install all valves in strict accordance to the manufacturer's recommendations.
- 3.02 Where drain lines are not piped to floor drains, furnish hose end adapters. Provide caps for all hose end adapters.
- 3.03 Ball valves and butterfly valves designated with an "M" shall be furnished with memory stops.

END OF SECTION

SECTION 22 05 29

INSERTS, PIPE HANGERS AND SUPPORTS

PART 1 GENERAL

1.01 SCOPE

- A. Furnish and install all necessary inserts, beam clamps and auxiliary steel for pipe hangers in the building.
- B. Furnish and install necessary pipe hangers and supports to properly support all piping and to maintain uniform elevation.

PART 2 PRODUCTS

2.01 HANGERS

- A. Hangers for copper lines, 2" and smaller, shall be similar to Anvil Fig. CT-99, adjustable carbon steel pipe ring, with 3/8" hanger rods. All copper plated.
- B. Hangers for copper lines 2-1/2" to 4" shall be similar to Anvil Fig. CT-65, adjustable carbon steel clevis, with proper size rods, all copper plated. Unplated clevis may be used if full round lead sleeves 2" wider than the clevis are secured to the pipe at each hanger.
- C. When copper lines are insulated and hangers are sized for outside of insulation, provide steel hangers as described below.
- D. Hangers for steel lines 2" and smaller shall be similar to Anvil Fig. 97, adjustable pipe ring, galvanized steel band with 3/8" hanger rods.
- E. Hangers for steel lines 2-1/2" and larger shall be similar to Anvil Fig. 260, adjustable carbon steel clevis, heavy duty, with proper size rods.

- 2.02 B-Line, F & S, Elcen, Penn, Fee-Mason, PHD Manufacturing or Modern Pipe Hangers of the same type may be furnished at the Contractor's option.

PART 3 EXECUTION

- 3.01 Riser clamps shall be used at each floor where required.
- 3.02 Wall bracket pipe supports shall be installed where required.
- 3.03 All copper piping is to be shielded from steel pipes or electrical conduit with sheet lead or electrical tape wherever pipes would touch each other.

- 3.04 Galvanized hangers and strap hangers will not be permitted for supporting copper lines except for hangers sized for outside of insulation.
- 3.05 Provide pipe anchors and guides where and as indicated on the Drawings and elsewhere as required to properly control pipe. Method to suit job conditions.
- 3.06 Support piping at pumps and equipment from floor, ceiling, or walls, so that piping weight is not supported directly from pumps or equipment.
- 3.07 All beam clamps and supports for piping and ductwork shall be in place prior to the fireproofing of the structural steel.
- 3.08 Piping to be supported according to the following schedule. Support at intervals not to exceed spacing listed or elsewhere as required in accordance with good workmanship. No pipe shall be supported from another pipe. All hangers shall be plumbed before insulation is applied and all hangers shall be double nutted.

SPACING					
(1) Steel Pipe			(2) Copper Pipe		
Pipe Size	Rod	Spacing	Pipe Size	Rod	Spacing
Thru 1"	3/8"	7'-0"	Thru 3/4"	3/8"	6'-0"
1-1/4"	3/8"	9'-0"	1"	3/8"	6'-0"
1-1/2"	3/8"	9'-0"	1-1/4"	3/8"	6'-0"
2"	3/8"	10'-0"	2"	3/8"	10'-0"
2-1/2"	1/2"	11'-0"	2-1/2"	1/2"	10'-0"
3"	1/2"	12'-0"	3"	1/2"	10'-0"
4"	5/8"	12'-0"	4"	5/8"	10'-0"
6"	3/4"	12'-0"	6"	3/4"	10'-0"

- 3.09 Support plastic pipe at intervals not to exceed 4 feet, 6 feet on 4 inch and larger.
- 3.10 Support piping at pumps and equipment from floor, ceiling, or walls, so that piping weight is not supported directly from pumps or equipment.

END OF SECTION

SECTION 22 05 30

INSTALLATION OF PIPING

PART 1 GENERAL

1.01 REFERENCE

- A. Section 22 05 19 - PIPING SPECIALTIES
- B. Section 22 05 23 - VALVES
- C. Section 22 05 29 - INSERTS, PIPE HANGERS AND SUPPORTS
- D. Section 22 05 93 - TESTS AND ADJUSTMENTS

1.02 SCOPE

- A. The requirements of this Section shall apply to all interior piping systems installed under this Contract, except where otherwise noted on the Drawings or elsewhere in the Specifications.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

- 3.01 All piping systems shall be installed with adequate provisions made for expansion and contraction to prevent stresses on piping, valves and equipment. Anchor and guide piping at all points indicated and/or as required. Type and method of anchoring, guiding and attachments to sustaining members to suit job requirements and conditions and shall be approved by the Architect.
- 3.02 Provide unions or flanges at each final connection, and at each piece of equipment. Branches from mains to equipment stubs, risers, etc., to have swing joints with at least one change of direction in the horizontal plane, and one change of direction in the vertical plane, before connecting to equipment or fixtures. Piping shall be arranged and unions and flanges located to permit easy removal of parts and equipment for inspection and cleaning without disconnecting any part except unions or flanges. No welded connections shall be made to valves or equipment. Use bronze unions in copper lines. Unions to be downstream of valves.
- 3.03 Flange bolts shall be cut to proper length so that one thread projects beyond the nut when nut and bolt are tightened.
- 3.04 Make proper connections to all items of equipment in the Contract as recommended by the Manufacturer or as detailed on the Drawings.

- 3.05 All piping shall be arranged in accordance with the best standards of the trade with vertical pipes plumb and horizontal runs parallel or perpendicular to the building wall.
- 3.06 Provide valves and specialties where indicated on the Drawings.
- 3.07 Provide 3/4" drain valves in piping at low points to provide complete drainage of all systems and as shown on the Drawings.
- 3.08 Ream ends of pipe and clean before installing.
- 3.09 All joints in copper piping shall be made with 95-5 solder. Solders and fluxes containing lead are prohibited.
- 3.10 Use pipe dope on male threads of screwed pipe only. Teflon pipe joint tape may be used, at the Contractor's option.
- 3.11 Valves to be installed with handwheel at or above center of pipe. Valves outdoors exposed to weather shall be installed with handwheel in the horizontal.
- 3.12 Make all changes of direction with fittings, rather than bending.
- 3.13 All valves and unions to be installed so as to be accessible through ceiling, access panels, etc.
- 3.14 Provide dielectric unions or insulating flanges between dissimilar metals, i.e., copper to steel.
- 3.15 Bull head connections in any piping service are expressly prohibited.
- 3.16 At the end of each day's work and otherwise as required or directed, provide caps and/or plugs at all openings in piping for protection. Particular attention must be given to avoid the possibility of any foreign materials entering the pipes, whether it be inadvertent or with malicious intent.
- 3.17 Flanged joints shall be faced true and square. Flanges shall be same face style as mating surface to which it is connected.
- 3.18 Install thermometers and gauges so they may be read from floor level.
- 3.19 Install Pete's Plugs as close as possible to control valves, coils, etc., as shown on the Drawings, and arranged so that a probe may be inserted into the plug.
- 3.20 Where piping is installed in accessible chases, keep all piping to sides of chase, except portions which must necessarily be in center of chase. Offset vents to side immediately above connection to waste line. All lateral runs are to be located at the floor or minimum 6'-0" above floor, and all vertical piping held close to the wall through that height leaving maximum service space.

- 3.21 Where pipe drops occur in block walls, pipes to enter and leave walls at block joints. Coordinate with General Contractor.
- 3.22 Install galvanized sheet metal troughs with drains under pipes crossing electrical equipment. Seal to make water tight.
- 3.23 Do not run water piping through electrical rooms.
- 3.24 Properly support all relief valve discharge piping and provide no more than one 90° ell.

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END OF SECTION

SECTION 22 05 53

TAGGING AND CODING

PART 1 GENERAL

1.01 SCOPE

- A. Provide brass tags on all valves. Tags shall state type of line in which the valve is installed (hot water supply, steam, etc.), building, floor and number of valve (example: HWHS-JH-02-253). Furnish a schedule or schedules of all valves tagged with number, location and purpose of each valve and mount schedules under glass in a frame on Equipment Room wall, or elsewhere as required. Schedules shall be located near and convenient to the valves on the schedule.

- B. After exposed piping and insulation is painted, this Contractor shall apply 2" wide color bands on each side of a stenciled legend, lettered with the name of contents of piping. Flow direction arrows of the same colors are to be located adjacent to the Identification Legends. Spacing not over 20 ft. apart and at least once in each room. Piping to be labeled on both sides of the wall where it passes through the wall. Do not use adhesive markers. Labelling and colors shall be as follows:

Contents	Color	Designation
Drain	Green	D
Sanitary	Green	SAN
Storm	Green	STM
Domestic Cold Water	Light Blue	DCWS
Domestic 140° Hot Water	Dark Blue	D140HWS
Domestic 140° Hot Water Return	Dark Blue	D140HWR
Domestic Hot Water	Dark Blue	DHWS
Domestic Hot Water Return	Dark Blue	DHWR
Natural Gas	Yellow	Gas

PART 2 PRODUCTS

- 2.01 Valve tags shall be brass minimum 16 gauge.

PART 3 EXECUTION

Not Applicable

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END OF SECTION

SECTION 22 05 54

EQUIPMENT IDENTIFICATION

PART 1 GENERAL

1.01 SCOPE

- A. This Contractor shall label all disconnects, equipment control panels, motor starters, switches and equipment furnished under this Contract.

PART 2 PRODUCTS

- 2.01 Labels shall be 1/16" thick laminated plastic nameplates or 0.020" thick aluminum nameplates. Background shall be black with 3/16" letters engraved on the face. Letters shall be white. Labels shall include the areas served by equipment, horsepower, and flows.

PART 3 EXECUTION

- 3.01 Secure plates with screws. Do not attach to covers where covers can be easily mixed up.

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END OF SECTION

SECTION 22 05 93

TESTS AND ADJUSTMENTS

PART 1 GENERAL

1.01 SCOPE

- A. After work has been completed but before pipe covering has been applied, the Contractor shall test and adjust the systems he has installed.
- B. The Architect shall be notified of all scheduled tests and adjustments at least 48 hours before they are scheduled so that he may witness same. If the Contractor performs any test or adjustment without the Architect present or without properly notifying the Architect the Contractor will be required to perform the test or adjustment a second time in the presence of the Architect.
- C. If the Architect determines that any work requires special inspection, testing, or approval, he will, upon written authorization from the Owner, instruct the Contractor to order such special inspection, testing or approval. The Contractor shall give timely notice so the Architect may observe the inspections, tests or approvals. If such special inspection or testing reveals a failure of the work to comply with the requirements of the Contract Documents, the Contractor shall bear all costs thereof, including compensation for the Architect's additional services made necessary by such failure; otherwise the Owner shall bear such costs, and an appropriate Change Order shall be issued.
- D. Concealed lines shall be tested before being concealed. If this is not done and a leak appears during the final test, this Contractor shall repair leak and all damage resulting therefrom.
- E. This Contractor shall adjust all his equipment in the plumbing system to obtain proper operation and shall demonstrate to the Owner and Architect that the entire system will function properly.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

3.01 TESTS

- A. After work has been completed but before pipe covering has been applied, the Contractor shall test the systems as follows. At these pressures, the circulation shall be free and the piping free of leaks.

System	Test Medium	Pressure Not Less than	Time Not Less Than	Notes
Water lines	water	125 lbs	6 hours	No drop
Drainage systems	In accordance with applicable plumbing codes			
Gas Piping	In accordance with applicable plumbing codes			

- 3.02 Purge gas system to outdoors. Purge and test to be witnessed by Gas Company and Architect.
- 3.03 The Contractor, before starting any pumping unit with pump and driver mounted on a common base plate with a flexible couplings, shall check the unit for proper alignment.
- 3.04 Before turning job over to Owner, inspect all valves and repack valves as necessary.
- 3.05 This Contractor shall adjust all equipment in the mechanical system to obtain proper operation and shall demonstrate to the Owner and Engineer that the entire system will function properly.

END OF SECTION

SECTION 22 05 94

PROTECTION AND CLEANING

PART 1 GENERAL

Not Applicable

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

- 3.01 Protect all plumbing equipment against damage from any cause whatsoever and pay the cost of replacing and repairing equipment made necessary by failure to provide suitable protection.
- 3.02 After all piping and equipment has been approved and after all plastering has been completed, bare piping and insulation provided under this Contract shall be thoroughly cleaned of dirt, grease, rust and oil.
- 3.03 Repair all dents and scratches in factory prime or finish coats on all plumbing equipment to the satisfaction of Associate. If damage is excessive, replacement may be required.
- 3.04 Flush out all piping systems to remove all dirt and grease from pipes and equipment before systems are placed in operation.
- 3.05 Cover all pumps, open pipes, etc., to keep out dirt, water and weather during construction.
- 3.06 This Contractor shall clean up and remove all debris from the site and shall at all times keep the premises in a neat and orderly condition.

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END OF SECTION

SECTION 22 05 95

FLUSHING AND STERILIZATION

PART 1 GENERAL

1.01 SCOPE

- A. Flush out all domestic water piping systems to remove all dirt and grease from pipes and equipment before systems are placed into operation. Clean strainers after each flushing until the strainer remains clean. Remove all faucet strainers and clean out debris then replace strainer.
- B. After domestic water lines are all installed, sterilize lines, including outside services as prescribed by AWWA-C-651. Sterilization shall be done under the immediate on the job supervision of a water testing laboratory regularly engaged in the service and shall be done per their instructions. All fees for testing and test equipment shall be paid by this Contractor.
- C. Furnish a Certificate of Sterilization and Approval For Human Consumption signed by a Professional Engineer registered in the State of Ohio regularly in the employ of the Testing Laboratory. Certification shall be furnished to the Architect before payment will be made.

PART 2 PRODUCTS

- 2.01 Sterilization: Chlorinating material either liquid chlorine meeting AWWA Standard B301, sodium or calcium hypochlorite meeting AWWA Standard B300.

PART 3 EXECUTION

- 3.01 With all outlets closed, fill system to working pressure and close valve at supply main.
- 3.02 A cleaning solution containing not less than 150 parts per million of chlorine shall be introduced into the system.
- 3.03 Each outlet, hot and/or cold, shall be tested during fill to prove the presence of chlorine at that outlet and valves and faucets shall be opened and closed several times during the disinfecting time period.
- 3.04 Water piping systems shall remain filled for a period of 24 hours and each outlet shall be again tested and shall produce not less than 100 parts per million of chlorine at the end of the retention period.
- 3.05 All outlets shall be opened wide and the main supply valves opened, flushing system with water until chlorine content is not greater than 0.2 parts per million or until approved by the Health Department. Flush drain valves.

- 3.06 After final flushing all aerators on plumbing brass shall be removed, cleaned and reinstalled.
- 3.07 Sterilization test may be performed at the same time the pressure test is placed on the system.

END OF SECTION

SECTION 22 05 97

REMODELING

PART 1 GENERAL

1.01 REFERENCE

- A. Division 1 - GENERAL REQUIREMENTS
- B. Section 22 05 98 - DEMOLITION

1.02 SCOPE

- A. This Contractor shall include the remodeling of and additions to all mechanical work in the areas indicated on the Architectural and Mechanical Drawings and in all areas shown on the Drawings. All necessary or required remodeling or additions to the present mechanical work shall be included in this Contract, as indicated or required, to the end that the work will result in the finished remodeled spaces shown on the Architectural Drawings.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

- 3.01 In all of the remodeling work the mechanical work shall follow the intent of the Mechanical Specification insofar as possible with regard to material and workmanship.
- 3.02 Where old walls and furrings are removed, exposed piping that will remain in use shall be offset to the nearest available new wall or concealed space and reconnected as necessary or required, using all new material. Note that this shall include piping of every description at both known and unknown locations.
- 3.03 All piping installed in the remodeling work shall be installed as concealed work. This Contractor shall do all cutting required.
- 3.04 Existing plumbing fixtures that are to remain but which interfere with the remodeling work of any Contractor shall be removed and replaced later when directed.

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End of Section

SECTION 22 05 98

DEMOLITION

PART 1 GENERAL

1.01 REFERENCE

- A. Section 22 05 97 - REMODELING

1.02 SCOPE

- A. The General Contractor shall be responsible for all plumbing demolition in all areas that will be renovated as part of this project. Refer to the demolition Drawings and demolition notes. The plumbing contractor shall be responsible for equipment disconnects and coordination with the general contractor to identify the equipment, piping, etc that is to be removed.

PART 2 PRODUCTS

Not Applicable.

PART 3 EXECUTION

Not Applicable.

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End of Section

SECTION 22 07 00

PLUMBING INSULATION

PART 1 GENERAL

1.01 REFERENCE

- A. Section 22 05 16 - SLEEVES AND COLLARS
- B. Section 22 05 29 – INSERTS, PIPE HANGERS AND SUPPORTS
- C. Section 22 00 00 – PLUMBING GENERAL
- D. Section 22 13 16 - FACILITY SANITARY WASTE AND VENT PIPING SYSTEM
- E. Section 22 11 13 – FACILITY DOMESTIC WATER DISTRIBUTION PIPING

1.02 SCOPE

- A. Provide listed insulation cover for all items/elements as specified herein, as shown on plans; and for any other items/elements requiring same.
- B. Insulate piping and associated accessories and appurtenances included in the following systems:
 - 1. Domestic cold water.
 - 2. Domestic hot water.
- C. Existing piping insulation removed or damaged by new work shall be replaced in accordance with these specifications for new piping of the same system type.
- D. Insulate all sanitary waste lines and supply lines under ADA lavatories. Use Pre-Manufactured Insulation covers. Pre-manufactured Insulation covers as manufactured by Handi-Wrap, Pro-Wrap, and Truebro.

PART 2 PRODUCTS

- 2.01 All insulating materials, including jackets, cements, adhesives, vapor barriers, etc., shall be U.L. listed, with a flame spread rating not to exceed 25, and a smoke development rating not to exceed 50. All exterior finishes shall have a minimum service temperature limit (FSTM 70) of minus 50 to 220 degrees F.
- 2.02 Molded plastic fitting covers shall be U.L. listed, with a flame spread rating not to exceed 25, and a smoke development rating not to exceed 50.
- 2.03 Insulation thicknesses are based on insulation having thermal resistance in the range of 4.0 HR F ft²/Btu to 4.6 HR F ft²/Btu per inch of thickness on a flat surface at a mean temperature of 75°F. Minimum insulation thickness shall be increased for materials having R values less than 4.0 or may be reduced for materials having R values greater than 4.6 to give equivalent "R" values.

- 2.04 Pipe cover shall be similar to Johns Manville "Micro-Lok" glass fiber insulation, rated for 850 degrees F., with a factory applied AP-T all-purpose self-sealing vapor barrier jacket. Butt strips shall be minimum 3" wide, and of same material as jacket. Equal materials, including thickness and conductivity ratings/listings, as manufactured by Owens Corning, Knauf or Manson may be furnished, at the contractor's option. Where insulation thickness is indicated for cover herein, it is nominal MINIMUM required thickness.
- 2.05 All cements, adhesives, finishes, and associated materials shall be similar to that provided by Foster. Equal materials as provided by Childers or Vimasco may be furnished at the contractor's option.

PART 3 EXECUTION

3.01 Cover cold water as follows:

- A. Cover with minimum 1" thickness glass fiber pipe insulation.
- B. Butt all edges of insulation and seal all longitudinal laps and butt strips with white vapor barrier cement, similar to Foster no. 85-20; or furnish with manufacturer's integral self-sealing laps.
- C. Fittings and mechanical couplings shall be wrapped with compressed fiber glass to same thickness and density as adjacent pipe covering, and covered with a listed molded plastic fitting.
- D. All appurtenances and accessories such as valves, flanges, unions, etc. installed in referenced piping (with the exception of backflow prevention assemblies listed at the end of this paragraph) shall be wrapped with full thickness insulation and covered with a listed molded plastic fitting cover; or an open mesh glass cloth shall be applied over wet mastic, and covered with a second coat of fire resistant mastic. Backflow prevention assemblies which require periodic inspection/testing/maintenance shall not be provided with insulation cover, unless these assemblies are in water sensitive locations, such as above lay-in ceilings. If listed backflow prevention assemblies are in water sensitive locations, furnish cover complying with this specification that allows removal and replacement as necessary for required access.

3.02 Cover hot water as follows:

- A. Cover with minimum 1" thickness glass fiber pipe insulation.
- B. Butt all edges of insulation and seal all longitudinal laps and butt strips with white vapor barrier cement, similar to Foster no. 85-20; or furnish with manufacturer's integral self-sealing laps.
- C. Fittings and mechanical couplings shall be wrapped with compressed fiber glass to same thickness and density as adjacent pipe covering, and covered with a listed molded plastic fitting.

- D. All appurtenances and accessories such as hangers, valves, flanges, unions, etc. installed in referenced piping shall not be covered. Cover shall be interrupted to allow direct hanger support of referenced piping. All insulation cover termination points shall be stopped with an even flat surface perpendicular to piping, sealed with Foster "Tight-Fit" coating.
- 3.03 All applications shall be made on clean, dry surfaces with all joints butted firmly together.
- 3.04 Insulation must run continuous through hangers, sleeves and walls for all cold water piping.
- 3.05 On all piping 1 1/4" diameter and larger with insulation cover specified to run continuous through hanger assemblies, provide a listed/approved sheet metal protective insulation shield at each hanger.
- 3.06 Insulation shall not be applied until general construction has progressed sufficiently to minimize potential for physical or moisture damage to the cover assembly. All damaged cover shall be replaced at the contractor's expense.
- 3.07 Install protective sleeve on all insulated, exposed pipes penetrating floor structure.
- 3.08 Hanger rods must be perpendicular before insulation is installed.
- 3.09 Longitudinal lap joints and butt strips for glass fiber piping insulation shall be secured with staples on three (3) inch centers, and sealed with an approved vapor barrier adhesive where applicable. Staples are not required when insulation utilizes a "double" adhesive self-sealing system.

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END OF SECTION

SECTION 22 33 36

ELECTRIC WATER HEATER

PART 1 GENERAL

1.01 SCOPE

- A. Furnish and install electric water heater(s), accessories and appurtenances as required to provide domestic hot water supply to all items/elements indicated on plans, and to any and all other points requiring same. The assembly shall include all components necessary for automatically maintaining constant water temperature supply.
- B. Water heaters must comply with all requirements of the applicable Energy Conservation Code.

PART 2 PRODUCTS

2.01 STORAGE TANK ELECTRIC WATER HEATERS; as specified on plans.

- A. Water Heater shall be listed by Underwriters' Laboratories and approved by the National Sanitation Foundation.
- B. Glass lined tank shall have 150 psig working pressure and be equipped with extruded, high density magnesium anode. Enclose tank with fiber glass insulation. The outer shell jacket shall have a baked enamel finish.
- C. Electric heating elements shall be medium watt density with incoloy sheathing and stainless steel resistors. Elements shall be fused according to the National Electrical Code.
- D. Control circuit shall have double pole manual reset high limit and thermostat(s) with sensing element immersed in water.
- A. The heater tank shall have a minimum three (3) year limited warranty against corrosion.
- B. Equal electric tank type water heaters as manufactured by A.O. Smith, Ruud, National, Lochinvar, Rheem, Bradford White or State may be furnished at the Contractor's option.

2.02 Thermal expansion tanks shall be similar to Amtrol Inc. ST Therm-X-Trol series, ASME rated, capacities as indicated on plans. Furnish with steel shell, rigid polypropylene liner and heavy duty rubber diaphragm. Liner and diaphragm mechanically bonded to shell to form a separate air chamber and non-corrosive water reservoir. Air chamber is pre-charged to 55 psig, and provided with a standard air valve fitting.

- 2.03 All water heater storage tanks that do not include an integral listed/approved anti-siphon device in accordance with ANSI standards shall have a vacuum relief valve installed in cold water supply piping to the tank per inspection/approval authorities requirements. Relief valve to be similar to Watts model no. N36.
- 2.05 The water heater manufacturer shall assume single source responsibility for the complete assembly, including ensuring proper operation and performance, testing certification, warranty, owner/user instruction and start-up services. These conditions shall apply to the complete assembly, as well as all individual components.

PART 3 EXECUTION

- 3.01 Install water heaters, piping and accessories as recommended by manufacturer.
- 3.02 Install ASME rated temperature-pressure relief valves as required and/or as indicated on the plans. Valve setting 210°F and 125 psig. Extend discharge pipe full size to approved drain location.
- 3.03 Set hot water supply water temperature as indicated on plans.
- 3.04 Note that where heaters are indicated for hot water supply temperatures above 120 degrees F., all hand wash, shower or other fixtures with direct occupant skin surface contact shall be provided with listed/approved assemblies as required to limit hot water supply temperature to maximum 120 degrees F.
- 3.05 Water heaters installed without hot water recirculating systems (if applicable) are to be provided with "heat traps" at inlet and outlet piping adjacent to heater connections. Heat traps may be listed/approved pre-manufactured assemblies, or field constructed 360 degree "loop" piping arrangements in accordance with Energy Code and inspection/approval authorities requirements.
- 3.06 Provide piping manifold for interconnection of heaters & components in accordance with the manufacturer's recommendations. The piping manifold shall include unions or flanges at all equipment locations & other points as necessary to allow proper access for service, maintenance & removal/replacement of individual components without cutting or repair.

END OF SECTION

SECTION 22 34 36

STORAGE TANK GAS FIRED WATER HEATER

PART 1 GENERAL

1.01 SCOPE

- A. Furnish and install gas water heater(s), accessories and appurtenances as required to provide domestic hot water supply to all items/elements indicated on plans, and to any and all other points requiring same. The assembly shall include all components necessary for automatically maintaining constant water temperature supply.
- B. Water heaters must comply with all requirements of the applicable Energy Conservation Code.
- C. Water heater assembly gas pressure regulation valves installed within the building structure are to be individually vented to atmosphere in compliance with requirements of the Gas provider, referenced standards and the review/inspection/approval authorities.
- D. Products of combustion Ventilation/flue piping by Heating Contractor.

PART 2 PRODUCTS

2.01 STORAGE TANK GAS FIRED WATER HEATERS; as specified on plans.

- A. Water heater shall be equipped to burn gas and design certified by the American Gas Association and be approved by the National Sanitation Foundation.
- B. Glass lined tank shall be insulated with vermin-proof glass fiber insulation and the outer steel jacket shall have a baked enamel finish over a bonderized under coating.
- C. Heater shall have a working pressure of 150 psig. Heater shall be provided with an automatic gas shut-off device and safety shut-off in event pilot flame is extinguished; a gas pressure regulator set for the type of gas supplied; an approved draft diverter, and extruded magnesium anode rod rigidly supported for cathodic protection.
- D. Heater tank shall have a three year limited warranty against corrosion.

2.02 Water heaters by A.O. Smith, Rheem, Bradford White, Ruud, National, State, PVI or Lochinvar of the same type and capacity may be furnished at the Contractor's option.

2.03 Thermal expansion tanks shall be similar to Amtrol Inc. ST-C, ASME Rated extrol series, capacities as indicated on plans. Furnish with steel shell, rigid polypropylene liner and

heavy duty rubber diaphragm. Liner and diaphragm mechanically bonded to shell to form a separate air chamber and non-corrosive water reservoir. Air chamber is pre-charged to 55 psig, and provided with a standard air valve fitting.

- 2.04 All Water Heaters that do not include an integral listed/approved anti-siphon device in accordance with ANSI standards shall have a vacuum relief valve installed in Cold Water supply piping to the heater per inspection/approval authorities requirements. Relief valve to be similar to Watts model no. N36.
- 2.05 The water heater manufacturer shall assume single source responsibility for the complete assembly, including ensuring proper operation and performance, testing certification, warranty, owner/user instruction and start-up services. These conditions shall apply to the complete assembly, as well as all individual components.

PART 3 EXECUTION

- 3.01 Install water heaters, piping and accessories as recommended by manufacturer.
- 3.02 Install ASME rated temperature-pressure relief valves as required and/or as indicated on the plans. Valve setting 210°F and 125 psig. Extend discharge pipe full size to approved drain location.
- 3.03 Set hot water supply water temperature as indicated on plans.
- 3.04 Note that where heaters are indicated for hot water supply temperatures above 120 degrees F., all hand wash, shower or other fixtures with direct occupant skin surface contact shall be provided with listed/approved assemblies as required to limit hot water supply temperature to maximum 120 degrees F.
- 3.05 Water heaters installed without Hot Water recirculating systems (if applicable) are to be provided with "heat traps" in inlet and outlet piping adjacent to heater connections. Heat traps may be listed/approved pre-manufactured assemblies, or field constructed 360 degree looped piping/tubing arrangements in accordance with Energy Code and Inspection/Approval authorities requirements.

END OF SECTION

SECTION 22 42 00

PLUMBING FIXTURES

PART 1 GENERAL

1.01 REFERENCE

- A. Section 22 00 00 – PLUMBING GENERAL
- B. Section 22 11 00 – DOMESTIC WATER PIPING SYSTEM
- C. Section 22 13 19 – DRAINS, CLEANOUTS, AND DRAINAGE SPECIALTIES

1.02 SCOPE

- A. Furnish and install all plumbing fixtures and associated accessories as specified herein at locations indicated on plans. Fixtures to be provided free of defects and set in a neat, finished and uniform manner.
- B. Where fixtures are indicated to be handicap accessible, install as directed herein and in compliance with the codes and guidelines referenced.

PART 2 PRODUCTS

- 2.01 Plumbing fixtures, trim, fittings, accessories, appurtenances, etc. not included herein are as specified on plans. Fixtures and faucets shall be 'Watersense' certified where applicable.
- 2.02 China plumbing fixtures and accessories as manufactured by American Standard, Kohler, Eljer, or Toto may be furnished at the Contractor's option.
- 2.03 Stainless steel sinks and accessories as manufactured by Elkay, Just, Carlton or Advance Tabco may be furnished at the Contractor's option.
- 2.04 Manual flush valves for water closets and urinals as manufactured by Sloan, Zurn, Toto or Delany.
- 2.05 Sensor operated flush valves for water closets and urinals as manufactured by Sloan, Zurn, Toto or Delany
- 2.04 FAUCETS
 - A. Manual operation faucets and accessories as manufactured by American Standard, Symmons, Elkay, Kohler, Chicago Faucet, Zurn, T & S Brass or any of the listed fixture manufacturers may be furnished at the Contractor's option.
 - B. Sensor operation faucets and accessories as manufactured by Sloan, Bradley, Zurn, Delaney, Symmons or any of the manufacturers listed for manual operation faucets may be furnished at the Contractor's option.

- C. Where solid cast metal body faucets with integral waterways are specified, alternate stamped metal hollow body faucets with tubing waterways shall not be accepted.
- 2.05 Seats for water closets as manufactured by Bemis, Church, Olsonite, Beneke or Centoco may be furnished at the Contractor's option. All seats are to be furnished with self-sustaining check hinges unless otherwise indicated.
- 2.06 Fixture carriers shall be floor mounted and specified as manufactured by Josam, Zurn, J. R. Smith, Ancon or Wade may be furnished at the Contractor's option.
- 2.07 Equivalent precast molded stone or terrazzo mop sink receptors as manufactured by Fiat, Williams, Creative Industries, Mustee or Cutler may be furnished at the Contractor's option.
- 2.08 Unless indicated otherwise, all exposed metallic parts, piping, trim, fittings, accessories, appurtenances, etc. associated with plumbing fixtures shall be polished chrome finished when available. Provide polished chrome plated brass escutcheons on piping at all exposed structure penetrations (walls, floors, ceilings, casework, etc.), and at all fixture connections.
- 2.09 At all handicap access lavatories and/or sinks with exposed supply and drain piping below, provide pre-fabricated closed cell vinyl insulation/cover assemblies with seamless PVC jacket for all supply (full range of hot, cold and tempered) and drain piping. Assembly to be similar to McGuire Pro-Wrap series. Offset drains (if used) to be provided with cover assemblies specifically designed for same. Assemblies to be listed by manufacturer as handicap access compliant.
- 2.10 Provide tempering valves at all public lavatories. set outlet at lavatory to be at 109.9 degrees Fahrenheit.
- 2.11 Shower valve and shower head and arm as manufactured by Moen, American Standard or Kohler may be furnished at the Contractor's option.

PART 3 EXECUTION

- 3.01 Chrome plated brass escutcheons shall be installed on waste and supply piping penetrating walls and floors in exposed locations.
- 3.02 Provide individual **chrome plated brass** accessible stop valves on all fixture and equipment supply piping.
- 3.03 Furnish fixture carriers where specified to suit wall construction as indicated on Architectural Drawings. Carriers to be anchored securely to floor.
- 3.04 Install all fixtures according to manufacturer's recommendations.
- 3.05 Individual fixture connections sized as indicated in Section 22 11 00, "DOMESTIC WATER PIPING SYSTEMS", unless directed otherwise.

- 3.06 Mounting heights of fixtures and associated equipment as indicated on the Architectural drawings.
- 3.07 Install vandal resistant 0.5 gpm flow restrictors on all lavatory faucets in public access areas, similar to Chicago Faucet Model Number E-2805.
- 3.08 Provide insulation on hot water, cold water and drain piping exposed below handicap access lavatories. See Section 22 07 00, PLUMBING INSULATION for requirements.
- 3.09 At all countertop or other casework conditions, verify exact location and installation of all items with Architectural documentation before any work is performed. Coordinate installation with the General Contractor.
- 3.10 At handicap access water closet enclosures, verify "wide side" of enclosure from Architectural Drawings and provide flush valve assemblies with handle in corresponding location to comply with A.D.A. requirements.
- 3.11 All handicap access fixture controls, including faucets and flush valves, to be provided with operators requiring 5 lb. pressure or less for operation.
- 3.12 Provide a floor mounted fixture carrier for all wall mounted lavatories and all electric water coolers.

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MECHANICAL SPECIFICATIONS

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SECTION 23 01 05

MECHANICAL GENERAL PROVISIONS

PART 1 GENERAL

1.01 REFERENCE

- A. The Contractor for this work is referred to Instructions to Bidders, General Conditions and Division 1 - General Requirements, as a part of this Contract.

1.02 GENERAL REQUIREMENTS

- A. Furnish all labor, materials, tools, incidentals and details necessary to provide a complete mechanical system, ready to operate, including but not limited to the items listed under the Mechanical Specification Indexes.
- B. Include any minor details essential to successful operation and any other items specified or shown on the Drawings.
- C. The Contractor is required to read the Specifications covering all branches of the work and will be held responsible for coordination of his work with work performed under all other Contracts.
- D. The Contractor is required to visit the site and fully inform himself concerning all conditions affecting the scope of his work. Failure to visit the site shall not relieve the Contractor from any responsibility in the performance of his Contract.
- E. All questions shall be referred to the owner's representative in the form of RFI's as set forth in the General Conditions.
- F. Other than minor adjustments shall be submitted to the Architect/Engineer for approval before proceeding with the work.
- G. The Contractor shall submit on the "Form of Proposal", along with the Bid, the manufacturer's name and the names of all Subcontractors to whom he intends to sublet the work. If the Contractor fails to provide this information with the Bid, the Engineer shall have the right to select the manufacturers and Subcontractors with no additional charge.
- H. Scheduling of all work performed by this Contractor shall be completely coordinated with the Architect/Engineer.
- I. This Contractor shall furnish to the Architect/Engineer a written description of procedure on this job including scheduling of the work to be done for his approval. This shall be submitted within 10 days after the Contract is awarded. There shall be six (6) copies.

- J. Arrangements for storage of tools and material, removal of debris, and interruptions of services shall be made with the Building Foreman.
- K. All connections to, or revisions in, existing piping or facilities shall be done at such time as agreed to by the Engineer and Owner and all work shall be scheduled as required under "General Conditions". Revisions to the existing piping systems must be done with the minimum of shutdown time. All piping shall be run to the point of new connections and new equipment installed and ready to operate before any connections are to be made.
- L. Extreme care shall be taken to avoid interference with the Owner's equipment, especially in the existing portion of the building. Consult with the Architect/Engineer regarding any points where interference is likely to occur and follow dimensions carefully where given on the Drawings.
- M. It is mandatory that dust and debris be held to a minimum. This Contractor shall provide drop cloths, screens, curtains, etc., to protect Telephone Company equipment and personnel from dust and dirt during the course of his work. All damage to existing construction or finishes shall be repaired by this Contractor upon removal of dirt and dust protection devices. All dirt, dust and other protection devices shall be approved by the Architect/Engineer before any work is started in the area involved.
- N. The Contractor, insofar as this Contract is concerned, shall at all times keep the premises and the building in a neat and orderly condition. This includes using a vacuum cleaner as required.
- O. At the completion of the project, this Contractor shall promptly clean up and remove from the site, all debris and excess materials.
- P. All manufactured products must be in compliance with Section 1605 of the American Recovery Act of 2009, Subpart B, Buy American Requirement.

1.03 DRAWINGS

- A. Consult all Contract Drawings which may affect the locations of any equipment, apparatus, piping and ductwork and make minor adjustments in location to secure coordination.
- B. Piping layout is schematic and exact locations shall be determined by structural and other conditions and verified in the field. This shall not be construed to mean that the design of the system may be changed, it refers only to the exact location of piping and ductwork to fit into the building as constructed, and the coordination of all work with piping and equipment included under other Divisions of the Specifications.

- C. The Owner's Representative reserves the right to make minor changes in the location of piping and equipment up to the time of rough-in without additional cost to the Owner.
- D. Where certain grades and/or elevations are given on the Drawings, they have been obtained from the best information available; however, they are not guaranteed. This Contractor MUST assume the full responsibility of verifying present elevations in the field and making any adjustments as may be necessary, all of which must be included in his Bid Price.
- E. Due to the scale of the Drawings, it is impossible to show all offsets and transitions which may be required. This Contractor shall carefully investigate the conditions affecting all work and shall furnish all elbows, fittings, transitions, etc., required to accomplish the desired result at no additional cost to the Owner.
- F. Install all work as close as possible to walls, structural members, etc., consistent with the proper space for covering, access, etc., so as to occupy the minimum of space and allow as much space as possible between ductwork, piping, etc. and the ceiling.
- G. Actual dimensions shown on the Drawings and field dimensions shall take precedence over scaled dimensions.

1.04 PERMITS, INSPECTIONS AND CODES

- A. The HVAC Contractor will obtain the general building permit. Any other permits required for the project will be obtained by the Contractor performing the work. Fees will be included in the bid price.
- B. Completed installations shall conform with all applicable Federal, State and Local Laws, Codes and Ordinances, including but not limited to the latest editions of the following:
 - 1. Ohio Building Code, as administered by the City of Columbus Building Department.
 - 2. Specific Safety Requirements Relating to Building and Construction Work, Industrial Commission and Department of Industrial Relations, State of Ohio.
 - 3. Specific Safety Requirements Covering the Installation of Mechanical Refrigeration Systems and Equipment, Industrial Commission and Department of Industrial Relations, State of Ohio.
 - 4. National Electrical Code, Bulletin No. 70, National Fire Protection Association.
 - 5. Air Conditioning and Ventilating, Bulletin No. 90 A, National Fire Protection Association.

6. Life Safety Code, Bulletin No. 101, National Fire Protection Association.
 7. All Work Under Jurisdiction of Local Fire Prevention Authority/Fire Department shall conform to requirements set forth by that office and the National Fire Protection Association.
 8. State of Ohio Environmental Protection Agency (EPA) guidelines.
 9. City of Columbus Building Code.
- C. Nothing contained in the Plans and Specifications shall be construed to conflict with these laws, codes and ordinances and they are hereby made a part of these Specifications.
- D. When the work is completed, the Contractor shall furnish the Owner's Representative (through the HVAC Contractor) a Certificate of Inspection and Approval from the Local Board of Health before final payment of the Contract will be allowed.

1.05 OHIO ENERGY CODE

- A. The Mechanical System must comply with all requirements of the State of Ohio "Code of Energy Conservation". This includes, but is not limited to, efficiencies, power factors, insulation thickness, etc.

1.06 UTILITIES

- A. The Contractor shall investigate and locate all utilities prior to construction.
- B. Each Contractor is responsible for rerouting or replacing existing utilities where necessary to permit installation of his work.
- C. Support, protection and restoration of all existing utilities and appurtenances shall be the responsibility of the Contractor. The cost of this work shall be included in the price bid for the various items.
- D. The Contractor shall cause notice to be given to the Ohio Utilities Protection Service (telephone 800-362-2764 - toll- free) and to the Owners of underground utility facilities shown on the plans who are not members of a registered underground protection service in accordance with Section 153.64 of the Revised Code. The above mentioned notice shall be given at least 48 hours, excluding Saturdays, Sundays and legal holidays, prior to commencing work.
- E. The Contractor shall alert immediately the occupants of nearby premises as to any emergency that he may create or discover on or near such premises of the underground facility, any break or leak on its lines or any dent, gouge, groove or other damage.

1.07 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. This Contractor shall thoroughly instruct and supervise the Owner's Maintenance Personnel in the proper operation and maintenance of the mechanical system equipment. This Contractor shall be responsible for arranging for the instruction and supervision at a time convenient to the Owner or his representative and for notifying the Owner's Representative of the time at least 48 hours in advance. All training and instruction shall be coordinated through the HVAC Contractor

Instructions shall include the following:

1. Location of equipment and explanation of what it does.
 2. Reference to "Operating Instruction Manuals" for record and clarity.
 3. Coordination of written and verbal instruction so that each is understood by all personnel.
 4. Specific maintenance to be performed by Owner.
- B. This Contractor shall furnish three (3) copies of the printed Operating and Maintenance Instructions for the Mechanical Systems for review. Each copy shall be neat, legible and bound in a hard back 3-ring notebook. Instructions shall consist of the following items:
1. Manufacturer's maintenance manuals for each item of equipment furnished under this Contract. Manuals shall include such items as parts lists, detailed lubrication instructions, procedures for performing normal maintenance functions, preliminary trouble shooting procedures and wiring diagrams.
 2. Complete wiring diagrams for the mechanical systems as actually wired including control and interlock wiring.
 3. Brief but complete instructions for start-up, shut- down and routine maintenance of each system.
 4. Copy of corrected shop drawing for each item of equipment furnished under this Contract.

1.08 RECORD DOCUMENTS

- A. The Contractor shall keep an accurate record of all deviations from Contract Drawings and Specifications. He shall neatly and correctly enter in colored pencil any deviations on Drawings affected and shall keep the Drawings available for inspection. Extra sets of Drawings will be furnished for this purpose.
- B. At the completion of project and before final approval, make any final corrections to Drawings and certify to the accuracy of each print by signature and deliver same to the Owner's Representative through the HVAC Contractor. See General Conditions for further requirements.

1.09 SUPERVISION

- A. This Contractor shall have in charge of the work, on the job during construction, a competent superintendent experienced in the work installed under this Contract.

1.10 UNACCEPTABLE WORK AND OBSERVATION REPORTS

- A. Work shall be unacceptable when found to be defective or contrary to the Plans, Specifications, Codes specified or accepted standards of good workmanship.
- B. The Contractor shall promptly correct all work found unacceptable by the HVAC Contractor or Architect whether observed before or after substantial completion and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting such unacceptable work, including compensation for the HVAC Contractor or Architect additional services made necessary thereby.
- C. During the course of construction, the Engineer will prepare "Observation Reports" with a list of items found to be in need of correction. All items listed shall be corrected by the Contractor. A space is provided on the form for the Contractor to note the completion of each item. All prior "Observation Report" items must be completed, the lists signed and returned to the Engineer prior to making the final inspection. After the final list is issued, the same procedure will apply.

1.11 FINAL INSPECTION

- A. When the Contractor determines all work is completed and working properly per the Contract Documents, he shall request a "final" inspection by the Owner's Representative in writing. If more than one reinspection is required after this final inspection, the Contractor shall bear all additional costs including compensation for the Owner's Representative's additional services made necessary thereby. A final inspection will not be made until Operating and Maintenance Manuals and Air Balance Reports are submitted and approved and all prior "Observation Report" punch lists completed, signed and returned to the Engineer.

1.12 GUARANTEE

- A. This Contractor is responsible for all defects, repairs and replacements in materials and workmanship, for a period of one (1) year after final payment is approved by the Owner's Representative.

PART 2 PRODUCTS

Not Applicable.

PART 3 EXECUTION

Not Applicable.

END OF SECTION

SECTION 23 01 10

MANUFACTURER'S DRAWINGS

PART 1 GENERAL

1.01 SCOPE

- A. The Contractor shall submit to the Owner's representative for review, within one week after date of contract, ten (10) copies of manufacturer's drawings, wiring diagrams, pump and fan curves or data. The Engineer will review Contractor's shop drawings and related submittals (as indicated below) with respect to the ability of the detailed work, when complete, to be a properly functioning integral element of the overall system designed by the Engineer. Before submitting a shop drawing or any related material to the General Contractor, Contractor shall: review each such submission for conformance with the means, methods, techniques, sequences, and operations of construction, and safety precautions and programs incidental thereto, all of which are the sole responsibility of Contractor; approve each such submission before submitting it; and so stamp each such submission before submitting it. The Engineer shall assume that no shop drawing or related submittal comprises a variation unless Contractor advises Engineer otherwise via a written instrument which is acknowledged by Engineer in writing. The shop drawings and related material (if any) called for are indicated below:

Heating, Ventilating and Air Conditioning Contract

Condensing units
Condensing unit Hail Guard
Cooling Coil
Furnace
Exhaust Fan
Ductwork
Air Devices

- B. The Engineer shall return shop drawings and related materials with comments provided that each submission has been called for and is stamped by Contractor as indicated above. The Engineer shall return without comment material not called for or which has not been approved by Contractor.
- C. This Contractor shall furnish equipment shop drawings which will indicate power hook up and control connections as required for mechanical equipment. "Stock" wiring diagrams are NOT ACCEPTABLE.
- D. The manufacturer shall provide a statement on submittals that equipment furnished complies with the Ohio Energy Code. This previously relates to high efficiency motors, EER's, COP's, etc. If this is not done, submittals will be rejected.

- E. Engineer's review of manufacturer's drawings or schedules shall not relieve the Contractor from compliance with the requirements of the plans and specifications.

1.02 QUANTITIES

- A. Items may be referred to in singular or plural on Plans and Specifications. Contractor is responsible for determining quantity of each item.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

Not Applicable

END OF SECTION

SECTION 23 05 13

ELECTRICAL WORK

PART 1 GENERAL

1.01 REFERENCE

- A. Section 23 01 05 - Paragraph 1.05 - OHIO ENERGY CODE
- B. Division 26 - ELECTRICAL

1.02 SCOPE

- A. Electrical components and connections required for replacement of condensing units shall be furnished and installed by the Electrical Contractor except where specifically specified to be furnished with certain mechanical equipment.

1.03 WORK INCLUDED - This Contractor:

- A. All control wiring unless otherwise specified.
- B. 120 volt wiring required for mechanical equipment when not shown or specified elsewhere.

1.04 WORK INCLUDED - Electrical Contractor.

- A. All power wiring.
- B. All conduit and wiring incidental to Temperature Controls, including switches, controls, transformers and relays shall be by the Heating Contractor, except wiring as indicated on the Electrical Drawings will be by the Electrical Contractor.

1.05 SHOP DRAWINGS:

- A. The Contractor shall furnish to the Electrical Contractor, equipment shop drawings which will indicate power hook-up and control connections as required for mechanical equipment. "Stock" Wiring Diagrams are Not Acceptable.

PART 2 PRODUCTS

- 2.01 Refer to Section 15005 - Paragraph 1.05 for "Energy Code" requirements (Particularly power factor correction)
- 2.02 Refer to Division 26 - ELECTRICAL.
- 2.03 Disconnects are provided and installed by the Electrical Contractor, unless part of packaged equipment furnished by this Contractor, or otherwise specified.

PART 3 EXECUTION

- 3.01 All wiring, conduits, etc., shall be in strict accordance with the requirements of the latest edition of the National Electrical Code and Division 16, Electrical specification.
- 3.02 Low voltage wiring may be size and type recommended by the Manufacturer of the equipment for which the wiring is used.

END OF SECTION

SECTION 23 05 23

VALVES

PART 1 GENERAL

1.01 SCOPE

- A. Furnish and install all necessary valves for piping systems and equipment in the building required to provide proper shut off and balancing of systems included under this Contract.

PART 2 PRODUCTS

2.01 Check valves shall be manufactured in the USA and shall all be by the same manufacturer.

2.02 Ball valves shall be as manufactured in the USA. All ball valves to be by the same manufacturer.

2.03 BALL VALVES

- A. 2-1/2" size and smaller shall be two-piece bronze body ball valve, screwed piping connections, union connection body, teflon seats, conventional port, blowout proof stem, adjustable packing gland, chrome plated bronze ball, and lever handle labeled for service controlled. Rated for 150 S.W.P. and 400 WOG. Equal to Apollo 70-300 Series.

2.04 Drain valves shall be ball valves as specified above.

2.05 Check Valves

- A. 2-1/2" and smaller - all bronze, horizontal swing check with bronze or TFE disc, screwed, 125 lb. S.W.P.
- B. Clow, McAlear, Mueller or Metraflex non-slam check valves are acceptable manufacturers as well as previously listed manufacturers.

2.06 Combination Balance and Stop Valve - Bell and Gossett "Circuit Setter Plus", bronze body, screwed combination balance and stop ball valve. Valves to have readout ports, 1/4" drain port, memory stop indicator, calibrated nameplate, 300 lb. W.O.G. Same type USA manufactured stop and balance valves may be furnished at the Contractor's option.

PART 3 EXECUTION

3.01 This Contractor shall install all valves in strict accordance to the manufacturer's recommendations.

- 3.02 Where the Drawings call for both a shut-off valve and a balance valve or fitting, the Contractor may, at his option, furnish a combination balance and stop valve.
- 3.03 Where drain lines are not piped to floor drains, furnish hose end adapters. Provide caps for all hose end adapters. Hose thread outlets connected to domestic/potable water piping systems shall be provided w/ permanently affixed listed backflow assemblies.

END OF SECTION

SECTION 23 05 28

SLEEVES AND COLLARS

PART 1 GENERAL

1.01 SCOPE

- A. This Contractor shall furnish sleeves for his work to the General Contractor, who installs where directed by this Contractor. Coordinate carefully.
- B. Sleeves shall be provided through all new masonry construction.

PART 2 PRODUCTS

- 2.01 Sleeve material: 22 gauge galvanized sheet metal sleeves large enough to allow 1/4" clearance all around pipe (around pipe covering refrigerant suction line), except use machine cut copper sleeves for uninsulated copper pipe.

PART 3 EXECUTION

- 3.01 Sleeves in partitions to have length equal to the thickness of finished partitions. Sleeves in floors of finished areas to project 1/8" above finished floor. Sleeves in floors of non-finished areas to project 3" above finished floor. Fill space between pipe and sleeves into exposed areas with sealing compound. Ream all sleeves before installing.
- 3.02 Where pipes pass through fire rated walls, the space between the pipe and sleeve shall be filled with packing to maintain fire integrity.
- 3.03 All insulated pipes passing through floors in exposed locations shall have 20 gauge galvanized sheet metal insulation protectors from floor to 12" above floor.
- 3.04 Cutting required of any masonry wall or floor after it is in place shall be done by core drilling.
- 3.05 Piping not allowed to bear on sleeves.
- 3.06 Sleeves shall be installed plumb and true to line, grade, and position.
- 3.07 Unused sleeves shall be plugged and finished to match adjacent surface.

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END OF SECTION

SECTION 23 05 29

INSERTS, PIPE HANGERS AND SUPPORTS

PART 1 GENERAL

1.01 SCOPE

- A. Furnish and install all necessary inserts, clamps and auxiliary steel for pipe hangers in the building.
- B. Furnish and install necessary pipe hangers and supports to properly support all piping and to maintain uniform elevation.

PART 2 PRODUCTS

2.01 HANGERS

- A. Hangers for copper lines, 2" and smaller, shall be similar to Grinnell Fig. CT-99, adjustable carbon steel pipe ring, with 3/8" hanger rods. All copper plated.
 - B. When copper lines are insulated and hangers are sized for outside of insulation, provide steel hangers as described below.
 - C. Hangers for steel lines 2" and smaller shall be similar to Grinnell Fig. 97, adjustable pipe ring, galvanized steel band with 3/8" hanger rods.
 - D. Hangers for refrigerant suction lines shall be sized for outer diameter of insulation. Furnish half round 20 gauge galvanized sheet metal insulation protectors at least 12" long similar to Grinnell Fig. 167 on bottom half of insulation for suction lines at each pipe hanger.
- 2.02 B-Line, F & S, Elcen, Penn, Fee-Mason, PHD Manufacturing or Modern Pipe Hangers of the same type may be furnished at the Contractor's option.

PART 3 EXECUTION

- 3.01 Riser clamps shall be used at each floor where required.
- 3.02 Wall bracket pipe supports shall be installed where required.
- 3.03 All copper piping is to be shielded from steel pipes or electrical conduit with sheet lead or electrical tape wherever pipes would touch each other.
- 3.04 Galvanized hangers and strap hangers will not be permitted for supporting copper lines except for hangers sized for outside of insulation.

- 3.05 Provide pipe anchors and guides where and as indicated on the Drawings and elsewhere as required to properly control pipe. Method to suit job conditions.
- 3.06 Piping to be supported according to the following schedule. Support at intervals not to exceed spacing listed or elsewhere as required in accordance with good workmanship. If the piping manufacturer recommends more stringent (closer spaced) requirements than those indicated herein, the manufacturer's recommendations shall be followed. No pipe shall be supported from another pipe. All hangers shall be plumbed before insulation is applied and all hangers shall be double nutted.

<u>SPACING</u>					
<u>(1) Steel Pipe</u>			<u>(2) Copper Pipe</u>		
<u>Pipe Size</u>	<u>Rod</u>	<u>Spacing</u>	<u>Pipe Size</u>	<u>Spacing</u>	
Thru 1"3/8"		7'0"	Thru 3/4"	6'0"	
1-1/4"	3/8"	9'0"	1"	7'0"	
1-1/2"	3/8"	9'0"	1-1/4"	9'0"	
2"	3/8"	10'0"	2"	9'0"	

- 3.07 Support piping at equipment from floor, ceiling, or walls, so that piping weight is not supported directly from equipment.

END OF SECTION

SECTION 23 05 90

INSTALLATION OF PIPING

PART 1 GENERAL

1.01 REFERENCE

- A. Section 23 05 28 - SLEEVES AND COLLARS
- B. Section 23 05 29 - INSERTS, PIPE HANGERS AND SUPPORTS

1.02 SCOPE

- A. The requirements of this Section shall apply to all interior piping systems installed under this Contract, except where otherwise noted on the Drawings or elsewhere in the Specifications.

PART 2 PRODUCTS

Not Applicable.

PART 3 EXECUTION

- 3.01 All piping systems shall be installed with adequate provisions made for expansion and contraction to prevent stresses on piping, valves and equipment. Anchor and guide piping at all points indicated and/or as required. Type and method of anchoring, guiding and attachments to sustaining members to suit job requirements and conditions and shall be approved by the Owner's Representative.
- 3.02 Make proper connections to all items of equipment in the Contract as recommended by the Manufacturer or as detailed on the Drawings.
- 3.03 All piping shall be arranged in accordance with the best standards of the trade with vertical pipes plumb and horizontal runs parallel or perpendicular to the building wall.
- 3.04 Ream ends of pipe and clean before installing.
- 3.05 All joints in copper piping shall be made with 95-5 solder. Solders and fluxes containing lead are prohibited.
- 3.06 Make all changes of direction with fittings, rather than bending.
- 3.07 Where piping is installed in accessible chases, keep all piping to sides of chase, except portions which must necessarily be in center of chase. Offset vents to side immediately above connection to waste line. All lateral runs are to be located at the floor or minimum 6'-0" above floor, and all vertical piping held close to the wall through that height leaving maximum service space.

- 3.08 At the end of each day's work and otherwise as required for the safety of the tenants or as directed, provide caps and/or plugs at all openings in piping for protection. Particular attention must be given to avoid the possibility of any foreign materials entering the pipes, whether it be inadvertent or with malicious intent.

END OF SECTION

SECTION 23 05 94

PROTECTION AND CLEANING

PART 1 GENERAL

Not Applicable.

PART 2 PRODUCTS

Not Applicable.

PART 3 EXECUTION

- 3.01 Protect all mechanical equipment against damage from any cause whatsoever and pay the cost of replacing and repairing equipment made necessary by failure to provide suitable protection.
- 3.02 After all piping, equipment and ductwork has been approved and after all plastering has been completed, bare piping and insulation provided under this Contract shall be thoroughly cleaned of dirt, grease, rust and oil, and primed (where necessary), ready for painting.
- 3.03 Repair all dents and scratches in factory prime or finish coats on all mechanical equipment, including plumbing fixtures.
- 3.07 Cover all motors, fans, open pipes, etc., to keep out dirt, water and weather during construction.
- 3.08 This Contractor shall clean up and remove all debris from the site and shall at all times keep the premises in a neat and orderly condition.

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END OF SECTION

SECTION 23 05 97

REMODELING

PART 1 GENERAL

1.01 REFERENCE

- A. Division 1 - GENERAL REQUIREMENTS
- B. Section 23 05 98 - DEMOLITION

1.02 SCOPE

- A. This Contractor shall include the remodeling of and additions to all mechanical work in the areas indicated on the Mechanical Drawings and in all areas affected by the above. All necessary or required remodeling or additions to the present mechanical work shall be included in this Contract.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

- 3.01 In all of the remodeling work the mechanical work shall follow the intent of the Mechanical Specification insofar as possible with regard to material and workmanship.
- 3.02 All piping and ductwork installed in the remodeling work shall be installed as shown on drawings. This Contractor shall do all cutting and patching required.

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END OF SECTION

SECTION 23 05 98

DEMOLITION

PART 1 GENERAL

1.01 SCOPE

- A. This Contractor shall be responsible for removal of and modifications to the existing piping and equipment as hereinafter noted and as shown on the Drawings. All material removed and not reused in remodeling shall become the property of this Contractor and promptly removed from the site unless the Owner specifically asks to retain certain equipment. This Contractor is responsible for determining if the Owner wishes to retain the existing equipment before it is removed from the site. Coordinate with the Owners representative.
- B. This Contractor shall remove existing piping, equipment and appurtenances, etc., as shown on the Drawings and as specified.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

- 3.01 Relocate existing equipment as shown on the Drawings.

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END OF SECTION

SECTION 23 23 00

REFRIGERANT PIPING SYSTEM

PART 1 GENERAL

1.01 REFERENCE

- A. Section 23 05 30 - INSTALLATION OF PIPING

1.02 SCOPE

- A. Provide a complete system of refrigerant piping from outdoor split system condensing units to the associated air handling units as shown on the Drawings.
- B. All refrigerant piping shall be installed for minimal pressure drop.

PART 2 PRODUCTS

- 2.01 Pipe - Type L-ACR hard dehydrated scale free copper tubing. Per manufacturer's recommendation.
- 2.02 Fittings - wrought copper, solder type.
- 2.04 Shut-off valves in refrigerant lines shall be similar to Henry, balanced-acting diaphragm type with brass body, solder type ends, composition seat disc, a laminated metal diaphragm, positive back seat with valve in full open position and ball check for sealing balancing channel during diaphragm inspection.

PART 3 EXECUTION

- 3.01 Install all refrigerant piping according to ASHRAE 15.
- 3.02 Install piping in short and direct arrangement, with minimum number of joints, elbows, and fittings.
- 3.03 Arrange piping to allow normal inspection and service of compressor and other equipment. Install valves and specialties in accessible locations to allow for service and inspection.
- 3.04 Install piping with adequate clearance between pipe and adjacent walls and hangers, or between pipes for insulation installation. Use sleeves through floors, walls, or ceilings, sized to permit installation of full-thickness insulation. Maximum fill: 40%
- 3.05 Properly clean ends of all tubing before soldering or brazing.
- 3.06 All joints in split system refrigerant piping shall be made with 95/5 solder.

- 3.07 Brazing Filler Metals: AWS A5.8, Classification BAg-1 (Silver).
- 3.08 During construction, this Contractor shall take precaution to minimize contamination of system by dirt, scale, moisture or other foreign matter. All foreign material and moisture in the system shall be removed.
- 3.09 This Contractor shall provide oil for compressors and proper refrigerant charges for systems.
- 3.10 Refrigerant pipe size and configuration for split systems shall be per the manufacturer recommendation. If a manufacturer other than the basis of design is chosen to provide the air handling units and condensing units, the HVAC Contractor shall be responsible for all additional accessories and appurtenances required by the actual manufacturer to make the units suitable for use with this project.
- 3.11 Refrigerant pipe size and configuration for the VRV systems shall be coordinated with the VRV equipment manufacturer.
- 3.12 A quality installation is critical to avoid functional problems and to maximize the system reliability and service life. Arbitrary changes due to field conditions or contractor preferences can drastically affect the results; all revisions must be coordinated with the Owner's Representative.
- 3.13 Due to the risk of tenants puncturing the refrigerant piping while driving screws or nails into the walls, all refrigerant piping passing through apartment unit walls must be shielded with nail plates or other methods to protect piping.
- 3.14 All refrigerant suction lines shall be insulated per specification 23 07 00, inside and outside of the building. Do not install insulation until system testing has been completed and all leaks have been eliminated.
- 3.15 Support all refrigerant piping above the roof with polycarbonate pillow block type pipe stands equal to Miro Industries Model 1.5 or Model 3-R. Support all piping a minimum of 6 feet on center.
- 3.16 Slope refrigerant piping as follows: Install horizontal suction lines with a uniform slope of 0.4 percent downward to compressor. Install traps and double risers where indicated and where required to entrain oil in vertical runs. Liquid lines may be installed level. Per manufacturer's recommendation.
- 3.17 Use fittings for changes in direction and branch connections.
- 3.18 Reduce pipe sizes using eccentric reducer fittings installed with level side down.
- 3.21 When brazing, remove solenoid-valve coils; remove sight glasses; and remove stems, seats, and packing of valves, and accessible internal parts of refrigerant specialties. Do not apply heat near bulb of expansion valve.

- 3.22 Charge and purge systems, after testing, dispose of refrigerant following ASHRAE 15 procedures.
- 3.23 Install hangers for copper tubing with the following maximum spacing and minimum rod sizes. Tube sizes are nominal or standard tube sizes as expressed in ASTM B88.
 - A. 1/2 Inch: Maximum span, 60 inches; minimum rod size, 1/4 inch.
 - B. 5/8 Inch: Maximum span, 60 inches; minimum rod size, 1/4 inch.
 - C. 1 Inch: Maximum span, 60 inches; minimum rod size, 1/4 inch.
 - D. 1-1/4 Inches: Maximum span, 72 inches; minimum rod size, 1/4 inch.
 - E. 1-1/2 Inches: Maximum span, 96 inches; minimum rod size, 3/8 inch.
- 3.24 Install permanent filter dryers in low-temperature systems using hermetic compressors, and before each solenoid valve.
- 3.25 Fill pipe and fittings with an inert gas (nitrogen or carbon dioxide) during brazing to prevent formation of scale.
- 3.26 Install refrigerant valves according to manufacturer's written instructions.
- 3.27 Inspect and test refrigerant piping according to ASME B31.5, Chapter VI. Pressure test with nitrogen to 200 psig. Perform final tests at 27-psig vacuum and 200 psig using halide torch or electronic leak detector. Test to no leakage.
- 3.28 Test and adjust controls and safeties. Replace damaged or malfunctioning controls and equipment.
- 3.29 Adjust thermostatic expansion valve to obtain proper evaporator superheat requirements.
- 3.30 Before installation of copper tubing other than Type ACR, clean tubing and fittings with trichloroethylene.
- 3.31 Charge system using the following procedures:
 - A. Install core in filter dryer after leak test, but before evacuation.
 - B. Evacuate refrigerant system with vacuum pump until temperature of 35 deg is indicated on vacuum dehydration indicator.
 - C. During evacuation, apply heat to pockets, elbows, and low spots in piping.
 - D. Maintain vacuum on system for minimum of 5 hours after closing valve between vacuum pump and system.
 - E. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig.

- F. Complete charging of system, using new filter-dryer core in charging line. Provide full-operating charge.

END OF SECTION

SECTION 23 21 13.33

CONDENSATION DRAIN AND DRAIN PIPING SYSTEMS

PART 1 GENERAL

1.01 REFERENCE

Section 23 05 00 - COMMON WORK RESULTS FOR HVAC
Section 23 07 00 - HVAC INSULATION

1.02 SCOPE

- A. Provide condensation drain piping from outlets on drain pans of all cooling coils, and run indirect to floor drains and elsewhere as shown on the Drawings.
- B. Provide drain piping from drain valves and overflows to floor drains and elsewhere as indicated.

PART 2 PRODUCTS

2.01 PIPE

- A. Type "L" hard copper, minimum size 3/4 inch. Specify that wrought copper fittings with sweat joints of 95-5 solder be used. Trap drain lines and run to suitable drains.

2.02 Fittings cast brass drainage fittings.

PART 3 EXECUTION

- 3.01 Provide cleanouts at traps and in the piping system where pipe changes direction.
- 3.02 Pitch all condensation and other drain lines down a minimum of 1/8" per foot in the direction of flow.
- 3.03 Prior to leaving the jobsite, the HVAC Contractor shall flood the cooling coil drain pans with the units operating to verify that the drain pans are draining properly.

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END OF SECTION

SECTION 23 31 13.13 LOW PRESSURE DUCTWORK

PART 1 GENERAL

1.01 REFERENCE

- A. Section 23 07 00- HVAC INSULATION
- B. Section 23 37 00 - REGISTERS, GRILLES AND DIFFUSERS
- C. Section 23 33 13 - DAMPERS

1.02 SCOPE

- A. Furnish, install and insulate low pressure sheet metal work and appurtenances with sizes as shown on Drawings.
- B. All sheet metal work including ductwork, dampers, etc., shall be fabricated in accordance with the recommendations of the Sheet Metal and Air Conditioning Contractors National Association, Inc., (SMACNA) latest edition of the FOLLOWING:
 - 1. HVAC DUCT CONSTRUCTION STANDARDS, Metal and Flexible.
- C. This Contractor is to provide 1/4" scale reproducible sepias of sheet metal drawings for use in coordinating work of Plumbing, and Electrical with layout of air distributions system and related work. Lighting, ceiling grid and all ceiling access doors will be shown lightly to verify coordination. All valves shall be shown on the coordination drawings. HVAC Contractor to provide initial sepias within 60 days of award of contract. Each Prime Contractor is responsible for overlaying his work onto these sepias; for providing information as to size, elevation and location proposed for all components; and for coordination of his work with that of other Contractors. Final resolution of all items to be determined at project meetings held by Associate.
- D. All ducts joists shall be sealed with duct sealer.

PART 2 PRODUCTS

2.01 Sheet Metal Ductwork:

- A. Unless otherwise noted, all sheet metal ducts and plenums shall be fabricated of lock forming quality, hot-dipped galvanized steel sheets and shall comply with 2" w.g. pressure class construction. Metal gauges shall be in accordance with current SMACNA Standards.
- B. Flexible duct shall comply with NFPA requirements, Pamphlet 90A, and shall be UL listed with flame spread rating of 25 or less and smoke developed rating of 50 or less. Duct shall be a factory fabricated assembly composed of: an inner duct of woven and coated fiber glass providing an air seal and bonded permanently to

corrosion resistant coated steel wire helix and 1" thick fiber glass insulating blanket and low permeability outer vapor barrier of fiber glass reinforced metallized film laminate.

Flexible duct shall be terminal duct for air system and shall not exceed 5 feet in length. Do not make more than one (1) 90 degree bend with flexible duct. Bend radius shall be minimum of two (2) times duct diameter.

1. Flexible duct shall be Thermaflex MKC.
 2. Duct shall be rated for minimum 10" W.G. internal working pressure, for all duct sizes.
 3. Vinyl, clear plastic or mylar type liners are expressly prohibited.
 4. Flexmaster Type 3M insulated flexible duct meeting all specified requirements may be furnished at the Contractor's option.
- C. All fan flexible connections shall be made with commercial grade neoprene coated glass fabric (heavy duty).
- D. All duct sealing compounds, mastics and duct tape shall meet NFPA 90A standards and shall be UL listed with ratings not to exceed 25 for flame spread and 50 for smoke development.
- E. Access doors shall be insulated, airtight, "hinged" and gasketed style, with a minimum of two quick action latches. Door shall be mounted in a galvanized steel frame with an inside "fold-over" flange for duct attachment. Door height shall be 24"; width shall be equal to the duct width or 12", whichever is less, unless otherwise shown or noted on drawings.
- F. Sealer for ducts shall be equal to 3M Model EC-800.
- G. Exhaust ducts designated on the Drawings as stainless steel construction shall be fabricated from Type 316, 18-8 stainless steel, Class A welded longitudinal seam. Metal gauges shall be one size smaller than specified for steel ducts, all dampers in stainless steel ductwork to be stainless steel.
- H. Duct and fittings in areas listed on drawings to be United Sheet Metal Company Type "P" Acousti-K27, 3" thick for exterior ductwork and 1-1/2" thick for interior ductwork, with inner and outer walls of zinc- coated steel spaced one inch apart with annular space uniformly packed with fiber glass insulation. Inner wall to be perforated for sound control. Provide with mylar cover over the fiber glass insulation to minimize insulation erosion. Mylar cover to enclose all surfaces of the insulation which is exposed to the airstream.
- A. All supply and exhaust/return air ductwork cross-hatched on the drawings. The double wall duct shall extend from the air conditioning unit on grade connection to the points indicated on the drawings for noise control. The double wall duct shall extend from the existing exhaust duct shown on drawings.

PART 3 EXECUTION

3.01 SHEET METAL DUCTS

- A. Except as noted or shown otherwise on the Drawings, all sheet metal work including ductwork, dampers, etc., shall be fabricated and supported in accordance with the recommendations of the SMACNA "HVAC Duct Construction Standards".
- B. Cross break all flat surfaces or reinforce with a bead approximately 5/16" wide x 3/16" deep on 12" centers, to prevent vibration on all ducts 19" maximum dimension and larger.
- C. Sheet metal plenums shall be single wall construction, reinforced with steel angles 2 ft. on center. Provide hinged access doors where shown on the Drawings. Provide close off sheet metal as required. Provide neoprene sponge gaskets between filter frames and housing for mixed air plenums. Gauges same as specified for ducts, unless otherwise noted. At the Contractor's option, sheet metal ducts and plenums may be put together using "Ductmate" or "TDC Lockformer" couplings.
- D. Seal all seams and joints in outside air plenums. Pitch plenums to low points and drain all low points in the system. All plenums to be watertight.

3.02 FLEXIBLE AND ROUND DUCT CONNECTIONS

- A. Connection of flexible and round ducts to rectangular ducts to be made with spin-in type fittings complete with damper with locking operator.

3.03 FITTINGS AND ACCESSORIES

- A. Install flexible connections in all duct connections to fans and air handling units, unless otherwise noted.
- B. Install manual balancing dampers with locking quadrants where shown on the Drawings and as required for proper balancing of the systems. Locking quadrants shall be easily accessible. On insulated ducts, locking quadrants shall be installed on outside of insulation.
- C. Install double turning vanes in all right angle elbows. Install 45° tap collar for branch ducts and register openings.
- D. Provide access doors in ducts to all fire dampers and elsewhere as shown on drawings unless otherwise noted. Access doors at fire dampers shall be located so that fire dampers may be reopened from them in case of fusible link failure.
- E. All duct joints in duct systems shall be made tight. Duct sealer shall be used to seal joints.

- F. All other round ductwork and fittings not mentioned shall be spiral lockseam construction equivalent to United Sheet Metal.
- F. The use of multi-piece adjustable angles and elbows is prohibited.

End of Section

SECTION 23 34 20

INLINE CEILING CABINET FANS

PART 1 GENERAL

1.01 REFERENCE

- A. Section 23 01 05, Paragraph 1.05 - ENERGY CODE
- B. Section 23 05 13 - ELECTRICAL WORK
- C. Section Section 23 31 13.13 - LOW PRESSURE DUCTWORK

1.02 SCOPE

- A. Furnish and install duct mounted inline exhaust fans and appurtenances with sizes and capacities as shown on the drawings.

PART 2 PRODUCTS

- 2.01 Inline ceiling cabinet fans based on Greenheck SP / CSP series with dynamically balanced forward curved centrifugal wheel, direct drive type motor, in embossed galvanized steel casing. Fans shall have a factory installed internal plug in type disconnect. The outlet duct collar shall include a spring loaded aluminum backdraft damper. The housing interior shall be lined with 0.5" acoustical insulation. SP series fans shall be furnished with non-yellowing high impact polystyrene intake grille attached to the housing with screws.
- 2.02 Fan ratings shall be AMCA certified and fan shall bear AMCA seals and shall be U.L. Listed.
- 2.03 Motor shall be 115/60/1 with built in thermal overload protection. The motor shall be mounted on vibration isolators.
- 2.04 Furnish fans with a factory mounted variable speed switch for balancing the fan system airflow.
- 2.05 Inline cabinet exhaust fans by ACME, Cook, Carnes or Twin City of the same type, size, capacity and meeting other specified requirements, may be furnished at the Contractor's option.

PART 3 EXECUTION

- 3.01 Provide flexible connections at inlet and discharge ducts.
- 3.02 Mount unit from vibration isolators furnished with the unit minimum 90% efficient.
- 3.03 Auxiliary steel for supporting units to be furnished and installed by the HVAC Contractor.

- 3.04 HVAC Contractor shall provide line voltage thermostats or humidistats for fan control where specified on the drawings.
- 3.05 Wiring of fans, line voltage thermostats and line voltage humidistats by the Electrical Contractor.
- 3.06 All ductwork for fans that discharge into the ceiling plenum space shall be lined.

END OF SECTION

SECTION 23 54 16.13

GAS-FIRED FURNACES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION

- A. Provide a furnace with a 95% or greater two-stage gas-fired multi-position gas furnace as noted on drawings.
- B. Coordinate equipment selection with the cooling coil and condensing unit.

1.03 RATINGS AND CAPACITY

- A. Size, capacity, arrangements, and location as indicated on the Drawings.

1.04 MOTORS

- A. Unless otherwise noted, high-efficiency motors shall be National Electrical Manufacturers Association (NEMA) Design B, continuous rated with 1.15 service factor, with Class F insulation and Class B temperature rise, copper windings and leads, 1,750 RPM with the horsepower indicated on the Drawings. All motors shall be equipped with ball bearings.

PART 2 PRODUCTS

2.01 UP-FLOW FURNACE

- A. Heavy-gauge cold roll steel cabinet, phosphatized, baked enamel finish, complete with foil-faced fiberglass insulation in heat exchanger section, large removable access doors, exhaust outlet, combustion air inlet, and filter rack with disposable filters. (Filters shall be easily removed without using screws. Quick-opening latches are acceptable.)
- B. Heat Exchanger Assembly: Entire assembly shall have a minimum 20-year warranty.
 - 1. Optional condensing furnace heat exchangers:
 - a. Primary: Aluminized steel.
 - b. Secondary: Corrosion-resistant polyethylene-coated or stainless steel, multi-pass, condensation chamber, with 3/4 in. condensation drain connection.
- C. Evaporator Section: Copper tube/aluminum fin evaporator coil, insulated galvanized steel drain pan, with 3/4 in. drain connection.
- D. Blower: Centrifugal type connected to multi-speed direct drive motor mounted resiliently to fan housing.

- E. Intake and Exhaust Piping: Schedule 40 PVC, including mufflers. Size as recommended by Manufacturer for longer runs. Pitch all horizontal runs upward away from equipment, at a minimum of 1/4 in. per ft. Provide roof termination kit.
- F. Controls: 24 volt, wiring junction box, step-down transformer, combination gas control valve, 7-day programmable room heating/cooling thermostat with FAN/OFF/AUTO and HEAT/AUTO/COOL subbases, and fan relay, fan, and high limit controls for community building. See note on drawings for thermostat for residential units.
- G. Acceptable Manufacturers: York, Lennox, Rheem, Bryant, or Trane.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Mount furnace on neoprene rubber pads.
- B. Secure unit to building structure.
- C. Provide all code-required clearances to combustibles.
- D. Plumbing Contractor shall provide gas piping final connection.
- E. Plumbing Contractor shall provide shut-off valve, dirt leg, and union for equipment connection.
- F. Install exhaust vent and combustion air intake pipe as recommended by Manufacturer.
- G. Provide roof penetration, and flashing.
- H. Oversize piping as recommended by Manufacturer for long runs.
- I. Adjust blower speed.
- J. Install flexible duct connections at supply and return connections to furnace.
- K. Install a set of filters for use during construction. Install a new set of filters at Contract Completion. Furnish a third set of filters to the Owner at Contract Completion.

3.02 EQUIPMENT ACCESS

- A. Locate all units to provide sufficient access to change filters, pull coils, or service other items requiring periodic maintenance.

3.03 WIRING

- A. Electrical Contractor shall provide disconnect switch and power wiring.
- B. Electrical Contractor shall provide control wiring.

END OF SECTION

SECTION 23 62 13

PACKAGED AIR-COOLED REFRIGERANT COMPRESSOR AND CONDENSER UNITS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION

- A. Provide factory-assembled and factory-tested air-cooled condensing units as scheduled on the Drawings, complete with compressors, refrigeration circuits, condensing coils, fans, and controls.
- B. Condensing unit efficiency shall be SEER as noted on drawings.

1.03 QUALITY ASSURANCE

- A. Standards:
 - 1. Underwriters Laboratories, Inc. (UL).
 - 2. Air-Conditioning and Refrigeration Institute, ARI 210-75, "Certified Unitary Air-Conditioner Equipment," and ARI 270-75, "Certified Sound-Rated Outdoor Unitary Equipment."

1.04 RATINGS AND CAPACITY

- A. Size, capacity, arrangements, and location as indicated on the Drawings.

1.05 ACCEPTABLE MANUFACTURERS

- A. York, Lennox, Bryant, Rheem, or Trane.

PART 2 PRODUCTS

2.01 AIR-COOLED CONDENSING UNITS

- A. Fully weatherproofed, galvanized steel, with zinc phosphate and baked-on enamel finish. Each unit shall match the capacity as required for its respective evaporator coil unit. Provide openings for all connectors and gasketed access panels for servicing and maintenance.
 - 1. Coil: Aluminum plate fins mechanically bonded to seamless copper tubing. Provide coil guard.
 - 2. Fans and Motors: Propeller-type vertical discharge, with permanently lubricated, resiliently mounted, direct-drive motors, UL-listed for outdoor use, with overload protection in windings, statically and dynamically balanced fans. Provide fan guard.
 - 3. Refrigerant: Unit shall utilize a non-CFC type refrigerant R-410A or an equivalent. R-22 is not acceptable.

4. Compressor: Direct-drive hermetic scroll compressors, external spring isolation mounts, crankcase heater, centrifugal oil pump, suction gas cooled, filter/dryer, and 5-year (parts-only) warranty.
5. Controls: Fully factory-wired within a separate enclosure. All controls and wiring must be completely enclosed. Safety devices:
 - a. High-pressure and low-pressure switches.
 - b. Compressor overload control.
 - c. Oil pressure cutout.
 - d. Anti-recycle timer.
 - e. Low voltage cutout.
 - f. Separate circuit breakers for each compressor and fan motor.
 - g. Compressor motor contactors.
 - h. Relays.
 - i. Control power transformer.
 - j. Low ambient operation (down to 30 deg. F.).
 - k. Time delay.
 - l. Lockout thermostat
 - m. Changeover valve and accessories and controls.
6. Accessories:
 - a. Liquid line dryers.
 - b. Sight glasses.
 - c. Expansion valves.
 - d. Charging valves.
 - e. Suction and liquid line service valves.
7. Long Line Accessories:
 - a. Compressor start assist capacitor and relay.
 - b. Crankcase heater.
 - c. Hard shutoff thermostatic expansion valve.
 - d. Any additional accessories required for proper operation.
8. Provide with hail guard.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Mount condensing units as shown on the Drawings.
- B. Provide 4" thick concrete pads for units. Pads to extend 6" in each direction beyond condensing unit.
- C. Make all refrigerant line connections and fully charge system. Install refrigerant piping and accessories as recommended by Manufacturer, (i.e. inverted vapor line trap at the indoor unit).

3.02 TEST

- A. Conduct leak test of the refrigerant piping system.

3.03 WIRING

- A. Electrical Contractor shall provide disconnect switches, and power and control wiring.

END OF SECTION

ELECTRICAL SPECIFICATIONS

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SECTION 26 00 00

GENERAL PROVISIONS

PART 1 GENERAL

1.01 REFERENCE

- A. The General Conditions and other Contract Documents as set forth in the foregoing pages are hereby incorporated into and become a part of the Specifications for work under this title.
- B. All Specifications under this Division Title are directed to and are the responsibility of the Electrical Contractor. Unless other trades or persons are specifically mentioned, "Electrical Contractor" is inferred and intended.

1.02 CONTRACT DRAWINGS

- A. The Drawings accompanying these Specifications are complementary each to the other and what is called for by one shall be as if called for by both.
- B. Consult all Contract Drawings that may affect the location of equipment, conduit and wiring and make minor adjustments in location to secure coordination.
- C. Wiring layout is schematic and exact locations shall be determined by structural and other conditions. This does not mean that the design of the system may be changed. It refers only to the exact locations of conduit and equipment to fit into the building as constructed and with the coordination of conduit and other equipment with piping and equipment included under other divisions of the Specifications.
- D. Coordinate layout of Electrical work with other trades. Make minor adjustments in location required for coordination. Locations of structural systems, heating work and plumbing lines shall take preference over locations of conduit lines where conflict occurs.
- E. Other than minor adjustments shall be submitted to the Architect/Engineer for approval before proceeding with the work.
- F. The location of outlets and switches shown on the Drawings is approximate, and the Architect/Engineer shall have the right to relocate any outlets or switches before they are installed without additional cost.
- G. The first manufacturer listed in these Specifications or on the drawings, in schedule or coded note form, is the basis for design. Any manufacturers listed below this base manufacturer are considered to be other acceptable manufacturers. It shall be the responsibility of the Contractor and the Supplier to coordinate these other acceptable manufacturers' equipment with all building

trades and building architecture. The other acceptable manufacturers' products shall match the base manufacturer's products in size, quality and performance.

1.03 MANUFACTURER'S DRAWINGS

- A. The Contractor shall submit to the A/E for review highly-legible (not scanned) copies of manufacturer's drawings and wiring diagrams in PDF format. The Engineer will review Contractor's shop drawings and related submittals, as indicated below, with respect to the ability of the detailed work, when complete, to be a properly functioning integral element of the overall system designed by the Engineer. Before submitting a shop drawing or any related material to the Engineer, Contractor shall: review each such submission for conformance with the means, methods, techniques, sequences, operations of construction, safety precautions and programs all of which are the sole responsibility of Contractor. Contractor shall approve each such submission by stamping each submittal before submitting it. The Engineer shall assume that no shop drawing or related submittal comprises a variation unless Contractor advises the Engineer otherwise. The items, types of submittals and related material are indicated below:

<u>ITEMS</u>	<u>TYPE SUBMITTALS REQUIRED</u>
Branch Circuit Panelboards	Shop Drawings
Wiring Devices	Catalog Cuts
Disconnect Switches	Shop Drawings
Lighting Fixtures	Catalog Cuts

- B. The Engineer shall return shop drawings and related materials with comments provided that each submission has been called for and is stamped by Contractor as indicated above. The Engineer shall return, without comment, material not called for or which the Contractor has not reviewed and stamped.
- C. Engineer's review of Manufacturer's Drawings or Schedules shall not relieve the Contractor from responsibility for errors or omissions in Manufacturer's Drawings or Schedules and deviation from Engineer's Drawings or Specifications.
- D. At the completion of the Job before final payment is made, the Contractor shall submit six (6) copies of Manufacturer's "As-Built" Drawings.

1.04 JOB-SITE COPY OF DOCUMENTS

- A. Maintain at the site, one copy of all Drawings, Specifications, Addenda, approved Shop Drawings, Change Orders and other modifications, in good order. The Drawings shall be marked to record all changes made during construction, especially deviations made necessary to incorporate equipment different from base equipment specified. These shall be available to the Architect/Engineer. The Drawings shall be marked to record all changes made during construction and shall be delivered to the Architect/Engineer for the Owner upon completion of

the work. The Architect/Engineer will furnish an additional set of Drawings for this purpose upon request.

PART 2 PRODUCTS

2.01 MATERIALS

- A. All materials shall be new and undeteriorated and of a quality not less than the minimum specified.
- B. Materials and equipment for which there are Underwriters' Laboratories (UL) Standard requirements, listing and labels shall have listing of Underwriters' Laboratories and be so labeled.

2.02 SUBSTITUTIONS

- A. It is the intent of this article to make the Specification open in every respect to all available brands of material of equal quality during the period of bidding.
- B. Bid shall be based on furnishing one of the brands of material and equipment mentioned in the Specifications. Submit, attached to the Bid, selected list of all material and equipment brands intended to be furnished if awarded the Contract. No change of brands shall be made after receipt of Bid and attached material brands list, unless approved in writing by the Architect/Engineer.
- C. The Electrical Contractor is also invited to bid on any other equal or similar brands of material and equipment he may desire to furnish or substitute, stating the difference in cost, if any. Other brands must be clearly stated on a substitution sheet. Be prepared to submit sample material 10 days prior to bid date and assume all transportation costs involved in shipment and return of samples. Sample fixtures are to be sent with lamps and wired with cord and plug to facilitate lighting for appraisal. The Architect/Engineer shall decide the question of equality before the Contract is awarded.
- D. Substitutions which are accepted shall be written into the Contract and no changes of brands may be made after the Contract is signed unless approved in writing by the Architect/Engineer.
- E. Refer to "Instructions to Bidders" regarding substitutions.
- F. Where the Contractor furnishes equipment or material specified as equal or which is accepted as a substitution, he is responsible for all modifications required for his work, and work of all other trades to install the equipment and insure performance as originally specified.

2.03 GUARANTEES

- A. The Electrical Contractor shall be responsible for all defects, repairs and replacements in materials and workmanship for a period of one (1) year after final written acceptance by the Architect/Engineer.
- B. Product guarantees greater than one (1) year shall be passed along to the Owner for full benefit of the manufacturer's warranty.
- C. Contractor's signed statement of warranty shall be included in the Operation and Maintenance Manuals.

2.04 QUANTITIES

- A. Items may be referred to as singular or plural on the Drawings and in the Specifications. The Contractor is responsible for determining quantity of each item required.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Furnish and install all necessary hangers, supports, straps, boxes, fittings and other similar appurtenances not indicated on the Drawings but which are required for a complete and properly installed system consistent with the Architectural treatment of the building.
- B. Contractor shall inform himself fully regarding peculiarities and limitations of space available for installation of materials and apparatuses under this contract, and see that all equipment necessary to be reached from time to time for operation and maintenance are made easily accessible. Clearances, when possible, shall be greater than those required by Code.
- C. At least 6'-6" clear headroom must be maintained in front of all electrical equipment. Provide clear work space in front of electrical equipment as follows:

<u>Equipment Voltage</u>		<u>Clear Space</u>
120/240	Volt	3'-0"

The same clear work space is required at the rear of rear access equipment.

3.02 WORKMANSHIP

- A. Electrical work shall meet or exceed the standards of installation and workmanship set forth in the latest edition of the National Electrical Contractors Association publication entitled NECA Standard of Installation, except as otherwise modified in these Specifications or shown on the Drawings.
- B. The Architect/Engineer or Owner reserves the right to direct the removal and replacement of any item which, in his opinion, does not present an orderly, neat or

workmanlike appearance, provided that such item can be properly installed in an orderly way by methods usual in such work, or which does not comply with the contract drawings or these Specifications. Perform such removals or replacements when directed in writing by the Architect/Engineer and at the Contractor's expense.

- C. The Electrical Contractor shall at all times keep the premises in a neat and orderly condition, and at the completion of the work shall properly clean up and cart away debris and excess materials.

End of Section

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SECTION 26 00 15

WORK INCLUDED

PART 1 GENERAL

1.01 SCOPE

- A. Furnish all materials, labor, tools, transportation, incidentals and appurtenances to complete in every detail and leave in working order all items of work called for herein and shown on the accompanying Drawings.
- B. It is the intent that the ensuing work shall be complete in every respect and that any material or work not specifically mentioned or shown on the Drawings, but necessary to fully complete the work, shall be furnished.

1.02 COORDINATION OF PLANS AND SPECIFICATIONS

- A. Contact the Architect/Engineer immediately if there is any question regarding the meaning or intent of either the Plans or Specifications, or upon noticing any discrepancies or omissions in either the Plans or Specifications.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

3.01 SITE VISITATION

- A. The Bidder is *strongly encouraged* to visit the site and fully inform himself concerning all conditions affecting the scope of the work. Failure to visit the site shall not relieve him from any responsibility in the performance of this Contract.

3.02 SUPERVISION OF WORK

- A. The Contractor shall have in charge of the work, at all times during construction, a competent superintendent with relevant experience in the work to be done under this Specification.
- B. Refer to the Specifications covering all branches of the work and keep fully informed of the progress of general construction. Install all work that is concealed and built into the building in sufficient time to insure proper location without delays to the work of the other trades. Properly attend to the work during the process of building-in to prevent misalignment and damage.

3.03 EXISTING WORK AND DEMOLITION

- A. Locate existing utilities prior to beginning work. Reroute or replace existing utilities where necessary to permit installation of the new work. Provide adequate means of protection during work operations. Repair existing utilities that are damaged during work operations to the satisfaction of the utility owner and at Contractor's expense.
- B. Should uncharted or incorrectly charted piping or other utilities be encountered during work operations, notify the Architect/Engineer immediately for procedure directions. Cooperate with utility companies in maintaining active sewers and facilities in operation.
- C. Should uncharted or incorrectly charted mechanical or electrical items be encountered during work demolition, notify the Architect/Engineer immediately for procedure directions. Do not disconnect and remove conduits and wiring, etc. without permission from the Architect/Engineer.
- D. Suitably and adequately protect the existing work within, and immediately adjacent to, the new work areas from damage and injury during the process of installing the work under this Contract. Existing work that has been harmed, damaged or injured as a result of the Electrical Contractor's operations shall be repaired, restored or replaced at the Electrical Contractor's expense.
- E. Revise existing wiring as indicated or required. Existing work that remains shall be left in first class condition, properly cleaned and reconnected.
- F. All switches and exposed conduit noted for removal shall be removed and replaced with new devices and fixtures as indicated on the Drawings. All removed devices and fixtures shall be properly disposed of.
- G. Branch circuit wiring from removed devices and equipment shall be removed back to the source.
- H. Reuse existing flush mounted boxes and associated conduit concealed in wall (up to above accessible ceiling) when possible. All concealed existing boxes that are not reused shall be blanked off. Provide blank cover plate. Refer to Section Boxes and Plates. All new conduit and wire in remodeled areas shall be run concealed where possible.

3.05 CUTTING AND PATCHING

- A. Avoid cutting of concrete, masonry and other work by using inserts and sleeves instead. When necessary, cutting shall be done by the Electrical Contractor with such tools and methods as to prevent unnecessary damage to surrounding areas or equipment.
- B. Electrical Contractor shall give the General Contractor locations and sizes of all openings required for the installation of electrical equipment before walls, slab, etc., are started. If it becomes necessary to cut into new work because of the failure of this Contractor to notify the General Contractor, then the General

Contractor shall coordinate any necessary cutting by this Contractor. Patching shall be at this Contractor's expense.

- C. No cutting shall be done which will in any way reduce the structural strength of the building. If such cutting is found necessary, the Architect/Engineer must first be fully informed of in writing and consent to the proposed operation.
- D. All cutting through poured concrete slabs and walls shall be done with core drills. No jackhammers will be allowed.
- E. Patching shall match existing surfaces in type and finish and shall be done by the Electrical Contractor. This includes patching existing ceilings and floors where required and patching holes left by removal of existing conduits, equipment, etc.
- F. Repair of damage caused by this Contractor to newly painted or refinished areas shall be done by the Electrical Contractor in type and finish to match existing surrounding areas.
- G. All conduits, equipment, etc., that penetrate walls or floors shall have openings, sleeves, etc., filled and closed off to prevent the possible spread of fire or products of combustion through the wall or floor.
- H. Where required to maintain fire rating, openings shall be sealed utilizing 3M Brand Fire Barrier Penetration Sealing systems. Fire barrier or fire stop systems from Crouse-Hinds, Thomas & Betts or Dow Corning may be used at Contractor's option. This includes holes left due to removal of existing conduit. Openings shall be temporarily fire-stopped until permanent fire stopping is done.

3.06 CLEANING AND PAINTING

- A. All electrical equipment shall be kept dry and clean during the construction period. Panelboards shall be covered with fiberglass reinforced plastic sheeting as a minimum form of protection. Provide additional protection if job conditions so require.
- B. All finished surfaces of equipment furnished under this Contract shall be thoroughly cleaned of dirt. All scratched or damaged surfaces shall be touched up with matching materials before final acceptance of the work. No exposed ferrous metal surfaces shall be left unpainted. Touch-up all galvanized surfaces, if scratched, with two coats of aluminum paint.
- C. Prime and paint all steel hangers, boxes, straps, rods, etc., which are not provided with rust-protective finish or if the protective finish is damaged during installation. Paint is to be zinc chromate primer with aluminum bronze finish. This includes unfinished, mechanical and "exposed to view" locations.
- D. When all work is completed and has been satisfactorily tested and accepted by the Architect/Engineer, all fixtures, conduit and other exposed surfaces shall be thoroughly cleaned.

- E. Dust must be held to a minimum when work is performed inside of the existing building.

3.07 INTERRUPTION OF SERVICE AND OWNER'S OPERATION

- A. The Electrical Contractor shall organize his work so that these alterations and additions shall cause a minimum of interference and disturbance to the Owner. Arrangements shall be made with the Owner and Architect/Engineer before interrupting service in any area. A written detailed method of interruption procedure indicating elapsed time required and time of interruption shall be prepared by the Electrical Contractor and submitted to the Architect/Engineer for approval a minimum of ten (10) days prior to any interruption of service.
- B. All interruptions of service shall be made when the load is at a minimum and shall be scheduled at the Owner's convenience.
- C. At no time shall the Electrical Contractor or his employees normally working on the project leave the facility during a time when any normally live circuits or feeders are disconnected, without permission of the A/E and Owner.
- D. All materials, connections and equipment for temporary control or power wiring to maintain continuity of service during construction shall be provided by the Electrical Contractor. All loads normally supplied from the Utility Company are included in this paragraph.

End of Section

SECTION 26 00 20

CODES AND FEES

PART 1 GENERAL

1.01 CODES

- A. All work performed under this Specification shall be done in accordance with the latest edition of the National Electrical Code as prepared and published by the National Fire Protection Association; National Electrical Safety Code; Standards of National Bureau of Fire Underwriters; and any Federal, State or Local Codes that apply.

1.02 PERMITS AND FEES

- A. Obtain and pay for all permits required by all laws, regulations or public authority having such jurisdiction. File drawings necessary to obtain permits.
- B. The Electrical Contractor shall obtain and pay for all metering required by the Power Company for service.

1.03 OHIO ENERGY CODE

- A. All motors used in Mechanical Systems must comply with the requirements of the State of Ohio "Model Code for Energy Conservation".
- B. All motors rated greater than 1,000 watts shall have a power factor of not less than 85% under rated load conditions. Power factor of less than 85% shall be corrected to at least 90% under rated load conditions.
- C. For motors up to and including 50 horsepower, the manufacturer shall provide motors with a power factor of not less than 85%. If this is not possible, then the manufacturer shall furnish and install power factor corrective devices to comply with this Code.
- D. On all packaged equipment where starters are provided with the equipment such as chillers, heat pumps, rooftop units, etc., the manufacturer will be responsible for furnishing and installing power factor corrective devices to comply with this Code.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

Not Applicable

End of Section

SECTION 20 00 25

TESTS AND INSPECTIONS

PART 1 GENERAL

1.01 INSPECTIONS

- A. Obtain all inspections required by all laws, ordinances, rules, regulations or public authority having jurisdiction. Obtain certificates of such inspections and submit these to the Architect/Engineer. Pay all fees, charges and other expenses in connection with inspections.
- B. Before any electrical work is covered, the Architect/Engineer will inspect the electrical work completed at that time.
- C. When the Contractor determines all work is completed and working properly per the Contract Documents, he shall request a "Final" inspection by the Architect/Engineer in writing. If more than one re-inspection is required after this final inspection, the Contractor shall bear all additional costs, including compensation for the Architect/Engineer's additional necessary services. A final inspection will not be made until Operating and Maintenance Manuals and Test Reports are submitted and approved and all prior "Observation report" punch lists are completed, signed and returned to the Architect/Engineer.
- D. All work shall be inspected by the authority having jurisdiction and upon completion of the work, the Electrical Contractor shall furnish a certificate of inspection and approval before final payment on the Contract will be allowed. Fee for inspections shall be a part of this Contract.

1.02 OBSERVATION REPORTS

- A. During the course of construction, the Architect/Engineer will prepare "Observation Reports" with a list of items found to be in need of correction. The Contractor shall correct all items listed. A space is provided on the form for the Contractor to note the completion of each item. All prior "Observation Report" items must be completed and the lists signed and returned to the Architect/Engineer prior to making the final inspection. After the final list is issued, the same procedure applies.

1.03 TESTS

- A. When the Architect/Engineer makes final inspection of all electrical work, he will order tests to be performed as deemed necessary. These tests may include operation of lights and equipment, continuity of conduit system, grounding and insulation resistances and various system operations. This Contractor shall provide such assistance as required, including manpower and tools, to perform these tests and simulate control sequences. The Contractor, not the

Architect/Engineer, is responsible to turn on the systems and demonstrate they are operating properly.

- B. Submit data taken during such tests to the Architect/Engineer. Pay all necessary professional fees involved in required testing of equipment.
- C. If the Architect/Engineer determines that any work requires special inspection, testing or approval which "Part 3: Execution" does not include, he will, upon written authorization from the Owner, instruct the Contractor to order such special inspection, testing or approval. The Contractor shall give timely notice so the Architect/Engineer may observe these inspections, tests or approvals. If such special inspection or testing reveals a failure of the work to comply with the requirements of the Contract Documents, the Contractor shall bear all costs thereof, including compensation for the Architect/Engineer's additional services made necessary by such failure. Otherwise the Owner shall bear such costs, and an appropriate Change Order shall be issued.

1.04 UNACCEPTABLE WORK

- A. Work shall be unacceptable when found to be defective or contrary to the Plans, Specifications or Codes specified, or accepted standards of good workmanship.
- B. The Contractor shall promptly correct all work found unacceptable by the Architect/Engineer whether observed before or after substantial completion and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting such unacceptable work, including compensation for the Architect/Engineer's additional services made necessary thereby.

PART 2 PRODUCTS

Not Applicable.

PART 3 EXECUTION

3.01 RESISTANCE AND CONTINUITY

- A. Provide insulation and grounding resistance and ground continuity tests of branch circuits and equipment on demand.

3.02 CONTROL AND INTERLOCKING

- A. Prove that motors and equipment operate as indicated in control and wiring diagrams and in sequence of operation.
- B. Prove that lighting and miscellaneous controls operate as indicated in control and wiring diagrams and in sequence of operation.

3.03 EQUIPMENT

- A. Provide necessary electrical personnel and testing instruments as required to assist in installation testing.

End of Section

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SECTION 26 05 19

WIRE AND CABLE

PART 1 GENERAL

1.01 SCOPE

- A. Furnish and install all wiring required to connect complete power, lighting, grounding, control, and auxiliary systems.

PART 2 PRODUCTS

2.01 STANDARDS

- A. All conductors shall be stranded and of the AWG size and type shown on the Drawings. Where no size or type is shown, conductors shall not be less than #12 type XHHW, THHN or THWN. All conductors shall be copper and have 600 volt insulation, be UL listed and of an American manufacturer.
- B. All conductors shall be stranded unless otherwise noted and conform to the latest edition of the Underwriters' Laboratories, Inc., "Standard for Thermoset/Thermoplastic Covered Wires and Cables" and the National Electrical Code.
- C. No wire used for power shall be smaller than #12 AWG.
- D. No wire used for control circuits shall be smaller than #14 AWG.

2.02 CONDUCTOR AND CABLE APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type XHHW, single conductors in raceway; SER Cable.
- B. Feeders Exposed or Concealed in Ceilings, Walls and Partitions: Type THHN-THWN, single conductors in raceway.
- C. Feeders Concealed in Concrete, below Slabs-on-Grade and Underground: Type XHHW or THHN-THWN, single conductors in raceway.
- D. Branch Circuits in Exposed Locations: Type THHN-THWN, single conductors in raceway.
- E. Branch Circuits Concealed in Ceilings, Walls and Partitions: Type THHN-THWN, single conductors in raceway; Metal-clad cable, Type MC; Nonmetallic-sheathed cable, Type NM.
 - 1. Branch Circuits for HVAC Equipment: Type THHN-THWN, single conductors in raceway; Nonmetallic-sheathed cable, Type NM.

2. Branch Circuits for General Purpose Outlets and Lighting: Type THHN-THWN, single conductors in raceway, Metal-clad cable, Type MC; Nonmetallic-sheathed cable, Type NM.
3. Branch Circuits for Units: Metal-clad cable, Type MC; Nonmetallic-sheathed cable, Type NM.
4. Branch Circuits Concrete, below Slabs-on-Grade and Underground: Type THHN-THWN, single conductors in raceway.

PART 3 EXECUTION

3.01 INSTALLATION

- A. All conductors shall be continuous from box to box. No joints shall be permitted in the circuit other than in junction boxes or fixtures.
- B. All make up connections to fluorescent lighting fixtures and all branch circuit conductors run in wiring channels of fluorescent lighting fixtures shall be THHN, THHW, or XHHW rated 90°C.
- C. Equipment ground conductors shall be of the same insulation type as the associated circuit conductors.
- D. All conductors of a circuit shall follow the same path through any openings in metal partitions within the enclosure.
- E. The ampacity of all conductors shall be at least as great as the rating of the fuse or circuit breaker on the line side of the conductors. Note the ampacity reduction required by Code when more than three conductors are placed in a raceway.
 1. All conductors for distribution and control equipment terminations shall be based on full 75°C ampacity.
 2. All conductors for appliance and utilization equipment terminations rated 100 amperes or less shall be based on 60°C ampacity.
- F. Swab conduits free of moisture, dirt and grease before pulling wire. Care shall be exercised while installing wire in conduits so that conductor insulation will not be injured. No oils, grease or compounds other than Ideal "Wire Lube", "Yellow 77" or equal UL approved wire-pulling lubricants shall be used for pulling any conductors.
- G. Remove all wires cut dead.

- H. MC cable with green ground wire may be run above accessible ceilings and in stud walls in #12 awg size. Support from structure - not from grid, pipes, duct, etc.
- I. All Type NM cable must be concealed in walls or above ceiling and maintain a 15 minute fire barrier. There shall be no exposed Romex cabling anywhere in finished spaces.

3.02 CONNECTIONS

- A. All connections are to be made using pressure type terminals.
- B. Where connections are to be made to devices or equipment under screw heads only, install insulated, crimp-type spade clips on the wire ends before the connections are made.
- C. Devices shall not be used as through connection points. Where through circuits are involved, they shall be spliced in the box with a pigtail connected to the device.
- D. Connectors shall contain only one wire unless they are listed for multiple conductors.
- E. Joints in #10 and smaller wire shall be made using the following types of connectors: 3M "Scotchlok", Ideal Industries, Inc. "Wing Nut", or Thomas and Betts "PT". Connectors shall be used only within their range. Other threaded-on types of insulated connectors shall not be used.
- F. Joints in #8 and larger wire or joints in any wires above the range of threaded-on connectors shall be made using pressure type mechanical connectors applied after wires are cleaned and then insulated using two (2) layers of "Scotchfil" brand electrical insulation putty and covered by two (2) half-lapped layers of "Scotch 88", or Plymouth Slipknot gray vinyl-plastic electrical tape. Connectors shall be installed and sealed against moisture by installing Raychem "TCS" (indoor) or "WCSM" (exterior) sealant-coated heat shrink tubing.

3.03 WIRE COLOR CODE

- A. The following color code shall be used:

	<u>120/208 Volt</u>	<u>120/240 Volt</u>
Phase A	Black	Black
Phase B	Red	Red
Phase C	Blue	----
Neutral	White	White
Equipment Ground	Green	Green

- B. Conductors #10 AWG or smaller shall have insulation colored as noted above.

- C. Conductors # 8 AWG or larger shall have insulation colored as noted above or be identified with colored tape, minimum size ½", wrapped twice around at each terminal, at each conduit entrance and at intervals of not more than 12 inches apart in all boxes, panel tubs, switchboards, etc.
- D. Equipment grounding conductors #8 AWG and larger shall be green or have green tape applied in a continuous wrap where visible at panels, junction boxes, etc.

3.04 MARKING

- A. All branch circuits shall be marked in the panelboard gutters. Markers shall indicate corresponding branch-circuit numbers.
- B. All signal and control wires shall be marked at all termination points such as cabinets, terminal boxes, equipment racks, control panels, consoles, etc.
- C. Fire Alarm System detector and station circuit wire shall be marked to indicate what zone they are attached to.
- D. Wire markers shall be Thomas and Betts vinyl tape type WM wrapped once around the wire with the adhesive sides placed together to form a flag.
- E. Wire markers shall be installed when wire is pulled.

End of Section

SECTION 26 05 23

MOTOR AND EQUIPMENT WIRING

PART 1 GENERAL

1.01 SCOPE

- A. Provide power to and connect all motors and motor driven equipment shown on the Plans.
- B. Furnish, install and connect all over-current and disconnecting means as required by the NEC.
- C. Motors and motor driven equipment shall be furnished and installed by others. Motor control, except Code required disconnect switches, shall be provided by others except as otherwise noted.
- D. Cranes and other equipment used during construction shall be provided with power from a self-sustaining source. The Electrical Contractor shall be responsible for power used to execute this project.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install and wire all motor control equipment per wiring diagrams and instructions furnished to him, including interlock wiring between equipment.
- B. Motor and equipment locations shown on the Drawings are approximate. Obtain exact locations from the Contractor concerned.
- C. Refer to the Plumbing and Mechanical Specifications for description of electrical equipment and controls furnished by them.
- D. Verify all control sequences, etc., in accordance with Division 26 Section, "Tests and Inspections".

End of Section

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SECTION 26 05 26

GROUNDING

PART 1 GENERAL

1.01 SCOPE

- A. Grounding of the service and service entrance equipment shall be in accordance with the National Electric Code.
- B. All feeders and branch circuits over 100 volts shall include a Grounding Conductor sized in accordance with NEC Table 250.122, except not be smaller than #12 for power and lighting circuits and #14 for control circuits. All ground conductors shall be green, or as specified under Section 26 05 19, "WIRE AND CABLE".
- C. The Contractor shall, in the presence of the Engineer, test all system neutrals to prove they are free of grounds except at the source.

PART 2 PRODUCTS

2.01 GENERAL

- A. All ground clamps shall be Penn-Union "GPL" type or similar by O.Z. or Burndy.
- B. Conduit grounding type bushing shall be T & B Series 3870 with appropriate size ground wire terminal.
- C. All panels shall be furnished with a copper ground bar similar to the neutral bar and having the same number, size and type of lugs. The ground bar shall be factory bonded to the panel tub above or below the neutral assembly, but shall not be in a gutter.
- D. Enclosures, junction and pull boxes shall utilize a "panel" type ground bar or U.L. listed grounding lugs or screws, as the number of ground conductors dictates.
- E. Grounding Electrode Conductors: Stranded cable.
- F. Copper Bonding Conductors: As follows:
 - 1. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG copper conductor, 1/4 inch (6.4 mm) in diameter, minimum.
 - 2. Bonding Conductor: No. 4 or No. 6 AWG stranded copper conductor.

3. Bonding Jumper: Bare copper tape, braided bare copper conductors, terminated with copper ferrules; 1-5/8 inches (42 mm) wide and 1/16 inch (1.5 mm) thick, minimum.
4. Tinned Bonding Jumper: Tinned-copper tape, braided copper conductors, terminated with copper ferrules; 1-5/8 inches (42 mm) wide and 1/16 inch (1.5 mm) thick, minimum.

PART 3 EXECUTION

3.01 APPLICATION

- A. Use only copper conductors for both insulated and bare grounding conductors in direct contact with earth, concrete, masonry, crushed stone, and similar materials.
- B. In raceways, use insulated equipment grounding conductors.
- C. Equipment Grounding Conductor Terminations: Use bolted pressure clamps.

3.01 INSTALLATION

- A. All enclosures, boxes, etc., shall be grounded by being securely bonded to the grounding conductor. Boxes, conduit, etc., shall not be used as part of the grounding "conductor" system.
- B. Enclosures not requiring a ground bar shall have all ground conductors connected together and a pigtail the size of the largest conductor bonded to the enclosure with a single ground connector used for no other purpose.
- C. At each receptacle box, the ground conductor shall enter and connect, with normal wiring connector, to: 1) The ground pigtail to receptacle; 2) The ground pigtail to box ground screw; and 3) The outgoing ground conductor to next device, if not at end of run. Metal to metal contact between the device yoke and the outlet box is not acceptable as a bond for either surface mounted boxes or flush type boxes.
- D. Motor terminal boxes shall be grounded by the use of manufacturer-supplied ground lug or by drilling and tapping a hole for a ground screw. Remove paint prior to making the connection.
- E. Lighting fixtures shall be grounded by the use of a manufacturer-supplied ground lug or pigtail or by the use of ground clips fastened on bare metal that is free of paint.
- F. Conduit system shall be electrically continuous. All locknuts shall cut through enameled or painted surfaces on enclosures. Where enclosures and non-current carrying metals are isolated from the conduit system, use bonding jumpers with approved clamps. Where reducing washers are used and where concentric or

excentric knockouts are not completely removed bonding bushings shall be required.

3.07 CONNECTIONS

- A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
 - 2. Make connections with clean, bare metal at points of contact.
 - 3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
 - 4. Make aluminum-to-galvanized steel connections with tin-plated copper jumpers and mechanical clamps.
 - 5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
- B. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with grounding screw and pressure-type connectors.
- C. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically noncontinuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.
- D. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A.
- E. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.

End of Section

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SECTION 26 05 33

CONDUITS

PART 1 GENERAL

1.01 SCOPE

- A. Furnish and install all conduits, fittings, etc., for a complete raceway system.
- B. See Division 26 Section, "Boxes and Plates".

PART 2 PRODUCTS

2.01 CONDUIT - Electrical Metallic Tubing (EMT)

- A. All wiring in building interior including feeders, branch circuits and auxiliary wiring shall be run in thin wall (EMT) conduit.
- B. All steel conduits shall be galvanized and have the manufacturer's name and U.L. label attached to or stamped on each piece.
- C. Each section of conduit shall be straight, free from blisters and other defects and in 10'-0" lengths. Galvanizing shall be of such nature and so applied that it will not crack or flake when conduit is bent.
- D. All conduit sizes stated in Specifications or marked on the Drawings are minimum size and shall be no less than $\frac{3}{4}$ ", unless otherwise noted.

2.02 CONDUIT - Rigid Metallic

- A. All conduits on building exterior, in exterior partitions, in poured concrete, or buried beneath concrete slabs shall be rigid or intermediate (IMC) steel.
- B. Minimum size shall be no less than $\frac{3}{4}$ ".

2.03 CONDUIT - Flexible Metallic (FMC & LFMC)

- A. Flexible neoprene-clad galvanized steel conduit shall be used for "make-up" connections to rotating machinery and heating elements.
- B. Lighting fixtures may be supplied with short lengths of flexible metallic conduit with green ground wire.
- C. Minimum size shall be $\frac{3}{4}$ " trade size.

2.04 CONDUIT FITTINGS - Metallic

- A. All thinwall connectors shall be of the compression insulated-throat type, similar to Thomas and Betts No. 5223 ($\frac{3}{4}$ "). All fittings shall be steel. No die cast fittings will be allowed. Contractor may use Thomas and Betts, Raco, Steel City or Midwest fittings.

All rigid and IMC conduits shall have threaded connections.

- B. Liquid-tight flexible metallic fittings shall be Midwest LTB-50. Flexible metallic fittings shall be Steel City XC-242.
- C. "Mineralac" type supports and "Unistrut" type one bolt supports with square ends shall not be used at any location.

PART 3 EXECUTION

3.01 INSTALLATION

- A. All rigid (RMC) or intermediate (IMC) conduit entering cabinets, pull boxes, junction boxes or outlet boxes shall be secured with double lock nuts and bushed ends.
- B. No more than four (4) 90° bends will be allowed in any one conduit run. Where more bends are necessary in any single run, a pull box shall be installed. Pull boxes shall also be installed in long runs at a maximum separation of 100'-0". All conduit, except in concrete slab or earth, shall be routed parallel or perpendicular to the lines of the building. No out of plumb or diagonal lines will be accepted.
- C. Unless otherwise noted, all conduits shall be run concealed within the building construction when installed in finished interior or exterior areas. Conduit in equipment rooms may be run exposed.
- D. All conduits shall be substantially supported by pipe straps, suitable clamps or hangers that are attached to the elements of the building structure to provide rigid installation. In no case shall conduit be attached to or supported from adjoining pipe, or installed in such a manner as to prevent the ready removal of other pipe for repairs.
- E. Thomas and Betts "Ty-Rap" self-locking ties may be used to support conduits up to 1" which are running horizontally on top of small structural members or through bar joists.
- F. Strap iron hangers and wire will not be approved as means of conduit support.
- G. Exercise necessary precautions to prevent accumulation of water, dirt or concrete in conduits during execution of electrical work. Conduit in which water or foreign material has been permitted to accumulate shall be thoroughly cleaned or replaced where such accumulations cannot be removed.

- H. All conduits must be kept dry and free of water or debris with approved pipe plugs or caps. Care shall be given that plugs or caps are installed before pouring concrete.
- I. Pull Wires
 - 1. A pull wire shall be installed in all empty conduits. In dry locations, pull wire shall be #14 gauge galvanized steel or nylon pull cord.
 - 2. Both ends of all pull wires shall be identified by means of labels or tags, reading "PULL WIRE" and shall be numbered to refer to the same pull wire.
- J. Conduits through roof shall be flashed with 6" high pitch pockets or equally effective means which the Architect approves.
- K. Remove all conduits cut dead during demolition, except where in concrete or masonry.
- L. Seal all conduits entering from outside the building water and moisture tight.

End of Section

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SECTION 26 05 34

BOXES AND PLATES

PART 1 GENERAL

1.01 SCOPE

- A. Furnish and install all outlet, junction and pullboxes as indicated on the Drawings and as necessary to install conduit and wiring in a neat and workmanlike manner.
- B. Furnish and install all outlet and junction box covers and wiring device plates.

PART 2 PRODUCTS

2.01 STANDARDS

- A. Pullboxes and junction boxes shall be galvanized and of the correct size and gauge in accordance with Code requirements and be U.L. listed.

2.02 BOXES FOR FLUSH WORK

- A. Flush outlet, junction and pullboxes shall be pressed steel galvanized or sherardized and shall be a minimum of 4" square or octagonal similar to Appleton #40. Steel boxes cast in concrete shall be designed for concrete installation.
- B. Flush wall boxes in tile, marble, brick or other finished masonry walls shall be Steel City GW-135-C Series or Raco 695 Series.

2.03 BOXES FOR EXTERIOR WORK

- A. Boxes at exterior areas shall be watertight and dust-tight with gasketed covers.

2.04 PLATES AND COVERS

- A. Duplex receptacle plates on flush and cast boxes shall be Sierra No. P-8, plastic.
- B. Plates for exposed outlets in unfinished spaces shall have Steel City Series RS-4-11/16" galvanized surface covers for application required. Covers shall be raised 1/2" and edges shall fit flush with top of box.
- C. Blank outlets, where required in finished areas, shall match wiring device covers in that area.
- D. Plates as manufactured by Slater, Leviton or Hubbell may be furnished at this Contractor's option.

PART 3 EXECUTION

3.01 INSTALLATION

- A. All boxes shall be rigidly supported from building structure independent of the conduit system. Boxes cast into masonry or concrete are considered to be rigidly supported.
- B. Close all unused and open knockouts with plugs of the proper size.

End of Section

SECTION 26 05 53

IDENTIFICATION

PART 1 GENERAL

1.01 SCOPE

- A. All disconnects, power and lighting panels, cabinets and pull boxes for auxiliary systems such as fire alarm system, etc., shall be identified on the front cover or trim with its name and/or designation number or letter as shown on the Drawings and with the voltage available within the source panel. Emergency call and intercom system enclosures located in finished spaces shall be labeled within the box.

PART 2 PRODUCTS

2.01 GENERAL

- A. Identification shall be in the form of laminated plastic nameplates with black face and minimum 1/4" high letters engraved into a white background. Plates shall be drilled on each end for sheet metal screw attachment. No "Dymo" or similar tape-type labels will be allowed.
- B. Fire alarm system and emergency equipment nameplates shall be red face with minimum 1/4" high letters engraved into a white background.
- C. The following is an example of the nameplate layout and wording:

Panel H
208/120 volt, 3 phase, 4-wire
Fed From: "MDP"

EWH-3
12 KW, 208 volt, 3-phase
Fed From: "Panel H"

PART 3 EXECUTION

3.01 INSTALLATION

- A. Plastic nameplates shall be attached to face of electrical device by sheet metal screws. Locate plate so wording reads horizontally and plate does not obstruct other identification plates, latches or operators.
- B. Install nameplate at power receptacles where the nominal voltage between any pair of contacts is greater than 150 volts.

- C. Per NEC section 210.5(C), a phase color-code nameplate shall be mounted on the inside trim of the branch-circuit panelboards, adjacent to the manufacturer's nameplate. Refer to Specification section 26 05 19, "Wire and Cable" for proper color code for voltage utilized.
- D. Label all electrical/junction box covers with panel and circuit number(s) using permanent marker. Outlet and switch boxes in finished spaces shall have similar label on interior.
- E. Provide typewritten panel schedules for all new panelboards, and all existing panelboards where circuits are added, deleted, or modified. Panel schedules on drawings include abbreviated descriptions for reference only that should be elaborated on final panel directories to facilitate easy circuit identification. Include area/room names for all circuits.

End of Section

SECTION 26 27 26

WIRING DEVICES

PART 1 GENERAL

1.01 SCOPE

- A. Furnish and install all wiring devices where shown on the Drawings.
- B. Wiring devices shall be furnished in strict accordance with the catalog numbers and manufacturers listed in the Schedule that follows. Other special purpose devices shall be provided as specified on the Drawings.

PART 2 PRODUCTS

2.01 STANDARDS

- A. Duplex tamper resistant grounding type - 20 amp, 125 volt - NEMA 5-20R.

Hubbell – CR20
Pass and Seymour – CR20
- B. Single pole Switches - 20 amp, 120/277 volt, rocker type with decorator style cover plate

Hubbell – 2121
Pass and Seymour – 2621
- C. 3-Way Switches - 20 amp, 120/277 volt, rocker type with decorator style cover plate

Hubbell – 2123
Pass and Seymour – 2623
- F. Weatherproof Receptacles with “weatherproof-in-use” cover - 20 Amp, 125 Volt - NEMA 5-15R with WR stamp.

Hubbell – GF5362W with Intermatic Guardian I Series, NEMA 3R cover
Cooper – GF5362W with Intermatic Guardian I Series, NEMA 3R cover
- G. G.F.I. Tamper Resistant receptacle - 20 amp, 125 volt - NEMA 5-20R

Hubbell – GFTR 20 with 526.
- H. G.F.I. Receptacle - 20 Amp, 125 Volt - NEMA 5-20R

Hubbell – GF 5362 with S26

- I. Dryer Receptacle – 30 amp, 125/250 volt, 4 wire ground type – NEMA 14-30R

Hubbell – 9430 with 9432 angle plug
Cooper – 5744 with 5732 angle plug.

- J. Range Receptacle – 50 amp, 125/250 volt, 4 wire ground type – NEMA 14-50R.

Hubbell – 9450 with 9452 angle plug.
Cooper – 5754 with 5752 angle plug.

2.02 ACCEPTABLE MANUFACTURERS

- A. The Electrical Contractor may at his option furnish equal devices by Hubbell, Pass & Seymour/Legrand, Leviton, or Cooper.

2.03 FINISHES

- A. All finishes shall be selected by the Architect.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install wiring devices in a neat and workmanlike manner.
- B. Ground all receptacles in accordance with Article 250.146 of NEC and as indicated in the Grounding Section of this Specification.
- C. Wiring devices specified are side and back wired type and shall be back wired.
- D. To eliminate noise pass thru, no outlets shall be mounted back to back.
- E. All receptacles in apartment units shall be tamper resistant type.

END OF SECTION

SECTION 26 28 16

DISCONNECT SWITCHES

PART 1 GENERAL

1.01 SCOPE

- A. Provide heavy duty non-fusible disconnect switches where shown on the Drawings, in conformance with NEC requirements for each unit of equipment.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Square D, General Electric, Siemens, or Cutler Hammer disconnect switches may be furnished at this contractor's option.
- B. Switches shall be wall mounted in general purpose enclosure unless otherwise noted. They shall be NEMA heavy-duty type and shall have the rating, capacity and number of poles for the service concerned.
- C. Switches in exterior locations shall be NEMA 3R, unless otherwise noted.
- D. Switch handle shall be pad lockable.
- E. Switches for use on motor circuits shall be horsepower rated.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Switches shall be installed to provide Code required clearances and shall be within sight of equipment served.
- B. Disconnects mounted on equipment shall be field coordinated and located to clear any access openings or paths.
- C. Switches shall have identification plates in accordance with Specification Section 26 05 53, "Identification".

End of Section

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SECTION 26 51 13

LIGHTING FIXTURES

PART 1 GENERAL

1.01 SCOPE

- A. Contractor shall furnish and install lighting fixtures and lamps as indicated in the Fixture Schedule shown on the Drawings and Specified herein.
- B. All lighting fixtures are indicated on the Drawings with an identifying letter and number, i.e., S1, CL2, R5, etc. Refer to the Fixture Schedule on the Drawings, which identifies the fixture in accordance with these letters and numbers and indicates the type of mounting of the fixture in accordance with the Legend Section of the Schedule.

PART 2 PRODUCTS

2.01 STANDARDS

- A. Lighting fixtures scheduled on the Drawings are specified as standards for design, quality and appearance. The Architect will consider fixtures of other manufacturers provided they are equal to or better than the standard. Refer to Specification Section 26 00 00, "General Provisions."
- B. Fixture materials given with the standard fixtures shall be maintained if alternate manufacturers are used, i.e., metal sides for metal sides, acrylic plastic louvers for acrylic plastic louvers, etc.

2.02 GENERAL

- A. Flush fixtures may be furnished with prewired feature provided they are UL approved for 75°C. wiring and the junction box capacity is sufficient for the circuit wiring requirements.

2.03 LIGHT EMITTING DIODES (LEDs) AND DRIVER SYSTEMS

- A. All LED fixtures shall have integral 0-10V dimming, 120-277V power supplies, and shall be U.L. approved.
- B. LED Color temperature shall be 3500K to match linear fluorescent lamps unless otherwise noted.
- C. Fixture shall be fully serviceable with upgradeable led light engine. Provide delivered lumens as noted in the fixture schedule.
- D. Luminaries configuration shall be tested in accordance with LES LM-79.

- E. Diodes shall be tested in accordance with IES LM-80, CRI $\geq$ 80 at 50,000 hours.
- F. 5 year minimum warranty to include, LED, driver and labor to replace fixture components or fixture as required.
- G. Fixtures shall be dimmable to a minimum of 10%.

2.04 LAMPS

- A. Light Emitting Diode (LED) lamp modules shall contain color-matched LEDs. LED modules shall be configured in serviceable and replaceable module configurations. Modules shall be pre-wired with quick-connect terminations.
- E. Lamps in exit signs shall be L.E.D. type.

PART 3 EXECUTION

3.01 GENERAL

- A. This Contractor shall inform the General Contractor of location and framing details necessary for the installation of flush ceiling fixtures and deliver to the General Contractor all frames of these fixtures so that they become a part of the ceiling construction. This Contractor shall verify the actual suspension system to be used and make all adjustments in fixture installation provisions required thereby.
- B. Furnish all mounting straps, frames, rings and other accessories required for a complete lighting installation. Refer to architectural room treatment schedule. Should any conflict occur with the building structure that will not allow proper installation of fixtures, the Architect shall be contacted before proceeding.
- C. No fixtures shall be installed until painting is completed. Fixtures with paint marks on them shall be replaced.
- D. All light fixtures shall be installed with centerlines symmetrical to the building, or at angles so designated by the plans. Fixtures not set thus shall be removed and reinstalled at this Contractor's expense.
- E. Any fixtures scratched, bent, cracked or in any way damaged before acceptance by Owner shall be replaced at this Contractor's expense.
- F. All lamps shall be in working order at the time of final acceptance of the work by the Owner and Architect.
- G. All lighting fixtures are to be grounded on the interior of the fixture housing, on clean bare metal that is free of paint, by use of a pigtail and fastened by a screw used for no other purpose.

End of Section

SECTION 31 00 00

SITE WORK

PART 1 GENERAL

1.01 WORK INCLUDED

- A. These general requirements apply to all sitework operations. Refer to Division 31 Specification sections for specific general, product and execution requirements.

1.02 RELATED SECTIONS

- A. Site Preparation: Section 31 15 00.
- B. Earthwork: Section 31 30 00.

1.03 QUALITY ASSURANCE

- A. Comply with local, State and Federal requirements regarding materials, methods of work and disposal of excess and waste materials.
- B. Obtain and pay for required inspections, permits and fees.

1.04 PROJECT CONDITIONS

- A. Each Contractor shall locate and identify existing underground and overhead utilities in areas of their sitework.
 - 1. If utilities are to remain, provide adequate means of protection during sitework operations. Repair utilities damaged during sitework operations at responsible Contractor's expense.
- B. When uncharted or incorrectly charted underground piping or other utilities are encountered during sitework operations, notify the Architect immediately for procedure directions.
- C. Locate, protect and maintain benchmarks, monuments, control points, and protect engineering reference points. Reestablish disturbed or destroyed items at responsible Contractor's expense.
- D. Control dust caused by the work. Dampen surfaces as required.
- E. Perform site operations and the removal of debris and waste materials to assure minimum interference with streets, walks, and other adjacent facilities.

- F. Protect existing paving and other services or facilities on site and adjacent to the site from damage caused by sitework operations. Cost of repair and restoration of damaged items at responsible Contractor's expense.
- G. Protect and maintain utility services, valves and other services, except items designated for removal.
- H. Owner will occupy adjacent facilities during the entire construction period. Perform site work operations to minimize conflicts and to facilitate Owner's use of the premises and their ability to conduct normal operations.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. As selected by Contractor, except as indicated.

PART 3 EXECUTION

3.01 PREPARATION

- A. Examine the areas and conditions under which sitework is to be performed and materials installed. Do not proceed with the work until unsatisfactory conditions are corrected.
- B. Consult the records and drawings of adjacent work and of existing utilities and their connections which may affect sitework.

END OF SECTION

SECTION 31 15 00

SITE PREPARATION

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Work Included: Perform site preparation work as shown and specified for all site preparation operations. Work includes:
 - 1. Protecting existing improvements to remain.
 - 2. Removing plants, lawns and vegetation.
 - 3. Removing designated site improvements.
 - 4. Removing debris and waste materials.
 - 5. Stripping topsoil.

1.02 RELATED SECTIONS

- A. Site Work: Section 31 00 00.
- B. Earthwork: Section 31 30 00.
- C. Seeding: Section 32 92 21.

1.03 QUALITY ASSURANCE

- A. Comply with Section 31 00 00 requirements.

1.04 PROJECT CONDITIONS

- A. Perform site preparation work before starting paving operations.
- B. Locate, protect, and maintain active utilities and site improvements to remain.
- C. Provide necessary barricades, coverings and protection to prevent damage to existing improvements indicated to remain.
- D. Restore to original grades and conditions, areas adjacent to site disturbed or damaged as a result of site preparation work.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Materials and equipment: As selected by Contractor, except as indicated.

- B. Tree Protection: Provide one of the following:
 - 1. Wood Rail Fence: 4 x 4 posts; 2 x 4 rails; 4'-0" exposed height above grade.
 - 2. Fabric Fence: 4'-0" high wood slat snow fence fabric or plastic mesh; steel drive posts.

PART 3 EXECUTION

3.01 SITE CLEARANCE AND PROTECTION

- A. Clear and grub areas as required for access to sitework operations and performance of the work.
- B. Remove and dispose of all plants, other vegetation matter and debris from areas to be cleared and grubbed within Contract limits.
 - 1. Use only hand methods for grubbing inside the drip line of trees designated to remain. Strip existing grassplant materials to a maximum depth of 1" under tree canopies and carefully till or scarify existing grade to a maximum depth of 1".
 - 2. Remove stumps to their full depth; remove 3" and larger roots to a depth of 2'-0" below finished grade; and remove 3" and larger roots within 5'-0" of an underground structure, utility line, footings and paved areas.
- C. Care and Removal of Trees: Remove trees within building limits as indicated on the Drawings. Do not remove any other trees without permission of Architect.
- D. Other Improvements: Remove fences and other existing improvements as required to perform the work, and store and maintain for future replacement by Contractor.
- E. Protection Requirements: Protect existing trees indicated to remain in place, against unnecessary cutting, breaking, skinning, or bruising of roots and bark, smothering of trees by stockpiling construction materials or excavated materials within drip line.
 - 1. Protect designated trees to remain with 4'-0" high double wood rail type [or fabric type] fence enclosure. Locate enclosure at drip line of each tree.
 - 2. Erect temporary tree protection fencing before starting site preparation work. Maintain fencing during entire construction period. Remove temporary fencing when no longer needed or when acceptable to the Architect.
 - 3. Water trees and other vegetation as required to maintain their health during the course of construction operations.
 - 4. Interfering branches of trees may be removed, subject to Architect's approval.
 - 5. Contractor is responsible for all damage to plants scheduled to remain. Damage is defined as including the following: removal of tree,

disfigurement of the tree including skinned bark, broken branches or improper pruning and unnecessary compaction of root zone under canopy circumference. Damage that occurs shall be corrected as described below:

- a. Cost for tree replacement shall determined in accordance with the "Guide for Plant Appraisal" by the Council of Tree and Landscape Appraisers (International Society of Arboriculture, Publication #P1209).

F. Topsoil - Stripping and Storage

1. Strip topsoil to its full depth at building areas, and all areas to be regraded or resurfaced.
2. Stop topsoil stripping at trees designated to remain, a sufficient distance to prevent damage to the root system.
3. Dispose of roots, stones and other debris; store topsoil in piles within the work limits.
 - a. Obtain approval of Architect prior to establishing topsoil storage areas.
 - b. Grade and slope stockpiles for proper drainage and to prevent erosion.

3.02 EXISTING UTILITIES

- A. Information on the drawings relating to existing utility services and other structures is from the best sources presently available. All such information is furnished only for information and is not guaranteed. Excavate test pits as required to determine exact locations.
- B. Raise or lower existing catch basins, inlets, manholes and similar structures to accommodate new grade elevations at paved and lawn areas where indicated. Rework structures as required. Reuse existing catch basin, inlet and manhole frames and covers.

3.03 WASTE MATERIALS

- A. Stockpile, haul from site daily and legally dispose of waste materials and debris. Accumulation not permitted.
- B. On-site burning of combustible, cleared materials is not permitted.

3.04 CLEANING

- A. At completion of work, clean site within Contract limits and leave site clear, clean and free of rubbish and debris and suitable for site work operations.

3.05 REPLACEMENT OF MISCELLANEOUS ITEMS

- A. Replace with existing material previously removed and stored.

- B. If damaged, repair to Architect's satisfaction or replace with new material.

END OF SECTION

SECTION 31 30 00

EARTHWORK

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Requirements of this section apply to all earthwork operations as shown and specified. Work includes:
 - 1. Site grading and filling (embankment) to attain proposed grade elevations, profiles and contours.
 - 2. Subgrade preparation for building slabs, pavement, roadways, sidewalks and curbs.
 - 3. Structure excavating and backfilling.
 - 4. Trench excavating and backfilling.
 - 5. Providing granular base and fill at interior concrete slabs-on-grade.
 - 6. Providing topsoil and finish grading.
 - 7. Removing surplus, debris and waste materials.
 - 8. Field quality control testing and inspection.
 - 9. Providing granular base for pavement, roadways, sidewalks, curbs and unit pavers.
 - 10. Temporary erosion protection.
- B. Related Work
 - 1. Site preparation: Section 31 15 00.
 - 2. Seeding: Section 32 92 21
 - 3. Asphalt Paving: Section 32 12 16.
 - 4. Concrete Paving: Section 32 13 13.
 - 5. Erosion and Sediment Control: Section 31 25 00.

1.02 SUBMITTALS

- A. Submit inspection reports on fill material, subgrade, granular base, foundation excavations, and compaction operations.

1.03 QUALITY ASSURANCE

- A. Comply with Section 02000 requirements.
- B. Perform earthwork in compliance with applicable requirements of governing authorities.

- C. Materials and methods of construction: Comply with City of Columbus Construction and Material Specifications (CCMS), 2012 Edition and as specified.
- D. Testing and Inspection: Performed by a qualified independent testing laboratory, under the supervision of a registered professional engineer, specializing in soils engineering.
 - 1. Provide and pay for soils testing and inspection services during earthwork operations. Testing, inspection service, and Soils Engineer shall be acceptable to the Architect.
- E. Reference Standards
 - 1. ASTM: American Society for Testing and Materials.

1.04 PROJECT CONDITIONS

- A. Protect existing trees, plants, lawns and other features designated to remain as part of the work.
- B. Protect excavations by shoring, bracing, sheeting, underpinning or other methods, as required to prevent cave-ins or loose dirt from entering excavations. Barricade open excavations and post warning lights at work adjacent to public roadways. Conform to Occupational Safety and Health Administration (OSHA), Safety and Health Standards 29 CFR 1926, Subpart P "Excavations, Trenching and Shoring," and all local laws, ordinances and regulations.
- C. Promptly repair damages to adjacent facilities caused by earthwork operations. Cost of repair at responsible Contractor's expense.
- D. Promptly notify Architect of unexpected subsurface conditions. Discontinue work until notification to resume work is provided by the Architect.
- E. Protect bottoms of excavations and soil beneath and around foundations from frost and freezing.
- F. Grade around excavations to prevent surface water draining into excavated areas.

PART 2 PRODUCTS

2.01 MATERIALS

- A. All topsoil, fill and backfill material subject to testing and approval. Provide additional imported topsoil and fill as required to complete the work.
- B. Backfill and Fill Materials
 - 1. On-site fill: Clean soil or soil-rock mixture free of foreign materials, organic material and debris. Suitable excavated materials removed to

accommodate new construction may be used for fill, subject to the Soil Engineer's approval.

2. Imported fill: Clean, natural sandy-clay subsoil or soil-rock mixture, free of foreign matter, organic material, and debris. Designate borrow area. Sample and test as directed by the Geotechnical Engineer.
- C. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, crushed slag, natural or crushed sand; capable of specified compaction, and free of organic soil, shale, lumps, or excessive amounts of clay and other foreign substances.
- D. Granular Base (Building Porous Fill): Naturally or artificially graded mixture of crushed limestone or gravel, meeting size No. 57 grading requirements of ASTM C33. Surface choke with sand or fines to prevent damage to vapor barrier.
- E. Pipe Bedding Material: Crushed stone meeting size No. 57 grading requirements of ASTM D448.
- F. Drainage Fill: Washed, uniformly graded mixture of crushed stone, or crushed/uncrushed gravel, having the following gradation:

Sieve Size	Total % Passing
1"	100
3/4"	90 - 100
3/8"	20 - 55
No. 4	0 - 10
No. 8	0 - 5

- G. Topsoil: Sandy loam or loam soil as defined by USDA Soil Conservation Service, Soil Classification System. Free from admixture of subsoil, heavy clay, coarse sand, stones, plants, roots, sticks, and other foreign materials. 95% of topsoil shall pass a 2.0 mil sieve. Organic content shall be 4% to 12% of total dry weight.
1. If the quality or quantity of topsoil stored under Section 31 15 00 is insufficient to complete the work, provide imported topsoil. Obtain rights and pay all costs for imported topsoil material.
 2. Proposed topsoil shall be acceptable to Architect and Soils Testing Firm.]
- H. Lean Concrete Fill: Minimum 1500 psi, ready mixed. See Section 03 30 00.
- I. Erosion Control: Provide for erosion and sedimentation control in accordance with ODOT Construction and Material Specification, Item 207. Erosion methods to consist of straw or hay bales, temporary seeding and mulching or filter fabric as determined by Contractor for conditions encountered. Methods and materials to be approved by Architect prior to application or use.
1. Erosion Control Fabric (Silt Fence): Synthetic fabric water-permeable filtration separation fabric, nontoxic to plant material, inert to chemicals, and

resistant to degradation.

- a. Fabric: Woven, polypropylene, polyester, polyamide, polyethylene or a combination is acceptable.
 - b. Provide fence fabric with reinforcing cord or similar type method along top edge.
 - c. Fence Height: Approximately 36" high fabric; bury 12" below grade and extend 24" above grade.
 - d. Manufacturer: EXXON GTF-101 System (GTF-180 Fabric) or equal by SUPAC; DuPONT; MONSANTO or STABILENKA.
 - e. Stakes: Provide wood or metal fence stakes (posts) as recommended by fabric manufacturer.
- J. Other materials as required for proper completion of work: As selected by Contractor and approved by Architect.

PART 3 EXECUTION

3.01 GENERAL

- A. Examine areas and conditions under which work is to be performed. Consult the records and drawings of adjacent work and of existing utilities for conditions which may affect the work under this Section.
- B. Establish extent of grading and excavation by area and elevation; designate and identify datum elevation and project engineering reference points. Set required lines, levels, and elevations.
- C. Do not cover or enclose work of this Section before obtaining required inspections, tests, approvals, and location recording.

3.02 EXISTING UTILITIES

- A. Before starting grading and excavating, establish the location and extent of underground utilities in the work area. Exercise care to protect existing utilities during earthwork operations. Perform excavation work near utilities by hand and provide necessary shoring, sheeting and supports as the work progresses.
 - 1. Locate utilities which require tie-in work before performing work on new utility extension. Verify location and depth of existing utility. Notify Architect of discrepancies in actual field verified inverts and elevations and those indicated on drawings. Do not proceed with utility line work until procedure directions have been obtained from Architect.
- B. Protect active utility services uncovered by excavation.
- C. Notify Architect when interference with existing utility is necessary.
- D. Replace utilities disturbed or destroyed with new materials of same size, quality and dimensions as directed by Architect, at Contractor's expense.

- E. Maintain or permit maintenance of existing overhead, surface, or sub-surface utilities encountered.
- F. Remove abandoned utility service lines from areas of excavation. Cap, plug or seal abandoned lines and identify termination points at grade level with markers.
- G. Accurately locate and record abandoned and active utility lines rerouted or extended on Project Record Documents.

3.03 SITE GRADING

- A. Perform grading within Contract limits and along utility lines, including adjacent transition areas, to provide positive drainage away from structures. Provide subgrade surfaces parallel to finished surface grades. Provide uniform levels and slopes between new elevations and existing grades.
- B. Grading Outside Building Lines: Grade surfaces to assure areas drain away from structures and to prevent ponding and pockets of surface drainage. Provide subgrade surfaces free from irregular surface changes and as follows:
 - 1. Rough grading: Plus or minus 0.20 ft., subgrade tolerance. Degree of finish required will be that ordinarily obtained from either blade-grader or scraper operations.
 - 2. Subgrade surface shall be free of exposed boulders or stones exceeding 4" in greatest dimension in paved areas; 1" in lawn areas.
 - 3. Fill all areas of settlement to proper grade before subsequent construction.
 - 4. Planted areas: Allow for 6" average depth of topsoil at planted areas.
 - 5. Paved areas: Shape surface of subgrade areas to line, grade and cross-section indicated. Provide compacted subgrade suitable to receive paving base materials. Subgrade tolerance plus 1/2", minus 1".
 - 6. Granular base: Grade subgrade surface smooth and even, free of voids to receive granular base materials. Provide compacted subgrade suitable to receive granular base materials. Tolerance 1" in 10'-0".
 - 7. Perform grading, within branch spread of existing trees to remain, by hand methods to elevations indicated. Cut roots cleanly to 3" depth below proposed finished grade. Coat cut roots with tree wound paint.
- C. Grading of Subgrade and Surface of Fill Under Building Slabs
 - 1. Grade subgrade surface smooth and even, free of voids to receive granular base materials. Provide compacted subgrade suitable to receive granular base materials. Tolerance 1" in 10'-0".
 - 2. Grade surface of fill under building slabs smooth and even, free of voids, compacted as specified, and to required elevation.
 - a. Provide final grades within a tolerance of 1" in 10'-0"; the maximum out-of-level tolerance for the entire length of grade for slabs in either direction shall be plus or minus 2".

3.04 EXCAVATING: GENERAL

- A. Excavate to limits shown on the Drawings, as called for in soils report, and as specified.
- B. Earth excavation shall include the satisfactory removal and disposal of all materials encountered regardless of the nature of the materials, the condition of the materials at the time they were excavated or the manner in which they were excavated, except materials classified as rock excavation.
- C. Storage
 - 1. Store material suitable for backfill adjacent to excavation within work limits shown.
 - 2. Trim neatly, avoid overloading sides of excavation.
 - 3. Do not place on roadways, sidewalks or private property.
- D. Extra excavation: Excavate unsatisfactory soil materials extending below required elevations to depth as directed. Such extra excavation will be paid for as a change in work. Obtain Architect's written authorization before performing extra excavation work.]
- E. Unauthorized Excavation consists of removal of materials beyond indicated subgrade elevation or side dimensions without the specific direction of the Architect.
 - 1. Under footings or foundation bases: Unauthorized excavation may be filled by extending the indicated bottom elevation of the footing or base to the excavation bottom without altering the required top elevation. Lean concrete fill (1500 psi minimum) may be used to bring elevations to the proper position. This work can be performed only when acceptable to the Architect and when approval has been given. Architect must be notified and approval given before commencing,
 - 2. Elsewhere: Backfill and compact unauthorized excavations as specified for authorized excavations of the same classification, unless otherwise directed by the Architect.
- F. Shore, sheet or brace excavations as required to maintain them secure; remove shoring as backfilling progresses, when banks are safe against caving.

3.05 EXCAVATING: STRUCTURE

- A. Conform to the elevations and dimensions indicated on the drawings, within a tolerance of plus or minus 0.1 foot, and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction required, and for inspection.
- B. Preparation for other work: Hand trim foundation excavation to final grade just prior to placing concrete. Remove loose, soft material and all organic matter.

- C. Inspection: Obtain inspection and approval of foundation excavations by Soils Engineering Firm before concrete is placed.
- D. Do not excavate footings or slabs to the full depth when freezing temperatures may be expected, unless footings or slabs are placed immediately after the excavation has been completed. Protect excavation bottoms from freezing if the placing of concrete is delayed.

3.08 DRAINAGE

- A. Prevent surface water and subsurface or groundwater from flowing into the excavation.
- B. Do not allow water to accumulate in excavations. Remove water from excavations. Provide sumps, pumps, suction and discharge lines and other dewatering system components necessary to convey the water away from the excavations.
- C. All excavation shall be performed under workable dry conditions; prior to any excavation below groundwater level, the dewatering system as shall be installed and placed in operation in order to lower water level below the excavation bottom.
- D. Provide dewatering devices filtered to prevent the removal of fines from the soil.

3.09 PIPE BEDDING

- A. General: Bed all water and sewer lines below slabs-on-grade within building, all sewer lines outside building, except lines requiring concrete encasement. Use bedding material specified herein.
 - 1. Bed pipe in rock excavation in granular backfill material specified herein.
- B. Limits: CCMS Item 901.11, Type 1.
- C. Protection: Carefully place bedding by hand to avoid damage to pipe.
- D. Compaction: Comply with requirements specified herein below.

3.10 FILLING AND BACKFILLING

- A. This Article applies to all filling (embankment) and backfilling operations. Additional requirements for trench backfilling are listed in Article 3.11.
- B. Obtain inspection and approval of subgrade surfaces by Soils Engineer before filling operations. Scarify, dry and compact soft and wet areas; remove and replace unsuitable subgrade materials with compacted fill material as directed.
- C. Place acceptable soil material in layers to required subgrade elevations, for each

area classification listed below:

1. In all excavations: Excavated or borrow backfill materials.
2. Against face of structure at footing drainage pipes: Drainage fill.
3. Directly under building slabs: Building porous fill; 6" thick unless otherwise indicated.
4. Under walks, steps and pavements: Subbase material.
5. Trenches Containing Underground Pipes/Ducts/Etc: Granular base; extend to minimum 6" above top of duct.

D. Preparation for Backfill: Backfill excavations as promptly as the Work permits, but not until completion of the following:

1. Acceptance by Owner of construction below finished grade, including where applicable, dampproofing, waterproofing and perimeter insulation.
2. Inspection, testing, approval and recording locations of underground utilities.
3. Removal of concrete formwork.
4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off sheet piling driven below bottom of structures to prevent settlement of the structure or utilities, or leave in place if required.
5. Removal of trash and debris.
6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.
7. Do not backfill against walls until slab on grade and first floor is complete and concrete has attained its design strength.

E. Ground Surface Preparation for Fill

1. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills.
2. Slopes Greater Than 4 to 1: Plow, bench, step or break up existing material in such a manner that the embankment material will bond with existing surfaces.
3. Proofroll per "Compaction" Article herein.
4. When the existing ground surface has a density less than that specified under "Compaction" Article herein for the particular area classification, break-up the ground surface, pulverize, moisture-condition to the optimum moisture content, and compact to the required depth and percentage of maximum density.

F. Placement and Compaction

1. Place backfill and fill materials in layers not more than 8" in loose depth.
2. Lift thickness requirements may be modified by Soils Engineer to suit equipment and materials or other conditions when required to assure satisfactory compaction.
3. Moisture-condition fill material by aerating or watering and thoroughly mix materials to obtain moisture content permitting proper compaction.

4. Place and compact each layer of fill to indicated density before placing additional fill material. Repeat filling until proposed grade is attained.
5. Suspend fill operations when satisfactory compaction results cannot be obtained because of environmental or other unsatisfactory site condition. Do not use muddy or frozen fill materials. Do not place fill material on muddy or frozen subgrade surfaces.
6. Maintain surface conditions which permit adequate drainage of rain water and prevent ponding of surface water in pockets. When fill placement is interrupted by rain, remove wet surface materials or aerate and permit to dry before placing additional fill material.
7. Extend fill at buildings a minimum of 5'-0" beyond building foundations, except as otherwise indicated.
8. Use hand tampers or vibrating compactors at foundation walls. Do not use rolling equipment adjacent to foundation walls.

3.12 COMPACTION

- A. Provide compaction control for all fill and backfill. Field compaction tests and related laboratory analysis shall be performed by a qualified independent laboratory, a member of the American Society for Testing and Materials, under the supervision of a registered Professional Engineer specializing in soils engineering. Soils proposed for fill and backfill shall be analyzed by the Soils Engineer.
- B. Perform all compaction work in accordance with ASTM D698 Standard Proctor Method. Percentages of compaction are as follows:
 1. Foundations and Building Slabs: Compact top 12" of subgrade and each layer of fill or backfill to 100% of maximum dry density. Extend compaction at least 5'-0" on both sides of foundation walls and at least 12" beyond slabs-on-grade.
 2. Vehicle Pavement and Roadways: Compact top 12" of subgrade and each layer of fill or backfill to 98% of maximum dry density.
 3. Pedestrian Walks: Compact top 6" of subgrade and each layer of fill or backfill to 95% of maximum dry density.
 - a. Exercise care to obtain proper compaction under edges of walks that abut walls, stairs, curbs, adjacent slabs and other structures.
 4. Lawns and Unpaved Areas: Compact top 6" of subgrade and each layer of fill or backfill material to 90% of maximum dry density.
 5. Compact fill and backfill material for mechanical, plumbing and electrical trenches within building and pavement areas and extending minimum 5'-0" beyond building and pavement areas to 100% of maximum dry density.
- C. Puddling or jetting of fill and backfill materials as a compaction method is not permitted.
- D. Provide adequate equipment to achieve consistent and uniform compaction of fill and backfill materials.
- E. In cut areas, the subgrade surface must meet density criteria equivalent to those specified above for fill layers under various area classifications.

F. Maintain moisture content of materials, during compaction operations within required moisture range to obtain indicated compaction density.

1. Where the subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to the surface of subgrade, or layer of soil material, to prevent free water appearing on the surface during or subsequent to compaction operations.
2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
 - a. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing, until the moisture content is reduced to a satisfactory value, as determined by moisture-density relation tests.

G. Proof Rolling

1. After all topsoil has been removed, those areas receiving fill and those areas that have been cut shall be rolled with a minimum of four overlapping passes of a fully loaded tandem axle dump truck.
2. Unstable material evidenced by the rolling shall be stabilized or removed and replaced with a material complying with backfill and fill material, and compacted accordingly.

3.13 FINISH GRADING

A. General

1. Finish grade all disturbed areas to blend with surface of adjacent undisturbed areas.
2. Confine work to top 6 inches of backfill.
3. Roll to proper compaction.

B. Lawn Areas

1. Use stockpile of topsoil previously stored.
2. If supply is not sufficient, obtain additional topsoil from outside source at Contractor's expense.

C. Placement

1. Do not use frozen or muddy topsoil. Place during dry weather.
2. Fine grade topsoil eliminating rough and low areas to ensure positive drainage. Maintain levels, profiles and contours of subgrades.
3. Remove stones, roots, weeds, and debris while spreading topsoil materials. Provide surfaces suitable for soil preparation provided under lawn work.
4. At trees designated to remain, manually install topsoil not exceeding 2" depth under tree canopies. Avoid damage to root system.

3.14 MAINTENANCE

- A. Protect finish graded areas from traffic and erosion. Keep free of trash and debris. Repair and reestablish grades in settled, eroded and damaged areas.
- B. Where completed areas are disturbed by construction operations or adverse weather, scarify surface, reshape and compact to required density.
- C. Erosion Control: Provide silt fence around all areas where erosion and washing away of soil fines is probable (i.e. areas where existing vegetation has been stripped, earth areas not yet seeded, etc.).
 - 1. Mound soil approximately 8" to prohibit run-off away from site. Install silt fence on outside face of mounded area. Extend silt fence fabric approximately 12" below grade. Place fence posts and attach fabric to posts at spacing and in a manner approved by fabric manufacturer.
 - 2. Remove fence as seeding or other type of surface replacement work progresses in a particular area. Do not remove fence where a chance of erosion and run-off exists.
 - 3. Remove all fence materials at completion of project when directed by Architect.

3.15 WASTE MATERIALS

- A. Stockpile, haul from site and legally dispose of waste materials, including excess excavated materials, rock, trash and debris.
- B. Maintain disposal route clear, clean and free of debris.

3.16 TESTING

- A. Provide field quality control testing and inspection during earthwork operations.
- B. Contractor shall cooperate with, provide access to the work, obtain samples, and assist testing agency and their representatives in execution of their functions.
- C. Foundation excavations: Provide a minimum of two bearing tests. Based on visual examination at the site, provide additional bearing tests as required to verify bearing surfaces are adequate and meet or exceed design bearing values.
- D. Fill material and granular base materials: Test proposed materials to verify suitability for use, gradation of materials, moisture density relation by ASTM D698 Standard Proctor Method and percent of organic materials.
- E. Subgrade surfaces: Based on visual examination at the site, provide bearing tests as required to verify subgrade surfaces are adequate and meet or exceed design bearing values.
 - 1. Structure slabs: Make at least one test for each 2,000 sq. ft. of slab areas.

- F. Compaction operations: Provide full time inspection and testing during building area filling and compaction operations. Test each lift of fill to verify compaction meets specified requirements. Provide periodic inspection and testing during site area filling and compaction operations.
- G. When, during progress of work, field tests indicate that installed compacted materials do not meet specified requirements, provide additional compaction until specified density is achieved, or remove and replace defective materials with new compacted materials as directed by the Architect. Cost of additional labor, materials and testing to attain specified density at Contractor's expense.
- H. Contractor may, at his own option and for his own purpose, make other tests and inspections at the Contractor's expense.
- I. Employment of testing agency shall not relieve the Contractor of his sole responsibility to furnish materials and construction in full compliance with the Contract Documents.

END OF SECTION

SECTION 32 01 16

COLD MILLING ASPHALT PAVING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Planing of the existing surface course to the depth specified in the plans and replacing the asphalt surface course as specified in the plans.

1.02 REFERENCES

- A. Materials and Methods of Construction: Comply with the City of Columbus Construction and Material Specifications (CCMS), 2002 Edition and as specified.
- B. Materials and Methods of Construction: Comply with the Ohio Department of Transportation (ODOT) "Construction and Material Specifications" 2005 edition and as specified.

1.03 SUBMITTALS

- A. Product Data
 - 1. Submit list of materials to be used for proposed work.

1.04 QUALITY ASSURANCE

- A. Surface Testing
 - 1. At completion of each section of pavement planning and resurfacing, perform a water test for drainage.
 - 2. Rework areas where water stands, even to the point of replacement so pavement drains as designed. Skin patching in low areas is prohibited.

1.05 PROJECT CONDITIONS

- B. Weather Limitations
 - 1. Do not apply prime or tack coat materials when the temperature is below 50° F. Do not apply to wet base surface.
 - 2. Install asphalt surface material only when base is dry and air temperature is above 40° F.

PART 2 PRODUCTS

2.01 PAVEMENT REMOVAL

- A. Plane pavement to the depth indicated on the plans using planing equipment of satisfactory power and stability to consistently produce the required results. The cutting element may be of the grinding, sawing, or milling type. Planing equipment shall be mounted rigidly to the carrier and shall be adjustable and controllable as to depth of cut and cross-slope. Longitudinal planning action may be produced either by means of a suitable carrier wheelbase or by means of an automatic control system having external reference. Cross slope adjustments or automatic controls shall be capable of producing either variable or a constant cross slope as required.

2.02 PAVEMENT REPLACEMENT

- A. Asphalt Paving
 - 1. Tack Coat: Item 407 at .4 gallons per square yard.
 - 2. Asphalt Intermediate Course: 1-1/2" course, Item 448.
 - 3. Asphalt Surface Course: 1-1/2" course, Item 448.

PART 3 EXECUTION

3.01 PLANING

- A. Pavement Classifications: Engineer will classify the type of replacement pavement. This applies to type of base and depth of all materials.
 - 1. Permanent Pavement
 - a. Plane existing pavement to the depth and grade specified on the plans.
 - b. Remove loose debris from surface.
 - c. Apply tack coat to exposed surface.
 - d. Place new asphalt base course.
 - e. Place new asphalt wearing course.

END OF SECTION

SECTION 32 12 16

ASPHALT PAVING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Provide asphalt paving as indicated and specified. Work includes:
 - 1. Final subgrade preparation and granular base.
 - 2. Asphalt paving.
 - a. Aggregate subbase course.
 - b. Prime coats and tack coats.
 - c. Asphalt intermediate and wearing (finish) courses.

1.02 RELATED SECTIONS

- A. Site Work: Section 31 00 00.
- B. Earthwork: Section 31 30 00.
- C. Concrete Paving: Section 32 13 13.

1.03 REFERENCES

- A. Materials and Methods of Construction: Comply with City of Columbus Construction and Material Specifications (CCMS), 2012 Edition and as specified.

1.04 SUBMITTALS

- A. Product Data
 - 1. Submit complete materials list of items proposed for the work.
 - 2. Submit pavement marking paint and soil sterilizer product data.

1.05 QUALITY ASSURANCE

- A. Tolerances
 - 1. In-Place Compacted Thickness
 - a. Base Course: Maximum 1/2" plus, minus 0".
 - b. Intermediate Course: Maximum 1/4", minus 0".
 - c. Surface Course: Maximum 1/4" plus, minus 0".
 - 2. Finish Course Smoothness
 - a. Base Course: Maximum 3/8" in 10'-0".
 - b. Intermediate Course: Maximum 1/4" in 10'-0" in any direction.
 - c. Surface Course: Maximum 1/4" in 10'-0" in any direction.

3. Check surface areas at intervals as directed by Architect.
- B. Paving design is based on adequate CBR strength of the subgrade soils. Promptly notify Architect of unsatisfactory subgrade conditions before constructing base course.
- C. Surface Testing
 1. At completion of each section of paving, perform a water test for drainage.
 2. Rework areas where water stands, even to the point of replacement, so that pavement drains as designed. Skin patching for correcting low areas is prohibited.

1.06 PROJECT CONDITIONS

- A. Perform all layout work as required. Take all dimensions and establish elevations.
- B. Subgrade: Rework unsatisfactory subgrade as required.
- C. Weather Limitations
 1. Do not install base course materials over wet or frozen subgrade surface.
 2. Do not apply prime or tack coat material when temperature is below 50° F. Do not apply to wet base surface.
 3. Install asphalt surface material only when base is dry and air temperature is above 40° F.
- D. Safeguards
 1. Maintain vehicular traffic and pedestrian traffic during paving operations, as required for other construction activities.
 2. Provide barricades, warning lights and warning signs for the movement of traffic and safety and to cause the least interruption of work under this Contract.
 3. Protect adjacent work from damage, soiling, and staining during paving operations.

1.07 MAINTENANCE

- A. Repair and/or replace any surface replacement that is damaged due to settlement or inferior materials and workmanship for a period of one (1) year after acceptance of the work by Owner.
- B. Make repairs at no additional cost to the Owner.

PART 2 PRODUCTS

2.01 ASPHALT PAVING

- A. Type: Asphalt paving, aggregate base. Thicknesses as indicated on the

drawings.

1. Aggregate Base: Crushed gravel, Item 304.
2. Prime Coat: Item 408 at .3 to .5 gallons per square yard.
3. Asphalt Intermediate Course: Item 448.
4. Asphalt Surface Course: Item 448 or as indicated on the drawings.

PART 3 EXECUTION

3.01 INSPECTION

- A. Examine subgrade and installation conditions. Do not start asphaltic concrete paving work until unsatisfactory conditions are corrected.

3.02 PREPARATION

- A. Treat scheduled paved areas subgrade with soil sterilizer herbicide. Apply herbicides in strict accordance with manufacturer's installation instructions and recommended application rates.
- B. Frame Adjustments
 1. Verify frames for manholes, catch basins, and other such units, within areas to be paved, are at their proper elevation. Notify Architect if frames are not at proper heights.
 2. Provide temporary closures over openings until completion of rolling operations. Remove closures at completion of the work. Set covers to grade, flush with the surface of adjoining pavement surface.

3.03 APPLICATION

- A. Subgrade Preparation
 1. Proofroll as specified in Section 31 30 00.
 2. Thoroughly compact with 10 ton roller to density specified in Section 02300.
 3. Include re-shaping and wetting required along with rolling to obtain proper compaction and the desired cross section.
 4. Remove unsuitable material and replace with suitable material as directed by Architect.
 5. Compact subgrade at least 18" beyond edge of surface course.
- B. Reset castings and other structures to established grade as required.
- C. Conform to requirements of various CCMS items specified.
- D. Delay application of surface asphalt wearing course until heavy equipment traffic on site has terminated.

END OF SECTION

SECTION 32 13 13

CONCRETE PAVING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. All exterior concrete paving required or indicated on site plan, including, but not limited to, the following:
 - 1. Curbs, aprons, handicap ramps..
 - 2. Vehicular paving and sidewalks.

1.02 RELATED SECTIONS

- A. Asphaltic Concrete Paving: Section 32 12 16.
- B. Sealants: Section 07 92 00.

1.03 REFERENCES

- A. American Concrete Institute (ACI)
 - 1. ACI 301 Specifications for Structural Concrete for Buildings
 - 2. ACI 305R Hot Weather Concreting
 - 3. ACI 306R Cold Weather Concreting
 - 4. ACI 316R Recommendations for Construction of Concrete Pavements and Concrete Bases
- B. American Society for Testing and Materials (ASTM)
 - 1. ASTM C33 Concrete Aggregates
 - 2. ASTM C94 Ready-Mixed Concrete
 - 3. ASTM C143 Slump of Portland Cement Concrete
 - 4. ASTM C150 Portland Cement
 - 5. ASTM C171 Sheet Materials for Curing Concrete.
 - 6. ASTM C185 Welded Steel Wire Fabric for Concrete Reinforcement
 - 7. ASTM C231 Air Content of Freshly Mixed Concrete by the Pressure Method
 - 8. ASTM C260 Air Entraining Admixtures for Concrete
 - 9. ASTM C309 Liquid Membrane-Forming Compounds for Curing Concrete
 - 10. ASTM C494 Chemical Admixtures for Concrete
 - 11. ASTM D1751 Preformed Expansion Joint Material for Concrete Paving and Structural Construction (Non-Extruding

and Resilient Bituminous Types).

- B. Unless otherwise specified, provide work and materials conforming to ACI 316R.

1.04 SUBMITTALS

- A. Submit in accordance with the General Conditions and Section 01 33 23.
- B. Concrete mix design and test reports specified in Section 03 30 00.

1.05 QUALITY ASSURANCE

- A. City of Columbus Construction and Material Specifications (CCMS), 2012.
- B. Schedule and perform paving work, base course, etc. only after excavation and construction work which might injure them have been completed. Repair damage caused during construction before acceptance of work.
- C. Repair or replace, in accordance with these specifications, existing paved areas damaged or removed during course of this project.
- D. Do not place pavement, base or subbase on a frozen or muddy surface.
- E. Testing
 - 1. Testing and Inspection: Performed by a qualified independent testing laboratory, under the supervision of a registered professional engineer.
 - 2. Provide and pay for testing and inspection services during earthwork operations. Testing and inspection service firm shall be acceptable to the Architect.

PART 2 PRODUCTS

2.01 AGGREGATE BASE

- A. Material: Graded, granular, free-draining material, conforming to CCMS Item 304.

2.02 CONCRETE

- A. Type: Portland cement, air-entrained type.
 - 1. Aggregate (ASTM C33): Limestone.
 - 2. Air Content (ASTM C231): 5% +/- 1% entrained air.
 - 3. Strength: 4000 psi, minimum compressive strength at 28 days with water reducer and air entrainment.
 - a. Water Reducer: Conforming to ASTM C494, as required to minimize cement and water content of mix at specified slump.
 - 4. Cement: Portland cement, conforming to ASTM C150, Type I or II. Use one color throughout entire project, unless otherwise directed by Architect.
 - a. Content: 600 lbs. per cubic yard, minimum.

5. Water/Cement Ratio: 0.45, maximum.

B. Maximum slump at time of placement (ASTM C143): 2" minimum, 4" maximum.

C. No calcium chloride or admixtures containing calcium chloride are permitted. No admixtures, other than those specified, are permitted without the written permission of the Architect.

2.03 REINFORCING

A. Bars and Welded Wire Fabric: Specified in Section 03 30 00.

1. Welded wire fabric for vehicular traffic to be furnished in flat mats.

2.04 FORMWORK

A. Walks and Steps: Steel or solid lumber, minimum 1-1/2" nominal thickness.

B. Vehicular Traffic: Steel conforming to applicable CCMS Sections.

2.05 ACCESSORIES

A. Expansion Joints

1. Filler: Meet or exceed requirements of ASTM D1751, width as noted under "Joints" herein or indicated on drawings.

2. Joint Cap: Two-piece vinyl device with upper 1/2" removable after curing period; width corresponding to joint filler; products by GREENSTREAK PLASTIC PRODUCTS; VINYLEX CORPORATION or VULCAN METAL PRODUCTS.

3. Sealant: Section 07 92 00.

B. Curing Materials

1. Curing Compound: Resin base, white pigmented compound conforming to ASTM C309, Type 2.

2. Sheet Materials: "Orange Label Sisalkraft" by FORTAFIBER CORPORATION or equal material; a non-staining sheet material conforming to ASTM C171. Four mil polyethylene sheeting may be substituted for curing paper.

C. Reinforcing Supports

1. Welded Wire Fabric: "Mesh-Ups" by LOTEL or equal.

2. Bars: Bolsters and chairs suitable for application by DAYTON SURE-GRIP or equal.

PART 3 EXECUTION

3.01 PREPARATION OF SUBGRADE

- A. Areas to be paved will be compacted and brought to subgrade elevation under Section 02 30 00 before work of this Section is performed. Final fine grading, filling and compaction of areas to receive paving, as required to form a firm, uniform, accurate and unyielding subgrade at required elevations and to required lines shall be done under this Section.
- B. Remove existing subgrade material which will not readily compact as required and replaced with satisfactory materials. Provide additional materials needed to bring subgrade to required line and grade and to replace unsuitable material removed in accordance with Section 02 30 00.
- C. Recompect subgrade of areas to be paved as required to bring top 8 inches of material immediately below aggregate base course to the following compactions:
 - 1. Vehicle Pavement: Compact to 98% of maximum dry density as determined by ASTM D698.
 - 2. Pedestrian Walks: Compact to 95% of maximum dry density as determined by ASTM D698.
- D. Exercise care to obtain proper compaction under edges of walks that abut walls, stairs, curbs, adjacent slabs and other structures.
- E. Extend subgrade compaction for a distance of at least 1 foot beyond pavement edge.
- F. Areas graded or compacted shall be kept shaped and drained during construction. Ruts greater than or equal to 2 inches deep in subgrade, shall be graded out, reshaped as required, and recompacted before placing pavement.
- G. Do not store or stockpile materials on subgrade.
- H. Dispose of debris and other material excavated under this Section, and material unsuitable for or in excess of requirements for completing work of this Section off job site.
- I. Obtain Soil Testing and Inspection Firm's inspection and approval prior to installation of gravel base course. See Section 02 30 00. Disturbance to subgrade caused by inspection procedures shall be repaired under this Section.

3.02 AGGREGATE BASE COURSE

- A. Place, spread and compact base course in accordance with CCMS Item 304.
- B. Width of base course shall be greater than or equal to the width of pavement surface, if continuous lateral support is provided during rolling, and shall extend a

minimum of 2 times the base thickness beyond edge of pavement if lateral support is not provided.

- C. Place aggregate in maximum lifts of 6" thickness, compacted measure. Compact each lift to specified density.
 - 1. Place material adjacent to wall, manhole, catch basin, and other structures only after such structures have been set to required grade and level.
 - 2. Begin rolling operations at sides and progress to center of crowned areas; begin rolling on low side and progress toward high side of sloped areas. Continue rolling until material does not creep or wave ahead of roller wheels.
 - 3. Replace and properly recompact surface irregularities which exceed 1/2" as measured by means of a 10' long straightedge.
- D. Compact base course as follows:
 - 1. Vehicle Pavement: Compact to 98% of maximum dry density as determined by ASTM D698.
 - 2. Pedestrian Walks: Compact to 95% of maximum dry density as determined by ASTM D698.
- E. Maintain subbase and base course clean and uncontaminated. Mixing of specified base material and less select materials is not permitted. Remove materials spilled outside pavement lines and repair area.
- F. Clean, replace or otherwise repair, to conform to the requirements of this Section, portions of subgrade or of construction above subgrade that become contaminated, softened, or dislodged by passing of traffic or otherwise injured before proceeding with the next operation.

3.03 STEEL REINFORCEMENT

- A. Place reinforcing in accordance with ACI 301.
- B. Thoroughly clean reinforcing of loose mill and rust scale, dirt, ice and other foreign material which may reduce the bond between the concrete and reinforcing.
 - 1. Where there is a delay in placing concrete after reinforcing bars are in place, reinspect and clean reinforcing when necessary.
- C. Do not use reinforcing bars which show cracks after bending.
- D. Unless otherwise indicated on drawings, extend reinforcing to within 2" of formwork and expansion joints. Continue reinforcing through control joints. Lap adjacent sheets of fabric reinforcing 6".
- E. After forms have been coated with form release agent, but before concrete is placed, securely wire reinforcing steel anchors in the exact position indicated, and

maintain in that position until concrete is placed and compacted. Provide chair bars and supports in number and arrangement necessary.

3.04 PORTLAND CEMENT CONCRETE PAVING

- A. Paving mix, equipment, methods of mixing and placement, and precautions to be observed as to weather, condition of base, etc. shall meet requirements of ACI 316R.
- B. Notify Architect and Soils Testing and Inspection Firm sufficiently in advance of start of operation to allow for complete preliminary inspection of the work, including base course, forms and reinforcing steel.
- C. Place concrete for full thickness in one operation, without change in proportions; screed to proper elevations; finish and cure as specified. Dusting of surfaces with cement is prohibited.
- D. Follow normal concrete placement procedures. Concrete shall arrive at jobsite so that no additional water will be required to produce specified slump. When conditions develop that require the addition of water to produce the desired slump, permission of the Architect must be obtained.
- E. Do not perform work during rainy weather or when temperature is less than 40 degrees F.
- F. Protect adjacent work from stain and damage during entire operation. Repair or replace damaged and stained areas equal to their original conditions.
- G. When concrete is placed, thoroughly dampen existing concrete, earth, and other water-permeable material against which new concrete is to be placed.
- H. Do not use concrete which has set or partially set before placing. Retempering of concrete will not be permitted.
- I. Thoroughly spade and tamp concrete to secure a solid homogeneous mass, thoroughly worked around reinforcement and into corners of forms.
- J. When joining fresh concrete to concrete that has attained full set, clean set concrete of foreign matter. Remove mortar scum by chipping and washing. Saturate clean, roughened concrete with water; set concrete shall have no free water on surface. Scrub a coat of 1:1 cement-sand grout into dampened concrete. Place new concrete immediately before grout has dried or set.
- K. Construct concrete paving on compacted base accurately formed for required slab thickness and base.
- L. Construction: Unless otherwise indicated, provide the following:
 - 1. Sidewalks: CCMS Item 452.

- a. Base: 4" thick.
 - b. Reinforcing: None.
 - c. Concrete: 4" thick.
 - d. Slope: As noted on drawings. 1/8" per foot minimum.
 - 2. Pedestrian Paving
 - a. Base: 4" thick.
 - b. Reinforcing: None.
 - c. Concrete: 4" thick.
 - 3. Paving and Aprons at Vehicular Traffic: CCMS Item 452.
 - a. Base: 6", CCMS 304.
 - b. Concrete: 6 " thick.
- M. Provide concrete curbs and aprons as indicated to conform to details indicated on drawings.

3.05 JOINTS

- A. Location: Locate as indicated on drawings. In absence of information on drawings, provide joints as specified below.
- B. Contraction Joints: Sawed or formed within 8 hours of concrete placement.
- 1. Slabs
 - a. Space (in feet) between 2 to 2-1/2 times slab thickness (in inches) in both directions (i.e. 4" thick slab, spaces 8' to 10' on centers).
 - b. Grid of control joints to be approximately square with longest side to be not longer than 1.5 times the shortest side.
 - c. Slabs of sufficient thickness to space joints greater than 15 feet require transfer devices; obtain Architect's approval before proceeding.
 - d. Minimum Depth of Joint: 1/4 slab thickness.
 - e. See drawings for joint spacing in sidewalks.
 - 2. Curbs
 - a. Maximum 10 feet on center and aligned with joints in vehicular paving.
 - b. Minimum depth of joint: 1-1/2".
- C. Isolation Joints: Formed prior to concrete placement.
- 1. Slabs: Provide where slabs abut vertical surfaces, at intersections of sidewalks, or at abrupt changes of width. Include walls, columns, light pole bases, outside face of curbs, and utility structures such as drainage inlets or manholes. Form diamond shape around columns, bases, and round castings.
 - 2. Joint: Full depth of slab; 1/4" joint filler with top flush with slab.
- D. Construction Joints: Provide formed edge cold joint where indicated or required with tooled edge. Construction joints not to occur closer than contraction joint spacing.

- E. Expansion Joints: Formed prior to concrete placement. Provide at building walls, where specifically shown, and when placing concrete during temperatures less than 40 degrees.
1. Slabs
 - a. Space maximum 20 feet on center.
 - b. Provide where slabs abut vertical surfaces, at intersections of sidewalks, or at abrupt changes of width.
 2. Curbs: Align with joints in pavement or in absence of concrete pavement, provide at intervals not to exceed 20 feet.
 3. Sidewalks: See drawings for locations of joints. Provide at all intersections of pavement and vertical surfaces or structures.
 4. Joint: Full depth of slab or curb; 1/2" joint filler with top 3/8" filled with sealant. Sealant installed under Section 07900. Provide removable cap joints for all slabs; set top of cap to finish elevations.
- F. Sealant: All expansion, contraction and construction joints to be sealed under Section 07 92 00.

3.05 FINISHING

- A. Concrete flatwork surfaces shall be screeded off and finished true to line and grade, and free of hollows and bumps. Surface shall be dense, smooth, and at exact level and slope required.
1. Finished concrete surfaces shall be wood floated and finished with a fine broom to a sandy textured surface. Surface shall not deviate more than 1/8" in 10'.
- B. Unless otherwise indicated, provide exposed horizontal surfaces with a light broom finish, with direction of grooves in concrete surface perpendicular to length of concrete band, slab or pad. After concrete has set sufficiently to prevent coarse aggregate from being torn from surface, but before it has completely set, broom concrete to produce a pattern of small parallel grooves. Provide broomed surface uniform, with no smooth, unduly rough or porous spots or other irregularities. Do not dislodge coarse aggregate during brooming operations.
- C. Immediately following finishing operations, round arises at edges and expansion joints to a 1/4" radius. Score tooled control joints into slab surface with scoring tool. Finish adjacent edges of control joints to a 1/4" radius.

3.06 CURING

- A. It is essential that concrete be kept damp from time of placement until end of specified curing period. It is equally essential that water not be added to surface during floating and troweling operations, and not earlier than 24 hours after concrete placement. Between finishing operations, protect surfaces from rapid drying by a covering of waterproofing paper. Surface shall be damp when covering is placed over it, and shall be kept damp by means of a fog spray of water, applied

as often as necessary to prevent drying, but no sooner than 24 hours after placing concrete. None of the water applied shall be troweled or floated into surface.

- B. Cure concrete surfaces by completely covering with curing paper or by application of curing compound.
 - 1. Waterproof Paper: Completely cover concrete surface. Lap seams and seal with tape. During curing period check surface frequently. Spray with water as often as necessary to prevent drying, but not earlier than 24 hours after placing concrete.
 - 2. Curing Compound: Apply at rate recommended by manufacturer. Apply in two applications perpendicular to each other.
 - 3. Curing Period: Minimum 7 days.

3.07 COLD WEATHER CONCRETING

- A. Heat materials for concrete when concrete is mixed, placed or cured when the mean daily temperature is below 40 degrees F or is expected to fall below 40 degrees F with 72 hours. Protect concrete after placing by covering, heat or both.
- B. Details of handling and protecting concrete during cold weather shall be subject to approval of the Architect. Procedures shall comply with provisions of ACI 306R.

3.08 HOT WEATHER CONCRETING

- A. Protect fresh placed concrete from direct sunshine. Sprinkle forms and reinforcement with cold water just prior to concrete placement. Every effort shall be made to minimize delays which will result in excessive mixing of the concrete after arrival on the job.
- B. During periods of excessive hot weather, 95 degrees F and above, cool concrete ingredients insofar as possible and use cold mixing water to maintain the temperature of concrete at permissible levels all in accordance with the provisions of ACI 305. Concrete with a temperature above 95 degrees F at time of placement will not be acceptable and will be rejected.
- C. Maintain temperature records throughout the period of hot weather giving air temperature, general weather conditions (calm, clear, windy, etc.) and relative humidity. Include checks on temperature of concrete as delivered and after placement. Correlate data with the progress of the work so that conditions surrounding the construction of any part of the work can be ascertained.

3.09 PROTECTION OF CONCRETE SURFACES

- A. Protect concrete surfaces from traffic or damage until surfaces have hardened sufficiently. If necessary, protect exposed surfaces with 1/2" thick plywood sheets.

3.10 BONDING ADMIXTURE

- A. Latex, non-wettable type. "SBR Latex" or "FLEX-Con" by EUCLID CHEMICAL

COMPANY or "Daraweld" by W.R. GRACE. Or provide Structural Bonding Epoxy Adhesive: Two component 100% solids, 100% reactive compound suitable for use on dry or damp surfaces. "Euco Epoxy #452MV or #620" by EUCLID CHEMICAL COMPANY or "Sikadur Hi-Mod" by SIKA CHEMICAL CORPORATION

END OF SECTION

SECTION 32 92 19

SEEDING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. All seeding shall be performed by General Contractor, including seeding of trenching operations performed by Plumbing, HVAC and Electrical Contractors.
- B. Provide lawns as specified. Limits of lawns shall be all areas disturbed during construction excluding roads, walkways, other permanent structures and landscaped areas. Work includes:
 - 1. Soil preparation.
 - 2. Seeded lawns.
 - 3. Soil amendments and mulches.
 - 4. Gravel strip building edging.
 - 5. Maintenance.

1.02 RELATED SECTIONS

- A. Plants: Section 32 93 00.

1.03 SUBMITTALS

- A. Submit seed vendor's certification for required grass seed mixture, indicating percentage by weight, and percentages of purity, germination and weed seed for each grass species.

1.04 QUALITY ASSURANCE

- A. Provide mulch and seed free of weeds, annual bluegrass, nimblewill, bentgrass, perennial ryegrass, tall fescue, orchardgrass, quickgrass, nutsedge, and other objectionable foreign matter detrimental to the establishment of lawns.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver seed and fertilizer materials in original, unopened and undamaged containers showing weight, analysis and name of manufacturer. Store in manner to prevent wetting and deterioration.

1.06 PROJECT CONDITIONS

- A. Protect existing utilities, paving and other facilities from damage caused by lawn work operations.

- B. Perform lawn work only after work affecting ground surface has been completed.
- C. Restrict traffic from lawn areas until grass is established. Erect temporary signs and barriers as required.
- D. Install seeded lawns between March 15 and April 15, or August 15 to September 15, except as otherwise authorized by the Architect. Late summer is preferred.
- E. Provide necessary hose and lawn watering equipment as required for lawn maintenance.

1.07 GUARANTY

- A. Provide a uniform stand of grass by watering, mowing and maintaining lawn areas until acceptance. Reseed areas, with specified materials which fail to provide a uniform stand of grass until all affected areas are accepted by the Architect.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Lawn seed: Fresh, clean and new crop seed mixture. Each seed type certified. Mixed by an approved method.
 - 1. Composed of the following varieties, mixed to the specified proportions by weight and tested to minimum percentages of purity and germination. Poa Annua, bent grass, and noxious weed seed free.
 - 2. Test for germination made within preceeding six months. Not to exceed 0.25% weed seed.
 - 3. Lawn Seed Mixture: Similar to the following:

50% Common Kentucky Bluegrass
35% Red Fescue
15% Perennial Ryegrass (Pennfine)

Apply at 4 pounds per 1000 square feet.
 - 4. Wildlife Seed Mixture

50% Perennial Rye
20% Orchard Grass
15% Red Fescue
10% Kentucky Blue
5% Climax Timothy

Apply at 8 pounds per 1000 square feet.

2.02 LAWN ACCESSORIES

- A. Lawn Topsoil: Furnished, distributed and graded under Section 31 30 00.
- B. Lawn fertilizer: Provide a 12-12-12 analysis. Furnish fertilizer in a slow release (insoluble) form. The nitrogen source shall be ammonium sulphate or sulphur coated urea rather than urea, in a uniformly granular or pelletized form.
- C. Lawn mulch: Clean oat or wheat straw well seasoned before bailing, free from mature seed-bearing stalks or roots of prohibited or noxious weeds.
- D. Tackifier: Liquid concentrate diluted with water forming a transparent three dimensional film like crust permeable to water and air and containing no agents toxic to seed germination.
- E. Water: Free of substances harmful to lawn growth.
- F. Gravel Surfacing: Clean, round river washed gravel 1/2" to 3/4" size. Color range as selected by Architect.
- G. Wood Edging: Construction grade redwood or western red cedar, S4S, minimum 2" x 4" (nominal). Provide 2" x 2" x 18" wood stakes of same material for securing edging.
- H. Weed Barrier: Polypropylene or fiberglass landscape mat, rot resistant, water permeable and unaffected by freezing and thawing.

PART 3 EXECUTION

3.01 INSPECTION

- A. Examine finish surfaces, grades, topsoil quality and depth. Do not start lawn work until unsatisfactory conditions have been corrected.
- B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 PREPARATION

- A. Limit preparation to areas which will be immediately planted.
- B. Fine grade lawn areas to provide a smooth and continual grade between existing or fixed controls such as walks, roadways, elevations at buildings. Roll, scarify, rake and level as necessary to obtain true, even lawn surfaces. Correct irregularities in the surface resulting from tillage operations to prevent formation of depressions or water pockets.
- C. Cultivate soil to provide a firm bed a minimum of 4" deep, free of clods, stones, or foreign matter over 1" in diameter from the top 4" of soil. Do not move heavy objects except necessary lawn making equipment over the lawn areas after the soil is prepared unless it is again loosened and graded. Level off undulations or

irregularities in the surface.

- D. Apply fertilizer to lawn areas at the rate of 20 lbs per 1,000 square feet.
- E. Apply fertilizers by mechanical rotary or drop type distributor, thoroughly and evenly incorporated with soil to a depth of 3" by discing or other approved method. Fertilize areas inaccessible to power equipment with hand tools and incorporate into soil.
- F. Install lawn materials immediately after fertilizing. Maintain lawn areas in a smooth, friable and uniform condition. Restore prepared areas to specified condition if eroded, settled or otherwise disturbed after fine grading and before installing lawn materials.

3.03 INSTALLATION

A. Seeding

- 1. Seed immediately after preparation of bed.
- 2. Seed areas indicated and lawn areas disturbed as a result of construction operations.
- 3. Perform seeding operations when the soil is dry and when winds do not exceed five miles per hour velocity.
- 4. Apply seed with a rotary or drop type distributor. Install seed evenly by sowing equal quantities in two directions, at right angles to each other.
- 5. Use culti-packer to cover seed and form seed bed in one operation. In areas inaccessible to culti-packer, light rake seeded ground with flexible rakes and roll with water ballast roller. If seed bed is raked after seeding, cover seed by no more than 1/8" to 1/4" of soil.

B. Mulching

- 1. Place straw mulch on seeded areas within 24 hours after seeding.
- 2. Place straw mulch uniformly in a continuous blanket at the rate of 2-1/2 tons per acre, or two 50 lbs. bales per 1,000 square feet of area.
- 3. Anchor straw mulch with liquid tackifier applied uniformly at a rate of 60 gallons per acre.
- 4. Protect buildings, paving, plantings, and all non-seeded areas from liquid tackifier over-spray.
- 5. Mulch anchor may be omitted if area is adequately watered during establishment. Replace mulch displaced before grass has made a growth of 1" to 1-1/2". Leave mulch in place and allow to disintegrate; remove excessive accumulation when lawn is established.

- C. During germination period, protect and water seeded and sodded areas, maintain top 1/2" to 1" soil moist. Continue watering until final acceptance of lawn work.

3.04 GRAVEL BUILDING EDGING

- A. Treat entire area to receive gravel surfacing with weed killer before installation of weed barrier and surface material.
- B. Install wood edging. Provide top flush with adjacent lawn surfaces with horizontal lines true and straight. Provide galvanized fastenings for edging and stakes.
- C. Install minimum 4" uniform depth of gravel over single layer of weed barrier.
- D. Avoid mixing of gravel and soil.

3.05 RECONDITIONING EXISTING LAWNS

- A. Recondition existing lawn areas damaged by Contractor's operations including storage of materials or equipment and movement of vehicles and existing lawn transition areas where minor regrading is required.
- B. Provide fertilizer and seed materials as specified for new lawns and as required to provide a satisfactorily reconditioned lawn.
- C. Cultivate bare and compacted areas thoroughly to provide a satisfactory planting bed.
- D. Remove diseased or unsatisfactory lawn area. Do not bury into soil. Remove topsoil containing foreign materials including oil drippings, stone, gravel and other construction materials.
- E. Where substantial but thin lawn remains, mow, rake, aerate if compacted, fill low spots, remove humps, and cultivate soil, fertilize and seed. Remove weeds before seeding or if extensive, apply selective chemical weed killers as required. Apply seed bed mulch, as required to maintain moist conditions.
- F. Water newly seeded areas and keep moist until new grass is established.

3.06 MAINTENANCE

- A. Begin maintenance of lawns immediately after planting and continue until final acceptance of lawn work.
- B. Maintain lawns by watering, fertilizing, weeding, mowing, trimming, reseeding and other operations, including rolling and regrading as required to establish a viable, acceptable lawn.
 - 1. Set mower blades at a minimum height of 2". Not more than 30% of the grass leaf shall be removed at the initial or subsequent mowing. Mow all lawns before turf reaches a height of 3".
 - 2. If infestation of weeds or crabgrass develops, treat infestation by hand weeding or herbicidal control. Furnish and install weed chemical control as

recommended by manufacturer. Herbicidal controls, including renovation before seeding operations, shall be acceptable to the Architect.

- C. Provide and maintain temporary hoses and lawn watering equipment as required to convey water from water source and to keep lawn uniformly moist as required for proper growth.

3.07 ACCEPTANCE

- A. Lawns will be inspected for acceptance and accepted providing all requirements, including maintenance have been complied with, and a healthy, uniform, close stand of the specified grass is established, free of weeds, bare spots and surface irregularities.
- B. No individual area of lawn shall have bare spots or unacceptable cover totalling more than 2% of the individual lawn area, in areas requested to be inspected.
- C. Inspection to determine acceptance of lawn areas will be made by the Architect upon Contractor's written request. Provide notification at least ten (10) working days before requested inspection date.
- D. Upon acceptance the Owner will assume lawn maintenance.

3.08 CLEANING

- A. Perform cleaning during installation of lawn work and upon completion of the work. Remove from site all excess materials, debris and equipment. Repair damage resulting from lawn work operations.
- B. Sweep and hose down paved surfaces affected by lawn work operations.

END OF SECTION

SECTION 33 01 30

STORM SEWER CLEANING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. This specification covers flushing and blowing-out of existing piping system.
- B. Provide all labor, materials, tools, equipment, etc. required to perform the pipe flushing operations as specified herein.
- C. Cleaning of piping shall be accomplished by thoroughly flushing system with clear water at sufficient velocity to remove all foreign matter.

PART 2 PRODUCTS

2.01 MATERIAL

- A. Provide materials and equipment as required.

PART 3 EXECUTION

3.01 PREPARATION FOR FLUSHING

- A. Prior to flushing procedure, visually inspect all pipe runs as practicable.
- B. Equipment with restricted flow passages or inaccessible areas where sediment could collect, shall be by-passed or furnished with adequately sized temporary protection strainers.
- C. If system pumps that do not have a permanent strainer are used, the a temporary strainer shall be installed between the suction valve and the pump.
 - 1. Temporary Strainer: Galvanized woven wire cloth, .035 mesh, 6x6, or equal type.
- D. Where flushing water is recirculated and not wasted to sewers, install temporary strainers and/or baskets at all sumps, tanks, and other accessible areas where extraneous material flushed from the piping system can be collected and removed.

3.02 FLUSHING PROCEDURES

- A. Flush all pipelines at their design flow rate. Where possible, sectionalize piping systems and provide full system flow rates through individual sections. Where flushing large diameter lines at their design flow rate is not practical, then flush lines at a flow rate as directed by the Architect or an alternate cleaning

procedure shall be developed.

- B. Inspect strainers and/or baskets during flushing operations. Clean when necessary.
- C. Continue flushing operations until extraneous materials are no longer collected at baskets and strainers.
- D. Upon completion of flushing operations, remove, clean and reinstall strainers and baskets, unless otherwise specified. Tanks and sumps are to be drained and thoroughly cleaned. Return equipment and piping to their preflush condition.

END OF SECTION

**ASBESTOS MATERIAL SURVEY
AT
The Meadows Apartments
4855 Pintail Creek Drive
Canal Winchester, Ohio 43110**



**CONDUCTED FOR:
Moody-Nolon
300 Spruce Street, Suite 300
Columbus, Ohio 43215**

Date: November 8, 2021
Job Number: HES21-2231

A copy of this report must be maintained on site during asbestos abatement as per revised
OAC 3701-34-04 © (2) Effective November 13, 2014



Date: November 8, 2021

Asbestos Survey To: **Moody-Noland**
300 Spruce St., Suite 300
Columbus, Oh 43215

Contact Person: Anup Janardhanan
Phone: 614-461-4664 E-Mail: anupj@moodynolan.com

Asbestos Survey of: **The Meadows Apartments**
4855 Pintail Creek Drive
Canal Winchester, Ohio 43110

INTRODUCTION

We appreciate your consideration of *Hina Environmental Solutions*, LLC and are looking forward to working with you. We are committed to the highest ethics and integrity. We exist to serve our customers and to earn their trust, confidence and repeat business.

SCOPE OF WORK

As authorized by Anup Janardhanan, on November, 4, 2021, Brian Walker with *Hina Environmental Solutions* performed an asbestos survey of The Meadows Apartments located at 4855 Pintail Creek Drive in Columbus, Ohio. The purpose of this survey is to sample all suspicious friable and non-friable building materials for asbestos before the renovations. This survey is consistent with the requirements of 40 CFR (Code of Federal Regulations) 61, subpart M, "National Emission Standard for Asbestos" (NESHAP regulations) prior to a planned standard practice burn, demolition or renovation project. Building owners and employers must comply with 40 CFR 61 subpart M, EPA rules governing asbestos handling and waste disposal in building demolition and renovation. We will also collect bulk samples for asbestos in accordance with the regulation adopted by U.S EPA pursuant to Title II of the Federal Toxic Substances Control Act found in 40 CFR Part 763.86.

Building Description

The apartment complex was built in 2000 and has approximately 95 units, a community center and common areas. The interior of the units consists of drywall and flooring. The exterior of the units consists of brick, vinyl siding and asphalt roofing.

Bulk Sample Testing

The following items were tested for asbestos:

SAMPLE	*HSN	DESCRIPTION & LOCATION	ASBESTOS %	CATEGORY
1A	1	Tan 12x12 Floor Tile – Community Center/Units	NAD	N/A
1B	1	Mastic	NAD	N/A
2A	1	Tan 12x12 Floor Tile – Community Center/Units	NAD	N/A
2B	1	Mastic	NAD	N/A

3A	2	Grey Cove Base – Community Center/Units	NAD	N/A
3B	2	Mastic	NAD	N/A
4A	2	Grey Cove Base – Community Center/Units	NAD	N/A
4B	2	Mastic	NAD	N/A
5A	3	Black Cove Base – Community Center/Units	NAD	N/A
5B	3	Mastic	NAD	N/A
6A	3	Black Cove Base – Community Center/Units	NAD	N/A
6B	3	Mastic	NAD	N/A
7	4	White Sink Insulation – Community Center/Units	NAD	N/A
8	4	White Sink Insulation – Community Center/Units	NAD	N/A
9	5	Ceiling Tile – Community Center	NAD	N/A
10	5	Ceiling Tile – Community Center	NAD	N/A
11A	6	Grey Floor Tile – Community Center/Units	NAD	N/A
11B	6	Mastic	NAD	N/A
12A	6	Grey Floor Tile – Community Center/Units	NAD	N/A
12B	6	Mastic	NAD	N/A
13A	7	Drywall – Community Center/Units	NAD	N/A
13B	7	Joint Compound	NAD	N/A
14A	7	Drywall – Community Center/Units	NAD	N/A
14B	7	Joint Compound	NAD	N/A
15A	7	Drywall – Community Center/Units	NAD	N/A
15B	7	Joint Compound	NAD	N/A
16A	7	Drywall – Community Center/Units	NAD	N/A
16B	7	Joint Compound	NAD	N/A
17A	7	Drywall – Community Center/Units	NAD	N/A
17B	7	Joint Compound	NAD	N/A
18A	7	Drywall – Community Center/Units	NAD	N/A
18B	7	Joint Compound	NAD	N/A
19A	7	Drywall – Community Center/Units	NAD	N/A
19B	7	Joint Compound	NAD	N/A
20	8	Exterior Expansion Joint Caulking – Community Center/Units	NAD	N/A
21	8	Exterior Expansion Joint Caulking – Community Center/Units	NAD	N/A
22	9	Black Sink Insulation – Units	NAD	N/A
23	9	Black Sink Insulation – Units	NAD	N/A
24	10	Linoleum Flooring – Units	NAD	N/A
25	10	Linoleum Flooring – Units	NAD	N/A
26A	11	Tan 12x12 Floor Tile – Units	NAD	N/A
26B	11	Mastic	NAD	N/A
27A	11	Tan 12x12 Floor Tile – Units	NAD	N/A
27B	11	Mastic	NAD	N/A

***Homogeneous Sample Numbers**

1 Floor Tile/Mastic, 2 Cove Base/Mastic, 3 Cove Base/Mastic, 4 Sink Insulation, 5 Ceiling Tile, 6 Floor Tile/Mastic, 7 Drywall/Compound, 8 Caulking, 9 Sink Insulation, 10 Linoleum, 11 Floor Tile/Mastic.

Notes: (1) Asbestos Containing Materials as defined by EPA/NESHAP regulations
(2) OSHA regulations address materials containing any amount of asbestos

Conclusions and Recommendations

All of the samples taken came back with no asbestos detected. No asbestos abatement is needed before the demolition commences.

Regulations Information

According to OSHA Construction Industry Asbestos Standard contractors performing activities that disturb ACM, regardless of the amount involved are required to follow the Asbestos Standard governing workers exposed to asbestos.

Ohio Environment Protection Agency requires a 10 day notification period if asbestos building materials that are to be disturbed are more than 260 linear feet or 160 square feet. Notification of building demolition, regardless of whether ACM is present, to Ohio EPA is required at least 10 working days prior to a planned demolition.

Category I non-friable ACM such as the roofing were not sampled. According to EPA regulations, these materials can be assumed category 1 ACM. In their present, non-friable form they are not considered regulated ACM (RACM) by the EPA. They can be left in place during demolition (non-burning), and in a non-friable form these materials would not be subject to NESHAP waste disposal regulations. The demolition contractor must note the quantity of these materials on the EPA notification form. If a facility is to be used as a practice burn then all asbestos including category 1 ACM has to be removed prior to the practice burn.

Methodology

The EPA regulations require that the sample location be randomly selected. Suspect asbestos building materials were identified and samples of each type were taken from homogeneous areas. The number of sampled taken of each surfacing building material was procured according to the "3, 5, 7 rule".

Disclaimer

Concealed materials, which may be present beneath solid floors, above solid ceilings and between solid walls, if any, were not accessible for observation or sampling. During renovations if other materials are found please call for additional sampling.

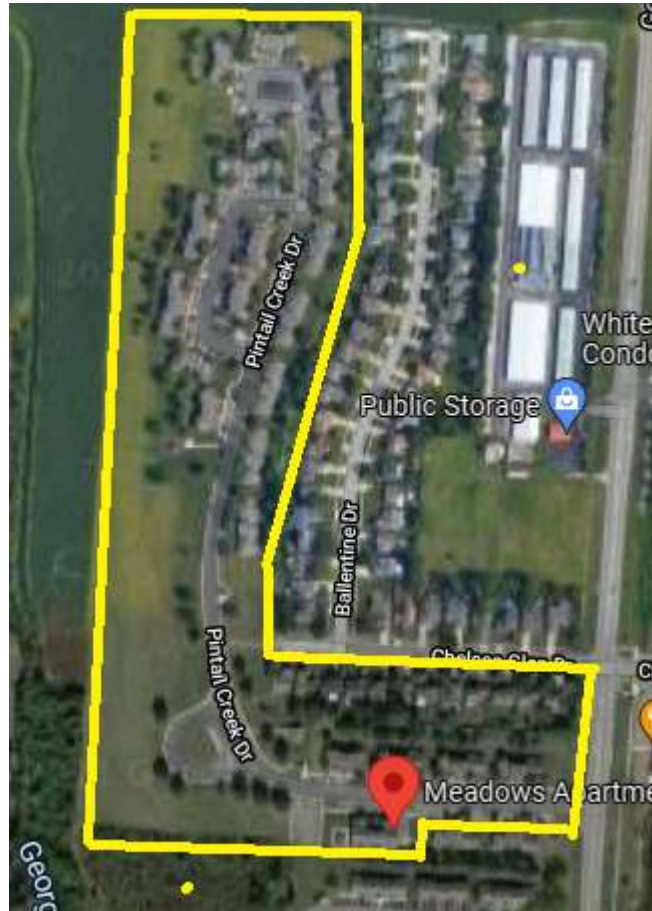
Any questions or clarifications, please contact Brian Walker @ (614) 272-8780.

Hina Environmental Solutions, LLC.



Brian Walker
Ohio Asbestos Hazard
Evaluation Specialist ES35451
Expires 2/17/2022

Site Plan



LAB REPORT



The Identification Specialists

Analysis Report
prepared for
Hina Enviromental Solutions, LLC

Report Date: 11/8/2021

Project Name: Moody Nolan

Project #: 21-2231

SanAir ID#: 21069973



NVLAP LAB CODE 600227-0

11709 Chesterdale Road | Cincinnati, Ohio 45246
888.895.1177 | 513.438.6006 | IAQ@SanAir.com | SanAir.com



SanAir ID Number

21069973

FINAL REPORT

11/8/2021 11:35:35 AM

Name: Hina Enviromental Solutions, LLC
Address: 995A Safin Road
Columbus, OH 43204
Phone: 614-272-8780

Project Number: 21-2231
P.O. Number: Meadows Apt
Project Name: Moody Nolan
Collected Date: 11/4/2021
Received Date: 11/5/2021 12:15:00 PM

Dear Brian Walker,

We at SanAir would like to thank you for the work you recently submitted. The 27 sample(s) were received on Friday, November 05, 2021 via UPS. The final report(s) is enclosed for the following sample(s): 1-1, 2-1, 3-2, 4-2, 5-3, 6-3, 7-4, 8-4, 9-5, 10-5, 11-6, 12-6, 13-7, 14-7, 15-7, 16-7, 17-7, 18-7, 19-7, 20-8, 21-8, 22-9, 23-9, 24-10, 25-10, 26-11, 27-11.

These results only pertain to this job and should not be used in the interpretation of any other job. This report is only complete in its entirety. Refer to the listing below of the pages included in a complete final report.

Sincerely,

A handwritten signature in black ink, appearing to read "Matt Daigneault".

Matthew Daigneault
Asbestos Laboratory Manager
SanAir Technologies Laboratory

Final Report Includes:

- Cover Letter
- Analysis Pages
- Disclaimers and Additional Information

Sample conditions:

- 27 samples in Good condition.



Name: Hina Enviromental Solutions, LLC
Address: 995A Safin Road
 Columbus, OH 43204
Phone: 614-272-8780

Project Number: 21-2231
P.O. Number: Meadows Apt
Project Name: Moody Nolan
Collected Date: 11/4/2021
Received Date: 11/5/2021 12:15:00 PM

Analyst: Scales, Sean

Asbestos Bulk PLM EPA 600/R-93/116

SanAir ID / Description	Stereoscopic	Components		Asbestos Fibers
	Appearance	% Fibrous	% Non-fibrous	
1-1 / 21069973-001 12x12 Floor Tile/Mastic, Floor Tile	Tan Non-Fibrous Homogeneous		100% Other	None Detected
1-1 / 21069973-001 12x12 Floor Tile/Mastic, Mastic	Yellow Non-Fibrous Homogeneous		100% Other	None Detected
2-1 / 21069973-002 12x12 Floor Tile/Mastic, Floor Tile	Tan Non-Fibrous Homogeneous		100% Other	None Detected
2-1 / 21069973-002 12x12 Floor Tile/Mastic, Mastic	Yellow Non-Fibrous Homogeneous		100% Other	None Detected
3-2 / 21069973-003 Cove Base/Mastic, Cove Base	Grey Non-Fibrous Homogeneous		100% Other	None Detected
3-2 / 21069973-003 Cove Base/Mastic, Mastic	Beige Non-Fibrous Homogeneous		100% Other	None Detected
4-2 / 21069973-004 Cove Base/Mastic, Cove Base	Grey Non-Fibrous Homogeneous		100% Other	None Detected
4-2 / 21069973-004 Cove Base/Mastic, Mastic	Beige Non-Fibrous Homogeneous		100% Other	None Detected
5-3 / 21069973-005 Cove Base/Mastic, Cove Base	Black Non-Fibrous Homogeneous		100% Other	None Detected
5-3 / 21069973-005 Cove Base/Mastic, Mastic	Beige Non-Fibrous Homogeneous		100% Other	None Detected

Analyst:

Approved Signatory:

Analysis Date: 11/5/2021

Date: 11/8/2021



Name: Hina Enviromental Solutions, LLC
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 Columbus, OH 43204
Phone: 614-272-8780

Project Number: 21-2231
P.O. Number: Meadows Apt
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Collected Date: 11/4/2021
Received Date: 11/5/2021 12:15:00 PM

Analyst: Scales, Sean

Asbestos Bulk PLM EPA 600/R-93/116

SanAir ID / Description	Stereoscopic	Components		Asbestos Fibers
	Appearance	% Fibrous	% Non-fibrous	
6-3 / 21069973-006 Cove Base/Mastic, Cove Base	Black Non-Fibrous Homogeneous		100% Other	None Detected
6-3 / 21069973-006 Cove Base/Mastic, Mastic	Beige Non-Fibrous Homogeneous		100% Other	None Detected
7-4 / 21069973-007 Sink Insulation	White Non-Fibrous Homogeneous	15% Cellulose	85% Other	None Detected
8-4 / 21069973-008 Sink Insulation	White Non-Fibrous Homogeneous	15% Cellulose	85% Other	None Detected
9-5 / 21069973-009 Ceiling Tile	Grey Fibrous Heterogeneous	30% Cellulose 30% Glass	10% Other 30% Perlite	None Detected
10-5 / 21069973-010 Ceiling Tile	Grey Fibrous Heterogeneous	30% Cellulose 30% Glass	10% Other 30% Perlite	None Detected
11-6 / 21069973-011 12x12 Floor Tile/Mastic, Floor Tile	Grey Non-Fibrous Homogeneous		100% Other	None Detected
11-6 / 21069973-011 12x12 Floor Tile/Mastic, Mastic	Yellow Non-Fibrous Homogeneous		100% Other	None Detected
12-6 / 21069973-012 12x12 Floor Tile/Mastic, Floor Tile	Grey Non-Fibrous Homogeneous		100% Other	None Detected
12-6 / 21069973-012 12x12 Floor Tile/Mastic, Mastic	Yellow Non-Fibrous Homogeneous		100% Other	None Detected

Analyst:

Approved Signatory:

Analysis Date: 11/5/2021

Date: 11/8/2021



Name: Hina Enviromental Solutions, LLC
Address: 995A Safin Road
 Columbus, OH 43204
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Project Number: 21-2231
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Received Date: 11/5/2021 12:15:00 PM

Analyst: Scales, Sean

Asbestos Bulk PLM EPA 600/R-93/116

SanAir ID / Description	Stereoscopic	Components		Asbestos Fibers
	Appearance	% Fibrous	% Non-fibrous	
13-7 / 21069973-013 Drywall/Joint Compound, Drywall	Grey Fibrous Heterogeneous	2% Cellulose < 1% Glass	98% Other	None Detected
13-7 / 21069973-013 Drywall/Joint Compound, Joint Compound	Cream Non-Fibrous Homogeneous		100% Other	None Detected
14-7 / 21069973-014 Drywall/Joint Compound, Drywall	Grey Fibrous Heterogeneous	2% Cellulose < 1% Glass	98% Other	None Detected
14-7 / 21069973-014 Drywall/Joint Compound, Joint Compound	Cream Non-Fibrous Homogeneous		100% Other	None Detected
15-7 / 21069973-015 Drywall/Joint Compound, Drywall	Grey Fibrous Heterogeneous	2% Cellulose < 1% Glass	98% Other	None Detected
15-7 / 21069973-015 Drywall/Joint Compound, Joint Compound	Cream Non-Fibrous Homogeneous		100% Other	None Detected
16-7 / 21069973-016 Drywall/Joint Compound, Drywall	Grey Fibrous Heterogeneous	2% Cellulose < 1% Glass	98% Other	None Detected
16-7 / 21069973-016 Drywall/Joint Compound, Joint Compound	Cream Non-Fibrous Homogeneous		100% Other	None Detected
17-7 / 21069973-017 Drywall/Joint Compound, Drywall	Grey Fibrous Heterogeneous	2% Cellulose < 1% Glass	98% Other	None Detected
17-7 / 21069973-017 Drywall/Joint Compound, Joint Compound	Cream Non-Fibrous Homogeneous		100% Other	None Detected

Analyst:

Approved Signatory:

Analysis Date: 11/5/2021

Date: 11/8/2021



Name: Hina Enviromental Solutions, LLC
Address: 995A Safin Road
 Columbus, OH 43204
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Project Number: 21-2231
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Received Date: 11/5/2021 12:15:00 PM

Analyst: Scales, Sean

Asbestos Bulk PLM EPA 600/R-93/116

SanAir ID / Description	Stereoscopic	Components		Asbestos Fibers
	Appearance	% Fibrous	% Non-fibrous	
18-7 / 21069973-018 Drywall/Joint Compound, Drywall	Grey Fibrous Heterogeneous	2% Cellulose < 1% Glass	98% Other	None Detected
18-7 / 21069973-018 Drywall/Joint Compound, Joint Compound	White Non-Fibrous Homogeneous		100% Other	None Detected
19-7 / 21069973-019 Drywall/Joint Compound, Drywall	Grey Fibrous Heterogeneous	2% Cellulose < 1% Glass	98% Other	None Detected
19-7 / 21069973-019 Drywall/Joint Compound, Joint Compound	White Non-Fibrous Homogeneous		100% Other	None Detected
20-8 / 21069973-020 Exterior Expansion Joint Caulking	Tan Non-Fibrous Homogeneous		100% Other	None Detected
21-8 / 21069973-021 Exterior Expansion Joint Caulking	Tan Non-Fibrous Homogeneous		100% Other	None Detected
22-9 / 21069973-022 Sink Insulation	Black Non-Fibrous Homogeneous		100% Other	None Detected
23-9 / 21069973-023 Sink Insulation	Black Non-Fibrous Homogeneous		100% Other	None Detected
24-10 / 21069973-024 Linoleum Flooring	Tan Fibrous Heterogeneous	15% Cellulose 2% Glass	83% Other	None Detected
25-10 / 21069973-025 Linoleum Flooring	Tan Fibrous Heterogeneous	15% Cellulose 2% Glass	83% Other	None Detected

Analyst:

Approved Signatory:

Analysis Date: 11/5/2021

Date: 11/8/2021



SanAir ID Number

21069973

FINAL REPORT

11/8/2021 11:35:35 AM

Name: Hina Enviromental Solutions, LLC**Address:** 995A Safin Road

Columbus, OH 43204

Phone: 614-272-8780**Project Number:** 21-2231**P.O. Number:** Meadows Apt**Project Name:** Moody Nolan**Collected Date:** 11/4/2021**Received Date:** 11/5/2021 12:15:00 PM

Analyst: Scales, Sean

Asbestos Bulk PLM EPA 600/R-93/116

SanAir ID / Description	Stereoscopic	Components		Asbestos Fibers
	Appearance	% Fibrous	% Non-fibrous	
26-11 / 21069973-026 12x12 Floor/Tile, Floor Tile	Beige Non-Fibrous Homogeneous		100% Other	None Detected
26-11 / 21069973-026 12x12 Floor/Tile, Mastic	Yellow Non-Fibrous Homogeneous		100% Other	None Detected
27-11 / 21069973-027 12x12 Floor/Tile, Floor Tile	Beige Non-Fibrous Homogeneous		100% Other	None Detected
27-11 / 21069973-027 12x12 Floor/Tile, Mastic	Yellow Non-Fibrous Homogeneous		100% Other	None Detected

Analyst:

Approved Signatory:

Analysis Date: 11/5/2021

Date: 11/8/2021

Disclaimer

The final report cannot be reproduced, except in full, without written authorization from SanAir. Fibers smaller than 5 microns cannot be seen with this method due to scope limitations. The accuracy of the results is dependent upon the client's sampling procedure and information provided to the laboratory by the client. SanAir assumes no responsibility for the sampling procedure and will provide evaluation reports based solely on the sample and information provided by the client. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Samples are held for a period of 60 days.

For NY state samples, method EPA 600/M4-82-020 is performed.

Polarized- light microscopy is not consistently reliable in detecting asbestos in floor covering and similar non-friable organically bound materials. Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing.

Asbestos Certifications NVLAP lab code 600227-0
Rhode Island Certification Number: PLM00144

RID 5/12/2026
SanAir Technologies Laboratory, Inc.

1551 Oakbridge Drive, Suite B - Powhatan, VA 23139
 804-897-1177 / 888-895-1177 / Fax 804-897-0070
 www.sanair.com

**Asbestos
Chain of Custody**

SanAir ID Number

91069973

Company: Hina Environmental		Project #: 21-2231	Collected by: B. Walker
Address: 995 Safin Road		Project Name: Moody Nolan	Phone #: 614-272-8780
City, St., Zip: Columbus, OH 43204		Date Collected: 11/4/2021	614-272-8787
State of Collection: OH Account#: 2156		P.O. Number: Meadows Apts	Email: bhina@hinaenvironmental.com

bwalker@hinaenvironmental.com cmelick@hinaenvironmental.com

Bulk			Air			Soil/Vermiculite		
ABB	PLM EPA 600/R-93/116	☒	ABA	PCM NIOSH 7400	☐	ABSE	PLM EPA 600/R-93/116 (Qual.)	☐
	Positive Stop	☒	ABA-2	OSHA w/ TWA*	☐	ABSP	PLM CARB 435 (LOD <1%)	☐
ABEPA	PLM EPA 400 Point Count	☐	ABTEM	TEM AHERA	☐	ABSP1	PLM CARB 435 (LOD 0.25%)	☐
ABB1K	PLM EPA 1000 Point Count	☐	ABATN	TEM NIOSH 7402	☐	ABSP2	PLM CARB 435 (LOD 0.1%)	☐
ABBEN	PLM EPA NOB	☐	ABT2	TEM Level II	☐			
ABBCH	TEM Chatfield	☐				Dust		
ABBTM	TEM EPA NOB	☐				ABWA	TEM Wipe ASTM D-6480	☐
			New York ELAP			ABDMV	TEM Microvac ASTM D-5755	☐
			PLM NY	PLM 600/M4/82/020	☐			
			ABEPA2	NY ELAP 198.1	☐			
			ABENY	NY ELAP 198.6 PLM NOB	☐			
			ABBNY	NY ELAP 198.4 TEM NOB	☐			
						Matrix Other		
								☐

Water		
ABHE	EPA 100.2	☐

Turn Around Times	3 HR (4 HR TEM) ☐	6 HR (8HR TEM) ☐	12 HR ☐	24 HR ☒
	2 Days ☐	3 Days ☐	4 Days ☐	5 Days ☐

Special Instructions

Sample #	Sample Identification/Location	Room #	Side A-D
1-1	Tan 12x12 Floor Tile/Mastic		
2-1	Tan 12x12 Floor Tile/Mastic		
3-2	Grey Cove Base/Mastic		
4-2	Grey Cove Base/Mastic		
5-3	Black Cove Base/Mastic		
6-3	Black Cove Base/Mastic		
7-4	White Sink Insulation		
8-4	White Sink Insulation		
9-5	Ceiling Tile		
10-5	Ceiling Tile		
11-6	Grey 12x12 Floor Tile/Mastic		
12-6	Grey 12x12 Floor Tile/Mastic		

Relinquished by	Date	Time	Received by	Date	Time
B Walker	11/4/2021	10 AM	M/S	11/5/21	12:55pm

Unless scheduled, the turn around time for all samples received after 3 pm EST Friday will begin at 8 am Monday morning. Weekend or Holiday work must be scheduled ahead of time and is charged for rush turn around time.

Work with standard turn around time sent Priority Overnight and Billed To Recipient will be charged a \$10 shipping fee. Positive Stop, Automatic Point count under 3%. Only test what is listed in description.

When plaster is found to be positive do not continue to analyze the other layers. Composite DW only if Joint Compound is positive after point count.

[illegible]

Special Instructions	

Relinquished by	Date	Time	Received by	Date	Time
			MD	11/5/21	1215pm

Unless scheduled, the turn around time for all samples received after 3 pm Friday will begin at 8 am Monday morning.

Weekend or Holiday work must be scheduled ahead of time and is charged for rush turn around time.

Work with standard turn around time sent Priority Overnight and Billed To Recipient will be charged a \$10 shipping fee.

Positive Stop, Automatic Point count anything under 3%, Only test what is listed in the description.

When Plaster is positive do not continue to analyze other layers. Composite DW only if Joint Compound is positive after point count.

Suspicious Materials

RACM

Yes, No, N/A

☐	☒	☐	Pipe Insulation
☐	☒	☐	Pipe joints
☐	☒	☐	Valves
☐	☒	☐	Duct Insulation
☐	☒	☐	Boiler Insulation
☐	☒	☐	Breeching Insulation
☐	☒	☐	Boiler door insulation
☐	☒	☐	Heat Exchanger Insulation
☐	☒	☐	Boiler Insulation
☐	☒	☐	Boiler Interior Components
☐	☒	☐	Gaskets
☐	☒	☐	Tank Insulation
☐	☒	☐	Cementious mud Insulation
☐	☒	☐	Sprayed-on Fire Proofing
☐	☒	☐	Cloth-Like Tape used on furnace Ductwork (NOT Typical Gray Duct Tape)
☐	☒	☐	Paper layers underneath wood flooring
☐	☒	☐	Paper layers above 1' x 1' ceiling tiles
☐	☒	☐	Outside layer on cork pipe insulation
☐	☒	☐	Reflective light liners in old ceiling light fixtures
☐	☒	☐	Plaster
☐	☒	☐	Texture Ceiling
☐	☒	☐	Acoustical Plaster ceilings
☐	☒	☐	Vermiculite
☐	☒	☐	Ceiling Panels
☐	☒	☐	Texture Wall
☐	☒	☐	Stucco
☐	☒	☐	Fire Brick

Category #1

Yes, No, N/A

☒	☐	☐	Drywall / Compound
☐	☒	☐	Packing
☐	☒	☐	Gaskets
☐	☒	☐	Window, Door and Siding Caulking
☐	☒	☐	Window Glazing
☐	☒	☐	Asphalt Roofing
☒	☐	☐	Floor tile
☒	☐	☐	Floor Tile Mastic
☒	☐	☐	Ceiling tile
☐	☒	☐	Ceiling Tile Mastic
☐	☒	☐	Chalk Board Mastic
☐	☒	☐	Lab top Mastic
☐	☒	☐	Vibration Dampers
☐	☒	☐	Galvalume
☐	☒	☐	Mastics
☐	☒	☐	Black insulation compound in older fluorescent light fixtures
☐	☒	☐	Cement panels (black "ebonized" ACM) in electrical fuse panels
☐	☒	☐	Felt layer behind corrugated exterior building siding
☒	☐	☐	Coating on bottom of stainless steel sinks

☐	☒	☐	Exterior window glazing
☐	☒	☐	Fire-stop compound at penetrations
☐	☒	☐	Basketball Backboards (on rear side)
☒	☐	☐	Caulk used on building exteriors and expansion joints
☐	☒	☐	Cloth fire curtains
☐	☒	☐	Transite, and Fire-doors (White core Material)
☐	☒	☐	Leveling Compounds
☐	☒	☐	Gunit
☐	☒	☐	Fire Doors
☐	☒	☐	Textured Paint
☒	☐	☐	Cove Base/Mastic
☒	☐	☐	Linoleum
☐	☒	☐	Stair Treads
☐	☒	☐	Mastic behind, drywall, paneling and other components
☐	☒	☐	Light weight concrete
☐	☒	☐	Built-up roof
☐	☒	☐	Roof Flashing
☒	☐	☐	Sink Insulation

Category #2

Yes, No, N/A

☐	☒	☐	Transite Siding
☐	☒	☐	Transite Roofing
☐	☒	☐	Transite Walls
☐	☒	☐	Transite Flue
☐	☒	☐	Transite Soffits
☐	☒	☐	Chalk Boards
☐	☒	☐	Lab Tops
☐	☒	☐	Transite Duct
☐	☒	☐	Transite Conducts
☐	☒	☐	Lab hood liner

Miscellaneous Materials

Yes, No, N/A

☐	☒	☐	Electrical Wiring
☐	☒	☐	Auditorium Curtains
☐	☒	☐	Fire Blankets
☐	☒	☐	Welding gloves
☐	☒	☐	Welding Apron
☐	☒	☐	Ironing Board Pad
☐	☒	☐	Table top pad

Non-Suspect Materials

All metals, Glass, Metal, Rock, Fiberglass, Carpet, wood, plastic, brick, Ceramic tile, terrazzo floors, rubber, foam, and pressed wood.

3-5-7 Rule

TYPE OF SUSPECT MATERIAL	MINIMUM SAMPLING
<u>Surfacing Materials</u> (Acoustical materials, Plaster, fireproofing)	< 1,000sf = 3 samples < 5,000sf = 5 samples >5,000sf = 7 samples
<u>Thermal System Insulation</u> (Pipes, Ducts, Boilers, Tanks)	3 samples
<u>Class 11 Materials</u> (Drywall, Compound, Skim Coats, Textured surfaces)	< 1,000sf = 3 samples < 5,000sf = 5 samples >5,000sf = 7 samples
<u>Miscellaneous Materials</u> (Floor Tile, Mastic, Acoustical Panels, Roofing)	2 Samples



1 - ELEVATION



2 - ELEVATION



3 - ELEVATION



4 - ELEVATION

UNIT TYPE 2-A & 3-A

GENERAL NOTES
BUILDING EXTERIOR

- A. AT ALL BUILDINGS, EXISTING VINYL SIDING TO BE REPLACED WITH NEW VINYL SIDING, TYP.
- B. AT ALL BUILDINGS, EXISTING GUTTERS, AND DOWNSPOUTS TO BE REPLACED, TYP.
- C. AT ALL BUILDINGS, EXISTING FACE BRICK TO REMAIN. CLEAN ANY GRAFFITI, TYP.
- D. AT ALL BUILDINGS, EXISTING VINYL WINDOW SYSTEM TO BE REPLACED, TYP.
- E. AT ALL EXTERIOR RAILS, CLEAN, PREPARE, AND PAINT EXISTING METAL HANDRAILS, COLUMNS, ETC. TYP.
- F. AT ALL BUILDINGS, PAINT EXTERIOR HM ENTRY DOORS, TYP.

CODED NOTES
BUILDING EXTERIOR

- 1 EXISTING ASPHALT SHINGLE ROOF SYSTEM TO REMAIN. ALTERNATE : REPLACE SHINGLES
- 2 PROVIDING NEW SIDING.
- 3 EXISTING FACE BRICK TO REMAIN. CLEAN ANY GRAFFITI, TYP.
- 4 REMOVE EXISTING AND PROVIDE NEW DOORS AND FRAMES, TYP.
- 5 REMOVE EXISTING GUTTERS AND DOWNSPOUTS. PROVIDE NEW GUTTERS & DOWNSPOUT SYSTEM, TYP.
- 6 REMOVE EXISTING WINDOWS AND SHUTTERS. PROVIDE NEW WINDOW SYSTEM WITH SHUTTERS, TYP.
- 7 PAINT EXISTING METAL RAILINGS, TYP.
- 8 PAINT EXISTING SHED/STORAGE DOORS AND FRAMES, TYP. U.N.O. IN DRAWINGS.
- 9 REFER TO MEP DRAWINGS FOR ROOF PIPE PENETRATION INFORMATION, TYP.
- 10 REMOVE EXISTING ALUMINUM CLAD FASCIA / TRIM AND PROVIDE NEW ALUMINUM CLAD.
- 11 REMOVE EXISTING GARAGE DOOR, PROVIDE NEW, TYP.
- 12 PAINT STUCCO, TYP.
- 13 CLEAN LOUVERS, TYP.
- 14 CLEAN AND PAINT ELECTRIC AND GAS METER CENTERS, TYP ALL LOCATIONS.



BUILDING TYPE I
TM-01

Project No. - 18076.04
08/14/2025
BID / PERMIT SET

THE MEADOWS RAD RENOVATIONS
4855 PINTAIL CREEK DRIVE
COLUMBUS, OH 43110





1 - ELEVATION

1
9

6

10

2

5

3

4

8



2 - ELEVATION



3 - ELEVATION

1
9

2

10

3

6

6



4 - ELEVATION

GENERAL NOTES
BUILDING EXTERIOR

- A. AT ALL BUILDINGS, EXISTING VINYL SIDING TO BE REPLACED WITH NEW VINYL SIDING, TYP.
- B. AT ALL BUILDINGS, EXISTING GUTTERS, AND DOWNSPOUTS TO BE REPLACED, TYP.
- C. AT ALL BUILDINGS, EXISTING FACE BRICK TO REMAIN. CLEAN ANY GRAFFITI, TYP.
- D. AT ALL BUILDINGS, EXISTING VINYL WINDOW SYSTEM TO BE REPLACED, TYP.
- E. AT ALL EXTERIOR RAILS, CLEAN, PREPARE, AND PAINT EXISTING METAL HANDRAILS, COLUMNS, ETC. TYP.
- F. AT ALL BUILDINGS, PAINT EXTERIOR HM ENTRY DOORS, TYP.

CODED NOTES
BUILDING EXTERIOR

- 1 EXISTING ASPHALT SHINGLE ROOF SYSTEM TO REMAIN. ALTERNATE : REPLACE SHINGLES
- 2 PROVIDING NEW SIDING.
- 3 EXISTING FACE BRICK TO REMAIN. CLEAN ANY GRAFFITI, TYP.
- 4 REMOVE EXISTING AND PROVIDE NEW DOORS AND FRAMES, TYP.
- 5 REMOVE EXISTING GUTTERS AND DOWNSPOUTS. PROVIDE NEW GUTTERS & DOWNSPOUT SYSTEM, TYP.
- 6 REMOVE EXISTING WINDOWS AND SHUTTERS. PROVIDE NEW WINDOW SYSTEM WITH SHUTTERS, TYP.
- 7 PAINT EXISTING METAL RAILINGS, TYP.
- 8 PAINT EXISTING SHED/STORAGE DOORS AND FRAMES, TYP. U.N.O. IN DRAWINGS.
- 9 REFER TO MEP DRAWINGS FOR ROOF PIPE PENETRATION INFORMATION, TYP.
- 10 REMOVE EXISTING ALUMINUM CLAD FASCIA / TRIM AND PROVIDE NEW ALUMINUM CLAD.
- 11 REMOVE EXISTING GARAGE DOOR, PROVIDE NEW, TYP.
- 12 PAINT STUCCO, TYP.
- 13 CLEAN LOUVERS, TYP.
- 14 CLEAN AND PAINT ELECTRIC AND GAS METER CENTERS, TYP ALL LOCATIONS.



BUILDING TYPE II

TM-02

Project No. - 18076.04

08/14/2025

BID / PERMIT SET

THE MEADOWS RAD RENOVATIONS
4855 PINTAIL CREEK DRIVE
COLUMBUS, OH 43110



COLUMBUS METROPOLITAN HOUSING AUTHORITY
COMMUNITY. COMMITMENT. COLLABORATION.



1 - ELEVATION

- 1
- 9
- 3
- 10
- 5
- 4
- 6
- 2



2 - ELEVATION

GENERAL NOTES
BUILDING EXTERIOR

- A. AT ALL BUILDINGS, EXISTING VINYL SIDING TO BE REPLACED WITH NEW VINYL SIDING, TYP.
- B. AT ALL BUILDINGS, EXISTING GUTTERS, AND DOWNSPOUTS TO BE REPLACED, TYP.
- C. AT ALL BUILDINGS, EXISTING FACE BRICK TO REMAIN. CLEAN ANY GRAFFITI, TYP.
- D. AT ALL BUILDINGS, EXISTING VINYL WINDOW SYSTEM TO BE REPLACED, TYP.
- E. AT ALL EXTERIOR RAILS, CLEAN, PREPARE, AND PAINT EXISTING METAL HANDRAILS, COLUMNS, ETC. TYP.
- F. AT ALL BUILDINGS, PAINT EXTERIOR HM ENTRY DOORS, TYP.

CODED NOTES
BUILDING EXTERIOR

- 1 EXISTING ASPHALT SHINGLE ROOF SYSTEM TO REMAIN. ALTERNATE : REPLACE SHINGLES
- 2 PROVIDING NEW SIDING.
- 3 EXISTING FACE BRICK TO REMAIN. CLEAN ANY GRAFFITI, TYP.
- 4 REMOVE EXISTING AND PROVIDE NEW DOORS AND FRAMES, TYP.
- 5 REMOVE EXISTING GUTTERS AND DOWNSPOUTS. PROVIDE NEW GUTTERS & DOWNSPOUT SYSTEM, TYP.
- 6 REMOVE EXISTING WINDOWS AND SHUTTERS. PROVIDE NEW WINDOW SYSTEM WITH SHUTTERS, TYP.
- 7 PAINT EXISTING METAL RAILINGS, TYP.
- 8 PAINT EXISTING SHED/STORAGE DOORS AND FRAMES, TYP. U.N.O. IN DRAWINGS.
- 9 REFER TO MEP DRAWINGS FOR ROOF PIPE PENETRATION INFORMATION, TYP.
- 10 REMOVE EXISTING ALUMINUM CLAD FASCIA / TRIM AND PROVIDE NEW ALUMINUM CLAD.
- 11 REMOVE EXISTING GARAGE DOOR, PROVIDE NEW, TYP.
- 12 PAINT STUCCO, TYP.
- 13 CLEAN LOUVERS, TYP.
- 14 CLEAN AND PAINT ELECTRIC AND GAS METER CENTERS, TYP ALL LOCATIONS.

UNIT TYPE 2-A & 3-A



BUILDING TYPE III
TM-03

Project No. - 18076.04
08/14/2025
BID / PERMIT SET

THE MEADOWS RAD RENOVATIONS
4855 PINTAIL CREEK DRIVE
COLUMBUS, OH 43110





1 - ELEVATION



2 - ELEVATION



3 - ELEVATION



4 - ELEVATION

UNIT TYPE 3-B

GENERAL NOTES
BUILDING EXTERIOR

- A. AT ALL BUILDINGS, EXISTING VINYL SIDING TO BE REPLACED WITH NEW VINYL SIDING, TYP.
- B. AT ALL BUILDINGS, EXISTING GUTTERS, AND DOWNSPOUTS TO BE REPLACED, TYP.
- C. AT ALL BUILDINGS, EXISTING FACE BRICK TO REMAIN. CLEAN ANY GRAFFITI, TYP.
- D. AT ALL BUILDINGS, EXISTING VINYL WINDOW SYSTEM TO BE REPLACED, TYP.
- E. AT ALL EXTERIOR RAILS, CLEAN, PREPARE, AND PAINT EXISTING METAL HANDRAILS, COLUMNS, ETC. TYP.
- F. AT ALL BUILDINGS, PAINT EXTERIOR HM ENTRY DOORS, TYP.

CODED NOTES
BUILDING EXTERIOR

- 1 EXISTING ASPHALT SHINGLE ROOF SYSTEM TO REMAIN. ALTERNATE : REPLACE SHINGLES
- 2 PROVIDING NEW SIDING.
- 3 EXISTING FACE BRICK TO REMAIN. CLEAN ANY GRAFFITI, TYP.
- 4 REMOVE EXISTING AND PROVIDE NEW DOORS AND FRAMES, TYP.
- 5 REMOVE EXISTING GUTTERS AND DOWNSPOUTS. PROVIDE NEW GUTTERS & DOWNSPOUT SYSTEM, TYP.
- 6 REMOVE EXISTING WINDOWS AND SHUTTERS. PROVIDE NEW WINDOW SYSTEM WITH SHUTTERS, TYP.
- 7 PAINT EXISTING METAL RAILINGS, TYP.
- 8 PAINT EXISTING SHED/STORAGE DOORS AND FRAMES, TYP. U.N.O. IN DRAWINGS.
- 9 REFER TO MEP DRAWINGS FOR ROOF PIPE PENETRATION INFORMATION, TYP.
- 10 REMOVE EXISTING ALUMINUM CLAD FASCIA / TRIM AND PROVIDE NEW ALUMINUM CLAD.
- 11 REMOVE EXISTING GARAGE DOOR, PROVIDE NEW, TYP.
- 12 PAINT STUCCO, TYP.
- 13 CLEAN LOUVERS, TYP.
- 14 CLEAN AND PAINT ELECTRIC AND GAS METER CENTERS, TYP ALL LOCATIONS.



BUILDING TYPE IV
TM-04

Project No. - 18076.04
08/14/2025
BID / PERMIT SET

THE MEADOWS RAD RENOVATIONS
4855 PINTAIL CREEK DRIVE
COLUMBUS, OH 43110



COLUMBUS METROPOLITAN HOUSING AUTHORITY
COMMUNITY. COMMITMENT. COLLABORATION.



1 - ELEVATION



2 - ELEVATION



3 - ELEVATION



4 - ELEVATION

UNIT TYPE 4-A

GENERAL NOTES
BUILDING EXTERIOR

- A. AT ALL BUILDINGS, EXISTING VINYL SIDING TO BE REPLACED WITH NEW VINYL SIDING, TYP.
- B. AT ALL BUILDINGS, EXISTING GUTTERS, AND DOWNSPOUTS TO BE REPLACED, TYP.
- C. AT ALL BUILDINGS, EXISTING FACE BRICK TO REMAIN. CLEAN ANY GRAFFITI, TYP.
- D. AT ALL BUILDINGS, EXISTING VINYL WINDOW SYSTEM TO BE REPLACED, TYP.
- E. AT ALL EXTERIOR RAILS, CLEAN, PREPARE, AND PAINT EXISTING METAL HANDRAILS, COLUMNS, ETC. TYP.
- F. AT ALL BUILDINGS, PAINT EXTERIOR HM ENTRY DOORS, TYP.

CODED NOTES
BUILDING EXTERIOR

- 1 EXISTING ASPHALT SHINGLE ROOF SYSTEM TO REMAIN. ALTERNATE : REPLACE SHINGLES
- 2 PROVIDING NEW SIDING.
- 3 EXISTING FACE BRICK TO REMAIN. CLEAN ANY GRAFFITI, TYP.
- 4 REMOVE EXISTING AND PROVIDE NEW DOORS AND FRAMES, TYP.
- 5 REMOVE EXISTING GUTTERS AND DOWNSPOUTS. PROVIDE NEW GUTTERS & DOWNSPOUT SYSTEM, TYP.
- 6 REMOVE EXISTING WINDOWS AND SHUTTERS. PROVIDE NEW WINDOW SYSTEM WITH SHUTTERS, TYP.
- 7 PAINT EXISTING METAL RAILINGS, TYP.
- 8 PAINT EXISTING SHED/STORAGE DOORS AND FRAMES, TYP. U.N.O. IN DRAWINGS.
- 9 REFER TO MEP DRAWINGS FOR ROOF PIPE PENETRATION INFORMATION, TYP.
- 10 REMOVE EXISTING ALUMINUM CLAD FASCIA / TRIM AND PROVIDE NEW ALUMINUM CLAD.
- 11 REMOVE EXISTING GARAGE DOOR, PROVIDE NEW, TYP.
- 12 PAINT STUCCO, TYP.
- 13 CLEAN LOUVERS, TYP.
- 14 CLEAN AND PAINT ELECTRIC AND GAS METER CENTERS, TYP ALL LOCATIONS.



BUILDING TYPE V
TM-05

Project No. - 18076.04
08/14/2025
BID / PERMIT SET

THE MEADOWS RAD RENOVATIONS
4855 PINTAIL CREEK DRIVE
COLUMBUS, OH 43110





1 - ELEVATION



2 - ELEVATION



3 - ELEVATION



4 - ELEVATION

UNIT TYPE 2-A, 2-B (ANSI TYPE A) & 3-A

GENERAL NOTES
BUILDING EXTERIOR

- A. AT ALL BUILDINGS, EXISTING VINYL SIDING TO BE REPLACED WITH NEW VINYL SIDING, TYP.
- B. AT ALL BUILDINGS, EXISTING GUTTERS, AND DOWNSPOUTS TO BE REPLACED, TYP.
- C. AT ALL BUILDINGS, EXISTING FACE BRICK TO REMAIN. CLEAN ANY GRAFFITI, TYP.
- D. AT ALL BUILDINGS, EXISTING VINYL WINDOW SYSTEM TO BE REPLACED, TYP.
- E. AT ALL EXTERIOR RAILS, CLEAN, PREPARE, AND PAINT EXISTING METAL HANDRAILS, COLUMNS, ETC. TYP.
- F. AT ALL BUILDINGS, PAINT EXTERIOR HM ENTRY DOORS, TYP.

CODED NOTES
BUILDING EXTERIOR

- 1 EXISTING ASPHALT SHINGLE ROOF SYSTEM TO REMAIN. ALTERNATE : REPLACE SHINGLES
- 2 PROVIDING NEW SIDING.
- 3 EXISTING FACE BRICK TO REMAIN. CLEAN ANY GRAFFITI, TYP.
- 4 REMOVE EXISTING AND PROVIDE NEW DOORS AND FRAMES, TYP.
- 5 REMOVE EXISTING GUTTERS AND DOWNSPOUTS. PROVIDE NEW GUTTERS & DOWNSPOUT SYSTEM, TYP.
- 6 REMOVE EXISTING WINDOWS AND SHUTTERS. PROVIDE NEW WINDOW SYSTEM WITH SHUTTERS, TYP.
- 7 PAINT EXISTING METAL RAILINGS, TYP.
- 8 PAINT EXISTING SHED/STORAGE DOORS AND FRAMES, TYP. U.N.O. IN DRAWINGS.
- 9 REFER TO MEP DRAWINGS FOR ROOF PIPE PENETRATION INFORMATION, TYP.
- 10 REMOVE EXISTING ALUMINUM CLAD FASCIA / TRIM AND PROVIDE NEW ALUMINUM CLAD.
- 11 REMOVE EXISTING GARAGE DOOR, PROVIDE NEW, TYP.
- 12 PAINT STUCCO, TYP.
- 13 CLEAN LOUVERS, TYP.
- 14 CLEAN AND PAINT ELECTRIC AND GAS METER CENTERS, TYP ALL LOCATIONS.



BUILDING TYPE VI
TM-06

Project No. - 18076.04
08/14/2025
BID / PERMIT SET

THE MEADOWS RAD RENOVATIONS
4855 PINTAIL CREEK DRIVE
COLUMBUS, OH 43110





1 - ELEVATION



2 - ELEVATION



3 - ELEVATION



4 - ELEVATION

COMMUNITY CENTER

GENERAL NOTES
BUILDING EXTERIOR

- A. AT ALL BUILDINGS, EXISTING VINYL SIDING TO BE REPLACED WITH NEW VINYL SIDING, TYP.
- B. AT ALL BUILDINGS, EXISTING GUTTERS, AND DOWNSPOUTS TO BE REPLACED, TYP.
- C. AT ALL BUILDINGS, EXISTING FACE BRICK TO REMAIN. CLEAN ANY GRAFFITI, TYP.
- D. AT ALL BUILDINGS, EXISTING VINYL WINDOW SYSTEM TO BE REPLACED, TYP.
- E. AT ALL EXTERIOR RAILS, CLEAN, PREPARE, AND PAINT EXISTING METAL HANDRAILS, COLUMNS, ETC. TYP.
- F. AT ALL BUILDINGS, PAINT EXTERIOR HM ENTRY DOORS, TYP.

CODED NOTES
BUILDING EXTERIOR

- 1 EXISTING ASPHALT SHINGLE ROOF SYSTEM TO REMAIN. ALTERNATE : REPLACE SHINGLES
- 2 PROVIDING NEW SIDING.
- 3 EXISTING FACE BRICK TO REMAIN. CLEAN ANY GRAFFITI, TYP.
- 4 REMOVE EXISTING AND PROVIDE NEW DOORS AND FRAMES, TYP.
- 5 REMOVE EXISTING GUTTERS AND DOWNSPOUTS. PROVIDE NEW GUTTERS & DOWNSPOUT SYSTEM, TYP.
- 6 REMOVE EXISTING WINDOWS AND SHUTTERS. PROVIDE NEW WINDOW SYSTEM WITH SHUTTERS, TYP.
- 7 PAINT EXISTING METAL RAILINGS, TYP.
- 8 PAINT EXISTING SHED/STORAGE DOORS AND FRAMES, TYP. U.N.O. IN DRAWINGS.
- 9 REFER TO MEP DRAWINGS FOR ROOF PIPE PENETRATION INFORMATION, TYP.
- 10 REMOVE EXISTING ALUMINUM CLAD FASCIA / TRIM AND PROVIDE NEW ALUMINUM CLAD.
- 11 REMOVE EXISTING GARAGE DOOR, PROVIDE NEW, TYP.
- 12 PAINT STUCCO, TYP.
- 13 CLEAN LOUVERS, TYP.
- 14 CLEAN AND PAINT ELECTRIC AND GAS METER CENTERS, TYP ALL LOCATIONS.



BUILDING TYPE VII
TM-07

Project No. - 18076.04
08/14/2025
BID / PERMIT SET

THE MEADOWS RAD RENOVATIONS
4855 PINTAIL CREEK DRIVE
COLUMBUS, OH 43110

