

LANDMARK HEALTHCARE FACILITIES LLC

GENERAL CONTRACTOR SPECIFICATIONS

FOR

MASTER SPECIFICATION

FORE RIVER MEDICAL PAVILLION

CONSTRUCTION DOCUMENTS

NOVEMBER 20, 2006

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DIVISION 1 – GENERAL REQUIREMENTS
Sections 01100 thru 01950 General Requirements

The General Conditions and Division 1 – General Requirements area hereby made a part of each division and section of the project specification.

PART 1 GENERAL

1.1 01100 GENERAL

The site and premises shall be kept clean and free of accumulation of waste material and rubbish on a daily basis.

- A. Work shall be installed in accordance with manufacturer's recommendations, specifications, and instructions.
- B. Materials shall be delivered to the site, undamaged in manufacturer's clearly labeled unopened container, identified with brand, type, grade, and U.L. label where applicable.
- C. All sales, consumer use and any other taxes required by law shall be included.

1.2 01140 CONTRACTOR'S USE OF SITE

- A. Construction shall be confined to improved and staging areas defined in cooperation with the hospital contractor. Other portions of the site or hospital campus shall not be disturbed. If other areas are disturbed, they shall be repaired.
- B. Driveways and entrances serving both the site and the hospital site shall be kept clear and available to the hospital contractors at all times. These areas shall not be used for parking or storage of materials. Deliveries shall be scheduled to minimize space and time requirements for storage of materials and equipment on site.
- C. Construction workers shall not be permitted to use hospital construction facilities.
- D. The hospital, site, and new construction areas is a "No Smoking" facility. Smoking shall not be allowed at any time inside buildings or within new construction once enclosed. Smoking may be allowed in designated smoking areas outside of the buildings.
- E. Radios and similar entertainment devices shall not be allowed on site.

1.3 01200 REFERENCE STANDARDS

- A. Reference Standards: When referenced in the preceding specifications, all work shall comply with the applicable portions of standards and specifications published by the technical societies, institutions, associations, and governing agencies referred to, latest revision in effect at the date of Contract Documents.

AAIEE	American Institute of Electrical and Electronics Engineers
AAN	American Association of Nurserymen
AAMA	Architectural Aluminum Manufacturers Association
ARI	Air Conditioning and Refrigeration Institute
ACI	American Concrete Institute
AIA	American Institute of Architects
AIEE	American Institute of Electrical Engineers
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ALSC	American Lumber Standards Council
ANSI	American National Standards Institute
APA	American Plywood Association
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers
ASLC	American Society of Landscape Contractors
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers Association
AWWA	American Water Works Association
AWI	Architectural Wood Institute
AWS	American Welding Society
AWWA	American Water Works Association
DOT	Department of Transportation Standard Specification for road and bridge construction, current edition.
FGMA	Flat Glass Marketing Association
FS	Federal Specification
GA	Gypsum Association
IMIAC	International Masonry Industry – All-Weather Council
LSGA	Laminated Safety Glass Association
ML/SFA	Metal Lath / Steel Framing Association
NEMA	National Electric Manufacturers Association
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Act
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SDI	Steel Deck Institute
SIGMA	Sealed Insulated Glass Manufacturers Association
SJI	Steel Joist Institute
SSPC	Steel Structures Painting Council
TCA	Tile Council of America
TPI	Truss Plate Institute
UL	Underwriter's Laboratories
WIC	Woodwork Institute of California
WWPA	Western Wood Products Association

1.4 01300 DEFINITIONS AND STANDARDS

- A. *Addendum* (plural - *Addenda*) is a document issued after the original document issue date, but prior to the date of the execution date of the Contract, which modifies the original documents to the extent indicated.
- B. *All* requires the doing of all things except those listed items which are specifically excluded.
- C. *Codes* mean rules, regulations, or statutory requirements of government agencies.
- D. *Complete* means complete with all connections, supports, attachments, and incidental items necessary for a finished and properly operating assembly or installation.
- E. *Equal*, in reference to the acceptability of products, materials, and equipment, other than those specified shall be defined as meeting some of the most important of, but not necessarily all of, the characteristics of the product, material, and equipment specified.
 - a. It is understood that all of the characteristics of equality may not be applicable to each and every product and application required in the Work. Where a proposed product possesses some, but not all, of the equal characteristics, Landmark will make a judgment as to which of the characteristics are most important to the particular application and may waive those determined to be less important in a particular instance.
 - b. Landmark shall make the final judgment on if a product, material, or equipment is equal to those specified
 - c. The following is a list of characteristics used to determine if a product, material, and / or equipment is equal:
 - i. Being similar in material composition, manufacture, assembly, configuration, size and finish and possessing the same or better functional and performance characteristics.
 - ii. Having the same or better operating characteristics in terms of power requirements and output.
 - iii. Having the same or greater term and force of Warranty/Guarantee.
 - iv. Having the same or greater choices of available colors and patterns.
 - v. Having the same or better availability and repair services.
 - vi. Having the same approvals of Code Officials and other governing authorities.
 - vii. Having the same or better compatibility with adjacent components and other related parts of the Work.
 - viii. Capable of providing the same design and artistic effect.
 - ix. Not requiring changes in details and construction of related work.
 - x. Having the same or lower installed cost.
- F. *Experienced* means having completed projects similar in size and scope to this Project.
- G. *Finished Floor Elevation* means the elevation of the top of the floor to which flooring finishes and materials are to be applied except that for terrazzo, mortar bed set ceramic and quarry tile, and other materials requiring a depressed slab, finished floor elevation means the top surface of the installed materials and the slab shall be depressed as required for the appropriate setting

bed.

- H. *Furnish* means supply and deliver to the construction site, ready for unloading, unpacking, assembly, installation and similar operations.
- I. *Hospital* refers to the entity sponsoring the Project.
- J. *Indicated* refers to graphic representations, notes or schedules. Where terms such as “shown,” “noted,” “scheduled,” and “specified” are used, it is to help locate the reference.
- K. *Install* is used to describe operations including actual unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protection, cleaning and similar operations.
- L. *Installer* is an entity engaged for performance of a particular construction activity, including installation, erection, application and similar operations. Installers shall be experienced in the operations they are engaged to perform.
- M. *Match* means providing a portion of the Work using the same construction products, techniques, sequences, dimensions, finishes, colors, and degree of craftsmanship as another portion of Work, or as existing conditions adjacent to the new portion of Work.
- N. *Necessary* shall be understood to refer to proper completion of the Work.
- O. *NIC* is used as an abbreviation for “Not included in the Contract”.
- P. *Opposite Hand* means a portion of the Work which matches another portion of Work but is a mirror image.
- Q. *Owner* refers to the entity owning the Project.
- R. *Project Site* is the space available for performance of construction activities, either exclusively or in conjunction with others performing other work as part of the Project.
- S. *Provide* means to furnish and install, complete and ready for the intended use.
- T. *Regulations* include laws, statutes, ordinances and lawful orders issued by Authorities Having Jurisdiction.
- U. *Required* shall be understood to refer to the requirements of the Contract Documents, unless its use clearly implies a different interpretation.
- V. *Similar* means a portion of the Work which matches the whole or part of another portion of Work but has a slightly different configuration.
- W. *Standards* are requirements set by authorities, custom, or general consent and established as acceptable criteria.
- X. *Symmetrical* means a portion of the Work which matches adjacent Work, or itself, but reversed about centerlines of symmetry.

- Y. *Tenant* means an individual or firm executing a lease for space within the building.
- Z. *Testing laboratory* is an independent entity engaged to perform specific inspections or tests and to report on and interpret the results of those inspections or tests.
- AA. *Undeveloped Space* indicates space that will be developed in the future for tenant space. The shell and core undeveloped space shall be developed to the following standards:
- a. Exterior wall shall be thermally insulated and the inside surface covered with a vapor retarder
 - b. Corridor and tenant demising walls shall not receive gypsum drywall, unless required by code to attain required fire rating.
 - c. Ceilings shall not receive finish material.
 - d. Floor structure for above grade areas shall receive specified concrete topping, but shall not receive finish flooring.
 - e. Floor structure for slab on grade areas shall receive specified sub-grade preparation and material including vapor barrier, but shall not receive concrete floor and slab reinforcing.
- AB. *Work* means the scope of construction work identified in the contents of the Contract Documents.

1.5 **01310 PROJECT MEETINGS**

- A. Contractor shall schedule and administer project meetings throughout progress of the work at minimum semimonthly intervals, or at mutually agreed upon times.
- a. Make physical arrangements for meetings, prepare agenda with copies for participants, preside at meetings, record minutes, and distribute copies within two (2) business days to Landmark, participants, and those affected by decisions made at meetings.
 - b. Attendance: shall include, but shall not be limited to, the Contractor's home office and field project managers, project supervisors, superintendent, home office and field representatives of major sub-contractors, vendors, and Landmark's Project Executive and / or representative.
 - c. Suggested Agenda: shall include, but shall not be limited to, review of the work progress, and adjustments thereto, deliver of schedules, submittals, maintenance of quality standards, pending delays, substitutions, and other items affecting progress of the work.
 - d. Meeting Minutes: Prepare and distribute job meeting minutes with revisions and with updated 8 1/2" x 11" bar chart schedule attached, to Landmark, Landmark's Architect, all sub-contractors and participants for their review, input, and verification. Job meetings minutes shall be used as the basis for agenda for each meeting. All old business items

shall be carried over on the agenda until each item is resolved or deemed unnecessary.

- B. Contractor shall schedule and administer pre-installation conferences with each sub-contractor and Landmark's Project Executive and / or representative.

1.6 **01320 PHOTOGRAPHS**

- A. Contractor is encouraged to, but is not required to, have pre-construction digital photographs taken of existing adjacent right-of-way, on-site, and adjacent site improvements in close proximity to proposed new construction prior to start of construction
- B. Photographs shall be taken in sufficient quantity, including close-up views where appropriate, to accurately record the existing physical condition of adjacent improvements.
- C. Prints shall be labeled by the photographer on the back of the print. Digital files shall be named. The label and / or file name shall describe the content of each photograph, and shall include the date the picture was taken
- D. Three (3) sets of prints of each photograph, or three complete set of digital files of each photograph shall be provided as a record of preconstruction conditions; One (1) for the Contractor, one (1) for Landmark, and one (1) for the Owner.
- E. Contractor and / or photographer shall keep the negatives or the digital files of each photograph for a period of (3) years after the date the picture was taken.

1.7 **01500 TEMPORARY FACILITIES**

- A. Temporary Facilities: Temporary water, electrical power, lighting, telephone, field office, sanitary facilities, drinking water, waste disposal, stairs, hard hats, barricades, warning signs, OSHA enclosures, fire extinguishers, partitions, site access roads, etc. shall be provided until the building is substantially complete and turned over to the Owner.
- B. Temporary Sign: A temporary construction sign, 6'-0" x 8'-0", shall be provided, unless otherwise required by local sign ordinance. Information required by Owner shall be included on a 4'-0" x 8'-0" portion of the sign. The remaining portion shall contain Landmark's information.
- C. Temporary facilities, utilities, and security and protection of facilities shall comply with regulations including building code requirements, health and safety regulations, utility company regulations, and environmental protection regulations.
- D. Facilities shall be maintained in good operating condition during construction.
- E. Protection of Adjacent Property
 - a. Contractor shall provide temporary shoring, bracing or other means as required to protect adjacent structures, adjacent streets and site improvements to remain from damage or collapse during the execution of the work.

- b. Locate and protect existing utilities and utility easements from damage during all operations on or adjacent to the construction site including those in public ways abutting the site.
 - c. Contractor is responsible for design, means and method of achieving protection of adjacent property.
- F. Temporary facilities shall be removed when their need has ended, but no later than substantial completion.
- a. Damaged work shall be repaired, and construction that can not be satisfactorily repaired shall be replaced.
 - b. Paving, curbs, and sidewalks damaged due to temporary access shall be repaired or replaced.

1.8 **01700 TESTING LABORATORY SERVICES**

- A. Site preparation shall be in accordance with Soil Investigation Report prepared by S.W. Cole Engineering Inc., dated September 7, 2006 (Rev. 1). In case of conflict between Soils Investigation and Specifications, the Soils Investigation shall govern. Landmark shall be notified of conflicts prior to Work proceeding.
- a. If actual subsurface conditions encountered required additional Work due to conditions which were not clearly defined by Drawings or testing data, a Change Order shall be agreed upon prior to additional work proceeding.
 - b. Among actual subsurface conditions that may not be defined by Soil Investigation, and soil testing data are rocks or boulders which cannot be removed by a three-quarter (3/4) yard backhoe, springs and pockets of unsuitable mater.
 - c. The cost of required tests and on-site inspections by a qualified independent testing and inspecting laboratory are not included in the Contract. The cost of any required re-testing due to inadequate performance by Contractor shall be paid for by Contractor.
- B. The Owner shall employ and pay for a qualified independent testing laboratory to perform specified services. The Contractor shall assist Landmark and shall coordinate the work. The Contractor shall notify the Owners testing and inspection laboratory for on-site testing and inspections as required in the specification sections.
- C. Written reports of inspections and tests shall be provided to the Owner, Landmark, and the Contractor within forty eight (48) hours of testing and inspection. Landmark and the Contractor shall be notified by phone or fax the same day any failing test is determined. Testing shall be required for, but is not limited to, the following:
- a. Geotechnical investigations and report
 - b. Earthwork soil and backfilling operations, and complete paving sub-grade preparation

testing, and on-site inspections

- c. Drilling Pier operation testing and on-site inspections
 - d. Site Concrete testing and on-site inspections
 - e. Concrete Work testing and on-site inspections
 - f. Architectural Pre-cast Concrete testing
 - g. Structural Metal Framing bolt, weld, and ultrasonic testing and on-site inspections
 - h. Cold Formed Metal Framing testing and on-site inspections
 - i. Sprayed-On Fireproofing testing and on-site inspections
- D. The Contractor shall require testing by the sub-contractors of the following:
- a. Mechanical equipment testing, adjusting and balancing
 - b. Piping systems testing, adjusting, and balancing
 - c. HVAC systems testing, adjusting, and balancing
 - d. Electrical systems testing and start-up
- E. Additional testing and inspection services desired by the Owner which are in addition to those provided by Landmark or the Contractor shall be at the Owner's cost. The Contractor shall provide access to the site and materials for the Owner's testing agency. The Owner shall provide Landmark with quality control testing, and inspection reports by the Owner's testing agency for services provided to the Project.

1.9 **01720 PROJECT COORDINATION**

- A. Lines of Authority: Landmark shall establish on-site lines of authority and communication. All communication between the Owner and the Contractors shall be through Landmark. The Contractor is not authorized to take direction or receive approvals from the Owner.
- B. Layout of Work: The Contractor shall provide layout of Work by using a Professional Engineer or Land Surveyor licensed in the State of the Project shall be used to layout the location of the building and site improvements on the site, shall ensure work is performed in accordance with the site plan, construction drawings, and property survey furnished by the Owner and / or Hospital's Surveyor.
 - a. Existing benchmarks established by the Hospital's Surveyor shall be maintained and protected during construction.
- C. Mechanical, Electrical Coordination: The Contractor shall provide the necessary coordination of General, Mechanical, Plumbing, Electrical, Fire Protection, and other Sub-contractors work

for the duration of the project. Each sub-contractor shall be responsible for all of their work fitting into place in a neat and concise manner in accordance with the specifications, drawings, and intent of the design, and to the approval of the General Contractor and Landmark.

- D. **Manufacturer Recommendations:** Equipment and materials shall be installed according to the manufacturer's instructions, and recommendations, unless otherwise specifically direct otherwise in the contract documents. Installation shall be executed to ensure full manufacturer warranties and guaranties are secured.
- E. **Changes in Work:** When a change in specified or scheduled equipment including the size shown, is made or directed for any reason, the sub-contractor making the change shall be responsible for generating coordination drawings showing the new layout of all equipment affected including required clearances, connection points, and the rerouting of piping, ductwork, and conduit.
- F. **Field Office:** A copy of all contractor documents, shop drawings, technical data, samples, certifications, manufacturer recommendations, and test reports shall be maintained in the temporary field office.

1.10 **01730 CUTTING AND PATCHING**

- A. **Cutting and Patching:** Shall be provided as required for all cutting, patching, or materials properly fitting together as required to complete the Work.
- B. Where cutting and patching involves addition of reinforcement to structural elements, reinforcing shall be coordinated with original structure.
- C. Cutting and patching shall be accomplished in a manner to permit existing operating elements or safety related components to perform as intended.
- D. Existing construction shall be protected during cutting and patching to prevent damage.

1.11 **01770 PROJECT CLOSEOUT**

- A. **Final Clean-up:**
 - a. All rubbish, implements and surplus materials shall be removed from the premises.
 - b. All labels which are not permanent labels shall be removed.
 - c. Windows, doors, fixtures and floors shall be cleaned of paint specks, glazing compound and stains and vinyl wallcovering and rubber base cleaned of adhesive.
 - d. All paint blemishes shall be removed.
 - e. All protective covers such as polyethylene film on light fixtures and elevator door jambs shall be removed.

- f. Glass and mirrors shall be washed and labels removed.
 - g. Cabinets and doors shall be dusted and wiped down.
 - h. Carpets shall be vacuumed.
 - i. All hard surface flooring and concrete to be left permanently exposed shall be washed.
 - j. Plumbing fixtures shall be cleaned to a sanitary condition.
- B. At completion, permanent facilities that have been used during construction shall be cleaned and renovated.
- a. Air filters shall be placed.
 - b. Toilet rooms shall be cleaned.
 - c. Lamps that are burned out shall be replaced.
- C. All electrical and mechanical equipment and panels shall be properly labeled.
- D. Equipment concealed above ceilings shall be marked with colored tacks in the ceiling as follows:
- a. Shut off valves Red
 - b. Air terminal devices Blue
 - c. Smoke detectors Yellow
 - d. HVAC sensors or devices Brown
 - e. Humidifiers or dehumidifier. Green
- E. Completed construction “as built” record drawings including color coded locations of the above tack identified equipment shall be turned over to Landmark.
- F. Required guarantees on Landmark’s Standard Form listed in each Specification Division and properly executed manufacturer’s guarantees and warranties shall be turned over to Landmark in a bound manual.
- G. “COMPLETION ITEMS” listed in each Specification Division shall be provided.
- H. Operation and Maintenance instructions, parts lists, and equipment brochures shall be provided to Landmark.
- I. Assignable service and maintenance contract proposals shall be provided.
- J. The key to the key cabinet shall be turned over to Landmark and all keys properly labeled

within the cabinet.

1.12 01780 SUBMITTALS

- A. General Requirements: Submittals, in the type and quantity listed below, shall be sent to the Architect, "Attn. Quality Control." The accompanying transmittal should clearly identify the project by name, city and state. The transmittal should identify if the submittal is for Review, for Information, or for Project Close-out. The transmittal should identify the specification section by number and name. A copy of the transmittal shall be sent to Landmark, "Attn. Project Executive."
- a. Within ten (10) days of contract execution, Contractor must submit the completed "General Contractor Projected Submittal Schedule" listing all Shop Drawings, Samples, and Product Data included in the Specification Divisions under SUBMITTALS. All submittals shall be submitted within eight (8) weeks after start of construction.
 - b. Contractor shall provide a list in triplicate of all items he intends to install in the project for which he has a proprietary name option in the Specifications and which are not required to be submitted as a Shop Drawing. The list shall state the specific brand name or manufacturer, and model number or type for each item.
 - c. In those instances where submittal to Landmark and the Architect is not required by the Specifications, Contractor shall arrange for necessary submittals from his subcontractors and suppliers and coordinate the work of all parties involved.
 - d. All Submittals shall be reviewed by the General Contractor for conformance with the specifications, dimensions, quantities, details, and related work, before they are sent to the Architect and Landmark. All Submittals shall be stamped "Approved" by the General Contractor. Submittals not indicating Contractor's approval shall be returned without review.
 - e. More than two (2) reviews of the same submittal by the Architect necessitated by continuing errors and / or deficiencies will result in additional costs to Landmark. Contractor agrees to reimburse Landmark through a deductive Change Order to the Contract Sum, for all costs associated with such reviews.
 - f. Two (2) copies of Submittals, after approval by Contractor and review by the Architect shall be maintained at the site.
- B. Submittals For Review:
- g. Prior to fabrication and installation, submit Shop Drawings, and Product Data listed under SUBMITTALS FOR REVIEW in each Specification Division. Work shall be in accordance with reviewed submittals..
 - h. Submittal drawings shall be sent to the Architect, and shall include six (6) full size prints (maximum size 30" X 42"), and six (6) Product Data, and Technical Data documents. The Architect shall return three (3) copies of the reviewed submittal to the General Contractor, and one (1) copy of the reviewed submittal to Landmark.

- i. The Architect will review shop drawings for general design compliance. Shop drawing review will require ten (10) working days (excluding mailing time) and does not guarantee completeness nor approval of a substitution.
- C. Submittals For Information:
- a. Prior to starting Work, submit information listed under SUBMITTALS FOR INFORMATION in each Specification Division.
 - b. Submittals for Information shall not be reviewed by the Architect and shall not be returned to the Contractor. The Contractor shall maintain copies of Submittals for Information as required to coordinate the work.
 - c. One (1) copy of the Submittals for Information shall be sent to the Architect, and one (1) copy of the Submittal for Information shall be sent to Landmark.
- D. Submittal for Substitution:
- a. A submittal which changes a specified material, product, or design must be accompanied by the reason for the change as well as the cost and schedule ramifications, on a separate letter attached to Contractor's transmittal.
 - b. Landmark's or the Architect's review of submittal which change a specified material, product, or design does not constitute authorization to incorporate the item into the project.
 - c. A Change Order must be executed before any changes to a specified material, product, or design can be made.
 - d. Contractor shall submit three (3) copies of each request for substitution identifying the product, fabrication, and installation method to be replaced by the substitution; include related Specification Section and Drawing numbers, and complete documentation showing compliance with the requirements for substitutions.
 - e. Include the following information, as appropriate, with each request:
 - i. Provide samples where applicable or requested.
 - ii. Provide a detailed comparison of the significant qualities including elements such as size, weight, durability, performance and visual effect where applicable.
 - iii. Provide complete coordination information. Include all changes required in other elements of the Work to accommodate the substitution, including work performed by separate contractors.
 - iv. Provide complete cost information, including a proposal of the net change, if any, in the Contract Sum.
 - f. By making a request for a substitution, Contractor:
 - i. Represents that Contractor has personally investigated the proposed substitute product and determined that it is equivalent or superior in all respects to that specified, and is suitable for the intended purpose

- ii. Represents that Contractor will provide the same warranty for the substitution that Contractor would for that specified.
 - iii. Certifies that the cost data presented is complete and includes all related costs except the Architect's redesign costs, and waives all claims for additional costs related to the substitution which subsequently become apparent.
 - iv. Will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.
- g. Once the change order has been executed, the contractor shall follow the Submittal for Review requirements listed above.
- E. Submittals For Project Closeout:
- a. Prior to Substantial Completion, submit information listed under Submittals for Project Closeout in each Specification Division.
 - b. Contractor shall compile all Submittals for Project Closeout, and shall submit a 100% complete set of documents to the Architect after review and confirmation that the Submittal is complete.
 - c. Submittals shall be sent to the Architect, and shall include three (3) original documents. The Architect shall return one original of the reviewed submittal to Landmark, and shall return two (2) originals of the reviewed submittal to the Owner.
 - d. The Architect will review Submittal for Project Closeout for conformance with the Contract Documents. Submittal review will require ten (10) working days (excluding mailing time) and does not guarantee completeness nor approval.

1.13 **01781 GUARANTEES AND WARRANTIES**

- A. Any defects due to faulty materials or workmanship, which appear during the progress of the Work or within a period of one year from the date of completion and acceptance of the Work shall be remedied. Any consequent damage caused by any such defect shall be corrected.
- B. Where there is a trade guarantee or special guarantee for a period in excess of one year, the longer period shall apply and any documents required to affect such guarantees shall be furnished. Neither the final payment nor final acceptance shall relieve Contractor for negligence or faulty materials, nor shall any defects be remedied promptly upon written notice.
- C. As part of the completion documents, specific guarantees from each subcontractor or supplier as required by the Specifications, on Landmark's Standard Guarantee Form shall be provided. In addition, manufacturer's guarantees and warranties for materials and equipment installed in the Work shall be provided. All guarantees shall be provided in triplicate.

1.14 **01930 CLARIFICATION AND PROPOSALS (Change Orders)**

- A. Written Change Orders will be issued for change occurring as follows:

- a. Adjustments which occur as a result of incorporating final suite designs or changes to the building shall be made in accordance with the “ALLOWANCES AND UNIT COST ADJUSTMENT SCHEDULES”.
 - b. Cash Allowance changes shall be adjusted on the basis of actual cost. All allowances set forth in the Specifications or Exhibits shall be an actual cost amount. No fee applies to these adjustments.
 - c. Changes in the Work may be required which are not anticipated by allowances or unit costs. The total cost for any added work shall not exceed a credit for the same or similar deleted work. Cost shall be defined as actual cost excluding supervision costs and office overhead which shall be included as part of the fee percentage set forth in EXHIBIT “G”.
- B. Upon notification from Landmark of a proposed change, Contractor and his subcontractors shall prepare a quotation itemizing the detailed changes to the Contract Sum, in a breakdown form itemizing labor and material in detail showing quantities and unit prices if applicable, including written quotes from manufacturers and suppliers. The changes shall also be recapped by major billing categories with overhead and profit distributed. Quotes for any requested change shall be provided within ten (10) days.
- C. Should additional work be commenced without an executed Change Order, it shall be deemed an unconditional waiver of any additional compensation or to an extension of the time of completion.
- D. Should disagreement occur on the quoted amount of a change, Landmark may request three (3) independent written quotes on each item of the change, or, a Change Order may be issued to perform the Work required by the change on the basis of actual cost. In this event, all time sheets, material delivery tickets and invoices, and equipment rental receipts, and invoices which document the Work performed each day shall be provided to Landmark for daily signature. Unused materials for the original work shall be credited in full as invoiced. Unused labor and equipment rental for the original work shall be credited in an amount equal to the cost of similar work for this project. Only added material cost, cost of equipment when in use, cost for added labor incorporated in the change shall be a proper charge. Labor rates shall not exceed the Local Rate Determination by the Secretary of Labor plus the proper and required fringe benefits. Equipment rental rates shall be no more than the rates as determined by Associated Equipment Distributors Index. All equipment shall be properly operated, maintained and insured. Only fees as set forth in EXHIBIT “G” shall apply to the net cost of any such change. The execution of a change in the Work under this paragraph shall not interfere with the normal and orderly job progress, which shall continue without interruption. On completion of the Work, an additional Change Order will be issued to adjust the final cost.
- a. Landmark’s review of quotations does not constitute approval for or guarantee of the completeness of any change, which is specifically the responsibility of Contractor.
 - b. At completion, a final Change Order will be issued to adjust the change in the cost of bond premiums, if any, resulting from changes to the original Contract Sum due to Change Orders issued during the course of construction. No fee applies to this adjustment.

1.15 01950 EQUAL OPPORTUNITY

- A. Contractor and Contractor's subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex or national origin. Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex or national origin. Such action shall included, but not be limited to the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. Contractor's subcontractors shall agree to post in conspicuous places, available to employees and applicants for employment, notices setting forth the policies of non-discrimination.

- B. Contractor and Contractor's subcontractors shall, in all solicitations or advertisements for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex or national origin.

END 01100.

DIVISION 2 - SITEWORK
Section 02010 – Site Verification

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Verification of existing conditions.

PART 2 PRODUCTS

2.1 NO PRODUCTS

PART 3 EXECUTION

3.1 VERIFICATION

- A. Visit the site and verify existing conditions.
- B. Check all underground utility data indicated on available design documents of the various contractors, utility companies and public agencies, and verify information shown on the Drawings.
 - a. All utility companies shall be contacted, including those in control of utilities not indicated on the Drawings.
- C. Actual locations of underground utilities shall be determined in the field prior to commencement.
 - a. If underground utilities are known to exist in areas to be excavated and their exact location cannot be determined, a utility company locator services shall be retained to locate prior to excavating.
- D. Mark location of utilities.
- E. Contractor shall notify Landmark of any variance from the information shown on the Drawings.

END 02010.

DIVISION 2 - SITEWORK
Section 02300 - Earthwork

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. The improved areas shall be trenched, excavated, and backfilled to the elevations shown on the Drawings and as required including the importation of or off-site disposal of materials necessary to achieve the proper grades.

1.2 SUBMITTAL FOR PROJECT CLOSEOUT

- A. As-Built Drawings: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

1.3 QUALITY ASSURANCE

- A. Perform Work in accordance with ASTM C136, ASTM D2419, ASTM D2434, and local governing authorities having jurisdiction.
- B. Owner Testing:
 - a. Owner shall employ and pay for a qualified independent geotechnical testing and inspection laboratory to perform soil testing and on-site inspection services during earthwork operations. Written reports of inspections, observations, and testing shall be provided to Landmark within 48 hours of testing and inspections. Landmark shall be notified by phone or fax the same day if any failing tests are determined.
 - b. Owner shall assure that the Soils Engineer provides written certification to the Owner, Landmark, and Contractor that Work was performed in accordance with the requirements of the Soils Report and Specifications at the completion of the excavation work, completion of backfilling operations, and completion of paving subgrade preparation.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Backfill and common fill material; shall be ASTM D 2487 soil classification groups GW, GP, GM, SW, SP and SM or a combination of these group symbols, free of boulders, debris, frozen materials, vegetation and other deleterious matter. Suitable on-site material may be used if approved by the Soils Engineer.
- B. Structural Fill; shall be similar material as backfill and common fill, but shall also be capable of supporting footings and slab on grade to 3,000 psi, unless noted otherwise in the Geotechnical Report.
- C. Engineered fill and sub-base material; shall be a naturally or artificially graded mixture of

natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least ninety (90) percent passing a 1 1/2" sieve and not more than ten (10) percent passing a No. 200 sieve.

- D. Drainage fill material; shall be a washed, narrowly graded mixture of crushed stone, or crushed or uncrushed gravel, ASTM D 448; course aggregate grading size 57; with one hundred (100) percent passing a 1 1/2" sieve and not more than five (5) percent passing a No. 8 sieve.
- E. Bedding material; shall be a naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with one hundred (100) percent passing a 1" sieve and not more than eight (8) percent passing a No. 200 sieve.

2.2 ACCESSORIES

- A. Geotextile Fabric: Non-biodegradable, woven fabric.
 - a. Mirafi 500X or approved equal
- B. Filter Fabric: Non-biodegradable, woven fabric.
- C. Detectable Warning Tape: Acid and alkali-resistant polyethylene film manufactured for marking and identifying underground utilities, minimum 6" wide and 4 mils thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 2'-6" deep, color as follows:
 - a. Red: Electric.
 - b. Yellow: Gas, oil, steam, and dangerous materials.
 - c. Orange: Telephone and other communications.
 - d. Blue: Water systems
 - e. Green: Sewer systems

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that survey bench mark and intended elevations for the Work are as indicated.
- C. Prior to backfilling, verify sub-drainage, dampproofing, or waterproofing installation has been inspected.
- D. Prior to backfilling, verify underground tanks are anchored to their own foundations to avoid flotation after backfilling.

- E. Prior to backfilling, verify structural ability of unsupported walls to support imposed loads by the fill.

3.2 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Locate, identify, stake, flag locations, and protect from damage, known utilities that remain.
- C. Notify hospital contractor, utility company and governing authority having jurisdiction to remove and/or relocate utilities.
- D. Protect above and below grade utilities that remain.
- E. Protect existing plant life, lawns, rock outcropping and other features remaining as a portion of final landscaping.
- F. Protect bench marks, survey control point, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

3.3 EXCAVATING

- A. Underpin adjacent structures which may be damaged by excavating work.
- B. Excavate subsoil to accommodate building foundations, slabs-on-grade, paving, and site structures, and construction operations.
- C. Coordinate special requirements for piling.
- D. Compact disturbed load bearing soil in direct contact with foundations to original bearing capacity.
- E. Slope banks with machine to angle of repose or less until shored.
- F. Do not interfere with 45 degree bearing splay of foundations.
- G. Grade the top perimeter of excavation to prevent surface water from draining into excavation.
- H. Hand trim excavation. Remove loose matter.
- H. Footings and Grade beam/ Pile cap foundations:
 - a. Excavation for footings and foundations shall be a minimum of 6” into undisturbed existing subsoil, or compacted fill, unless otherwise noted in soils report.
 - b. Excavations in unstable soils shall be extended a sufficient distance from footings and foundations to permit placing and removal of form work, and for inspection.

- c. Stable soils may be neatly cut and used for footing forms.
- J. Remove lumped subsoil, boulders, and rock up to 1/3 cu yd measured by volume.
- K. Notify Landmark and the Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- L. Correct areas over excavated.
- M. Stockpile excavated material in area designated on site; remove excess or unsuitable material from site.
- N. Prevent displacement or loose soil from falling into excavation; maintain soil stability.
- M. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

3.4 TRENCHING

- A. Trench subsoil for utilities in building footprint, including 5'-0" outside building footprint and as required for secondary power Cut sufficiently wide to enable installation and inspection.
- B. Remove water or materials that interfere with work.
- C. Do not interfere with 45 degree bearing splay of foundations.
- D. Hand trim trench and remove loose matter.
- E. Remove lumped subsoil, boulders and rock up to 1/3 cu. yd. measured by volume.
- F. Correct areas over excavated in accordance with Backfill requirements.
- G. Stockpile excavated material in area designated on site, and remove excess material not being used, from site.
- H. Minimum cover depth over piping shall be 1'-0" below local frost depth or 3'-0" below grade, whichever is greater.
- I. Excavate trenches to uniform width to provide 1'-0" working clearance on each side of pipe or conduit.
- J. Excavate trench walls vertically from trench bottom to 1'-0" higher than top of pipe or conduit, unless noted otherwise on the Drawings.
- K. Excavate trench 4" deeper than the bottom of the pipe elevation to allow for bedding course. Hand excavate for pipe bells.
 - a. Excavate trenches 6" deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.5 BACKFILLING

- A. Compact the sub-grade to density requirements for subsequent backfill materials.
- B. Cut out soft areas of sub-grade not capable of compaction in place. Backfill with subsequent type of fill, and compact to density equal to or greater than requirements for subsequent fill material.
- C. Backfill areas to contours and elevations with unfrozen material.
- D. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy sub-grade surfaces.
- E. Place geotextile fabric prior to placing next lift of fill.
- F. Backfill and Common Fill: Place and compact material in equal continuous layers not exceeding 12" compacted depth, unless noted otherwise.
 - a. Where compacted by hand operated tampers, compact material in equal continuous layers not exceeding 4" compacted depth.
 - b. Plow, scarify, bench or break-up sloped surfaces to steeper than one vertical to four so fill material will bond with existing material.
- G. Structural Fill: Place and compact material in equal continuous layers not to exceed 8" compacted depth.
 - a. Where compacted by hand operated tampers, compact material in equal continuous layers not exceeding 4" compacted depth.
- H. Engineered Fill and Sub-base: Place and compact material in equal continuous layers not exceeding 8" compacted depth.
- I. Bedding Fill: Place and compact material in equal continuous layers not exceeding 8" compacted depth.
- J. Employ a placement method that does not disturb or damage other work.
- K. Maintain optimum moisture content of backfill materials to attain required compaction.
- L. Backfill against supported foundation walls. Do not backfill against unsupported foundation walls.
- M. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.
- N. Slope grade away from building minimum 1/4" per 1'-0", unless noted otherwise.
- O. Make gradual grade changes. Blend slope into level areas.
- P. Remove surplus materials from site.

- Q. Leave fill material stockpile area free from excess fill materials.
- R. Proof roll compacted backfilled surface below slab-on-grade, to identify soft spots. Cut-out soft spots, fill and compact to density equal to or greater than requirements for subsequent fill material.
 - a. Proof roll with heavy pneumatic tired equipment to identify soft pockets and areas of excess yielding.
 - b. Do not proof roll wet or saturated subgrades.
- S. Trench Backfilling: Place and compact bedding course on trench bottom. Shape bedding course to provide continuous support for bells, joists, and barrels of pipes and for joints, fittings, and bodies of conduit and pipe.
 - a. Place and compact initial backfill of sub-base material to a height of 1'-0" over conduit or pipe. Compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of conduit or pipe to avoid damage or displacement.
 - b. Place and compact final backfill of common fill material to final subgrade.
 - c. Install detectable warning tape directly above conduit or pipe, 1'-0" below finished grade, except 6" below sub-grade under pavements and slabs.
- T. Engineered Fill and Sub-Base Placement: Inspect sub-grade elevations and proof-roll compaction test.
 - a. Spread aggregate over prepared sub-grade.
 - b. Place aggregate in maximum 6" layers and compact to specified density.
 - c. Level and contour surfaces to elevations and gradients indicated.
 - d. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist in compaction.
 - e. Add water to assist in compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.
 - f. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.6 TOLERANCES

- A. Top surface of subgrade – Lawn, unpaved area, or footing: Plus or minus 1" from required elevation.
- B. Top surface of subgrade – Pavement or slab on grade: Plus or minus 1/2" from required

elevation, not more than 1/2" in 10'-0".

3.7 FIELD QUALITY CONTROL

- A. Compaction testing will be performed in accordance with ASTM standards.
 - a. If tests indicate Work does not meet specified requirements, remove Work, replace and retest.
- B. Sides and slopes of excavations and trenches shall be maintained in a safe condition until completion of backfilling Work.

3.8 SCHEDULES

- A. Under Footings and Foundations:
 - a. Fill Type: Engineered Fill: Maximum 8" compacted depth to sub-grade elevation.
 - b. Compact Fill to minimum 95 percent of maximum density.
- B. Interior Building Backfill and Slab-On-Grade:
 - a. Sub-Base Fill Type: Structural Fill: Maximum 8" compacted depth to sub-grade elevation.
 - b. Cover Fill Type: Engineered Fill on Sub-Base: Minimum depth 4", unless otherwise indicated on Drawings.
 - c. Compact Sub-Base and Cover Fill to minimum 95 percent of maximum density.
- C. Exterior Side of Foundation Walls with Bituminous Dampproofing, and Retaining Walls:
 - a. Sub-Base Fill Type: Backfill and Common Fill: Maximum 8" compacted depth to sub-grade elevation.
 - b. Cover Fill Type: Topsoil: Minimum 4" depth, unless noted otherwise in Section 02900 - Landscape Work.
 - c. Compact Sub-Base and Cover Fill to minimum 95 percent of maximum density.
- D. Exterior Side of Foundation Walls with Sheet Membrane Waterproofing:
 - a. Sub-Base Fill Type: Drainage Fill: Maximum 8" compacted depth to sub-grade elevation.
 - b. Cover Fill Type: Topsoil: Minimum 4" depth, unless noted otherwise in Section 02900 - Landscape Work.
 - c. Compact Sub-Base and Cover Fill to minimum 95 percent of maximum density.
- E. Under Door Stoops, Steps, and Ramps:
 - a. Fill Type: Engineered Fill: Maximum 8" compacted depth to sub-grade elevation.

b. Compact Fill to minimum 95 percent of maximum density.

F. Conduit and Piping Trench:

d. Sub-Base Fill Type: Bedding Fill: Minimum depth 4" under pipe, unless noted otherwise on Drawings.

e. Cover Fill Type: Type required for finish surface, noted above.

f. Compact Sub-Base and Cover Fill to minimum 95 percent of maximum density.

END 02300.

DIVISION 2 - SITEWORK
Section 02365 - Driven Piles

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Work Includes: Foundations supported by steel H-Piles with cast driving tips, driven to end-bearing on bedrock.
 - a. The bottom of elevations and bearing capacities of driven piles are estimated from available soil borings and report. The actual elevations, lengths, and bearing capacity will be determined by the Independent Testing Service from actual site conditions.

1.2 SUBMITTAL FOR REVIEW

- A. Load bearing test reports.
- B. Driving Records.

1.3 SUBMITTAL FOR PROJECT CLOSEOUT

- A. Project Record Drawings: Submit project record drawings compiled with all other trades record information on a single set of drawings.

1.4 QUALITY ASSURANCE

- A. Pile Driving Contractor: Company specializing in performing the work of this section with minimum five (5) years documented experience.
 - a. Contractor to submit pile driving equipment information and driving criteria prior to start of driving activities.
- B. Welder Qualifications: Qualify welders, welding processes and procedures in accordance with AWS "Structural Welding Code".
- C. Owner Testing:
 - a. Owner shall employ and pay for a qualified Geotechnical engineering/ inspection firm to perform pre-driving survey, driven pile testing and on-site inspection services during site Work. Written reports of the inspections, observations, and testing shall be provided to Landmark within 48 hours of test and inspections. Landmark shall be notified by phone or fax the same day if any failing test is determined.
 - b. Contractor shall provide free access to the Work. Contractor shall notify the Owner's

Geotechnical engineer of scheduled Work. If Contractor fails to notify the Owner's Geotechnical engineer, and as a result, no tests are taken, Contractor shall bear the cost of verifying that the in place Work meets the strength requirements of these specifications.

- c. Test Piles: Owner's Geotechnical engineer shall use test piles and load test data in addition to tests on soil and rock samples to determine the pile tip elevations. Test piles that are located within the tolerances indicated for all piles and provide a safe design capacity as determined by the results of a satisfactory load test, may be used in the finished work.
- d. Pile Load Tests:
 - i. Install testing piles of the same size and configuration as permanent piles, in the location indicated or at other locations directed by the Owner's Geotechnical engineer.
 - ii. Load tests shall be performed by Dynamic method, using a Pile Driver Analyzer (PDA).
 - iii. Owner's testing agency shall review PDA results, prepare pre-installation summary plan and certification of installed piles.
 - iv. No piles or sheeting shall be driven in the immediate areas during the time a load test is being performed.
- e. Test piles, which pass the load test in an undamaged condition, may be utilized as permanent piles in the work. Reaction piles which were used to perform the pile load test may be utilized as permanent piles in the work, provided that they are not damaged and that they are not permanently moved upward. Acceptance of test piles as permanent piles shall be determined by the Geotechnical engineer and Engineer of Record based on the above criteria. Withdraw damaged test piles and reaction piles and remove from the site or cut them off one foot below any structure to be installed above.
- f. Load test requirements; at the direction of the Geotechnical Engineer and Engineer of Record, pile load tests shall be made in accordance with ADTM D4945. The load testing of piles shall be used to determine the following:
 - i. The correct lengths and installation criteria area being used, and if this is not the case, to establish the revised lengths or installation criteria are satisfactory.
- g. Load application: The test pile shall be loaded to a total load of not less than two times the design capacity of the pile. The test load shall be 200 percent of the design load, applied in increments of not more than 25 percent of the design load until the total test load has been applied.
- h. Analysis: For the pile to be accepted, the gross pile head movement at 200 percent of the design load shall be less than the calculated elastic pile compression for this load plus an additional value of 0.25 inches.
- i. If the pile has not failed prior to 200 percent load, continue loading until failure or until limited by facilities used. Failure shall be determined by inability to hold load or settle in excess of .01 inch per ton of load.
- j. Settlement readings: Reading shall be taken at three-minute intervals. Each load shall be maintained for 15 minutes.
- k. The Geotechnical engineer and Engineer of Record reserve the right to require the Contractor to make additional load tests, in the event that the behavior of the test pile or

any other pile shows any peculiarity, erratic action, or otherwise causes suspicion as to the reliability of the safe bearing value.

- l. Following the successful completion of load tests, the Geotechnical Engineer shall make a determination of the required penetration, to be approved by the Engineer of Record.
- m. If any quality control testing paid for by the Owner indicates that materials do not meet the requirements of these specifications, all retesting to verify compliance shall be paid for by the Contractor.

1.5 PROJECT RECORD DOCUMENTS

- A. Accurately record the following on project driving record documents:
 - a. Sizes, lengths, and locations of piles [and footing groups].
 - b. Sequence of placement.
 - c. Final base and top elevations.
 - d. Deviation from indicated locations.
 - e. Pile uplift, or any other unusual occurrences.

PART 2 PRODUCTS

2.1 MATERIALS

- A. H-Piles: Structural steel shapes conforming to ASTM A572, Grade 50.
 - a. HP10 x 57 (150 kips axial compressive pile capacity)
- B. H-Pile tips: Cast steel prefabricated pointed h shaped sections, with the slope forming the point not steeper than 1 $\frac{3}{4}$:1. Material shall conform to ASTM A27 (Grade 65-35). Pile tips may be welded to the piles either by the supplier of the piles or in the field by the Contractor, at its option. Alternate material or methods for fabricating points shall be upon the approval of the Engineer.
- C. Protective Coating: Clean surfaces of pile to be coated in accordance with SSPC Specifications. Apply approved coating system to required surfaces, only as directed by geotechnical engineer, and approval by owner.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. Use placement method which will not cause damage to nearby structures.
 - a. Geotechnical engineer to monitor vibrations due to driving operations
- B. Notify adjacent and affected land owners and building occupants with seven (7) days notice before proceeding with the Work.
- C. Protect structures near the Work from damage.
- D. Prepare to place piles from existing site elevations and excavated working elevations.

3.2 INSTALLATION

- A. Pile markings : Mark each piles' length with a horizontal line at 1'-0" intervals, and the number of feet from pile point at 5'-0" intervals.
- B. Continuously drive piles at locations indicated, to required point elevation and driving resistance established by driving and loading of test piles.
- C. Carefully maintain center of gravity for each group or cluster of piles to conform to locations shown on drawings.
- D. Carefully plumb leads and pile before driving. Take care during driving to prevent and to correct any tendency of piles to twist or rotate.
- E. When handling and driving long piles, take special precautions to ensure against overstress or leading away from a true position when driving.
- F. Splicing of piles (to be reviewed by Geotechnical engineer during field operations):
 - a. 20 to 35 ft. length – 1 splice max.
 - b. 35 to 79 ft. length – 2 splices max.
 - c. Lengths exceeding 79 ft. – 1 splice per 40ft.
 - d. Sections less than 10 ft. shall not be spliced except as final (top) section of pile.
- G. Welded splices: Clean surfaces to be welded of rust, scale, and other foreign material. Use only pile members with identical cross sections for splicing. Splices shall be full penetration butt welded, producing straight pile alignment through splice, and developing full strength of pile in both bearing and bending.
- H. Make splices before starting driving operations whenever possible. If welded splice is required

during driving operation, make splice when top of driven pile portion is at least 3'-0" above ground, to permit inspection of welded connection during welding and subsequent driving.

- I. Touch-up and repair protective coatings on piles after splices are made, inspected and accepted. Use same material as used in shop-applied coating systems.
- J. Prepare pile top to receive pile cap or grade beams, as indicated on the Drawings. Cut-off tops of driven piles, square with pile axis and at elevations indicated.
- K. Do not permit top of pile to deform to a mushroom shape.
- L. Extend reinforcement or provide dowels for connection of caps or grade beams, as indicated on the drawings.
- M. Heaved piles: Provide recorded instrument observations made during pile driving to determine whether driven pile has lifted from its original seat during driving of adjacent piles. If uplift occurs, re-drive affected piles to point elevation at least as deep as original point elevation with a driving resistance at least as great as original driving resistance.

3.3 TOLERANCES

- A. Maximum Variation From Vertical: 1" in 10'-0"
- B. Maximum Variation From Design Top Elevation: 4".
- C. Maximum Out-of-Position: 6".

3.4 UNACCEPTABLE PILES

- A. Unacceptable Piles: Piles that fail testing, are placed out of position, are below elevations, or are damaged shall be unacceptable.
- B. Withdraw piles rejected after driving, and replace with new piles.
- C. Piles rejected after driving may be abandoned and cut-off, and additional piles driven to replace rejected units at designated locations.
- D. Solidly fill spaces left by withdrawn piles that will not be filled by new piles, using cohesionless soil material such as gravel, broken stone, and gravel-sand mixtures. Place and compact throughout length of space.

END 02365.

DIVISION 2 - SITEWORK
Section 02620 - Foundation Drainage

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. A perimeter foundation drainage pipe system, complete with bends, reducers, adapters, couplings and joint materials, to sewer system.
- B. Retaining wall perimeter weep drainage pipe system.
- C. Filter fabric and bedding.

1.2 SUBMITTALS FOR REVIEW

- A. Shop Drawings: Indicate dimensions, layout of piping, high and low points of pipe inverts, gradient of slope between corners and intersections.
- B. Product Data: Provide data on pipe material and filter fabric material.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Polyvinyl Chloride Pipe: ASTM D2729; 4" inside diameter perforated PVC pipe with plain end, with required fittings, couplings, joint covering, and sleeves as recommended by manufacturer.
- B. Use perforated pipe at subdrainage system; unperforated pipe through sleeved walls.
- C. Drain Tile Receiver; shall be 18" diameter concrete pipe, vertically set with Neenah R-6350-C rim and cover.

2.2 AGGREGATE AND BEDDING

- A. Drainage Fill and Bedding Fill: Drainage Fill Material as specified in Section 02300 – Earthwork.

2.3 ACCESSORIES

- A. Filter Fabric: Water pervious type, black polyolefin or polyester.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that excavated base is ready to receive work and excavations, dimensions, and elevations are as indicated on Drawings.

3.2 PREPARATION

- A. Hand trim excavations to required elevations. Correct over excavation as specified in Section 02300 – Earthwork.
- B. Remove large stones or other hard matter which could damage drainage piping or impede consistent backfilling or compaction.

3.3 INSTALLATION

- A. Install and join pipe and pipe fittings in accordance with pipe manufacturer's instructions.
- B. Place drainage pipe on a supporting layer of compacted drainage fill, after compacting subgrade material. Drainage fill shall have a compacted depth of 6”.
- C. Lay pipe to slope gradients noted on Drawings and shop drawings.
- D. Provide full bearing of pipe on drainage fill.
- E. Place pipe with perforations facing down. Mechanically join pipe ends.
- F. Loosely butt pipe ends. Place joint cover strip 1’-0” wide, around pipe diameter centered over joint. Install pipe couplings.
- G. Install drainage fill material to a 6” width at sides, over joint covers and top of pipe. Provide top cover compacted thickness of 1’-0”.
- H. Place filter fabric over leveled top surface of aggregate cover prior to subsequent backfilling operations. Overlap edges at least 4”.
- I. Refer to Section 02300 - Earthwork for backfill and compaction requirements. Do not displace or damage pipe when backfilling or compacting.
- I. Connect to storm sewer system and sump pits as indicated on Drawings, with un-perforated pipe, through installed sleeves.

3.4 FIELD QUALITY CONTROL

- A. Contractor Testing: Lines shall be testing or checked prior to placing drainage fill over top of pipe, to assure flow.
 - a. Run water through all pipes and visually inspect flow.
 - b. Remove obstructions, replace damaged components, and retest system until satisfactory flow is achieved.
 - c. Inspect drainage fill and repair if required before continuing with backfill activity.

- B. Request inspection by Landmark prior to and immediately after testing, and placing drainage cover over pipe.

END 02620.

DIVISION 3 - CONCRETE
Section 03300 - Cast-In-Place Concrete

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete formwork, expansion filler, control joints, reinforcing, accessories, and cast-in-place concrete for footings, pile cap and grade beam foundations, slab on grade, metal stair pan fill, metal deck fill, and rooftop mechanical equipment pads shall be provided as indicated on the Drawings.

1.2 SUBMITTALS FOR REVIEW

- A. Shop Drawings: Reinforcing drawings detailing of fabrication, bending, and placement prepared in accordance with ACI 315, "Details and Detailing of Concrete Reinforcing". Include material, grade, bar schedule, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcing.
- B. Product Data: Provide data on joint devices, attachment accessories, admixtures.
- C. Mix Design: Provide concrete mix design(s).
- D. Provide mill certification for all reinforcing steel.

1.3 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Accurately record the actual locations of embedded utilities and components in concrete work which are concealed from view.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with the following:
 - a. ACI 117 "Specifications for Tolerances for Concrete Construction and Materials".
 - b. ACI 301 "Specifications for Structural Concrete for Buildings".
 - c. ACI 318 "Building Code Requirements for Reinforced Concrete".
 - d. ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete".
 - e. ACI 315 "Manual of Standard Practice."
 - f. ACI 347 "Recommended Practice for Concrete Formwork".
 - g. CRSI "Recommended Practice for Placing Reinforcing Bars".

- h. CRSI "Manual of Standard Practice".
 - i. AWS 01.4 "Structural Welding Code – Reinforcing Steel."
- B. Acquire cement and aggregate from same source for all work.
- C. Conform to ACI 305R when concreting during hot weather.
- D. Conform to ACI 306R when concreting during cold weather.
- E. Owner Testing:
- a. Owner shall employ and pay for a qualified testing and inspection laboratory to perform concrete testing and on-site inspection services during site concrete work. Written reports of the inspections, observations, and testing shall be provided to Landmark within 48 hours of test and inspections. Landmark shall notify by phone or fax the same day if any failing test is determined.
 - b. Contractor shall provide free access to the Work. Contractor shall notify the Owner's independent testing laboratory of scheduled pours. If Contractor fails to notify the Owner's independent testing laboratory, and as a result, no cylinders are taken, Contractor shall bear the cost of verifying that the in place concrete meets the strength requirements of these specifications. Cores shall be extracted and tested from the cast-in-place concrete in accordance with ASTM C42. Location of cores shall be determined by Landmark.
 - c. Contractor shall submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of Work.
 - d. Tests of cement and aggregates may be performed to ensure conformance with specified requirements.
 - e. A minimum of 4 test cylinders for each day's pour shall be taken for every 100 or less cu yds of each class of concrete placed each day and standard 7 and 28 day compression tests, certified by the independent materials laboratory, shall be made. One cylinder shall be held for later use, if necessary.
 - f. One additional test cylinder will be taken during cold weather and cured on site under same conditions as concrete it represents.
 - g. Test cylinders specified to exceed 3,000 psi and concrete deck fill shall be cast by the Owner's independent materials laboratory.
 - h. All testing shall be in accordance with ACT 318.95 Section 5.6.
 - i. One slump test will be taken for each set of test cylinders taken.
 - j. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.
 - k. If any quality control testing paid for by the Owner indicates that materials do not meet

the requirements of these specifications, all retesting to verify compliance shall be paid for by the Contractor.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Do not place concrete when base surface temperature is less than 40 degrees F. or surface is wet or frozen.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

- A. Portland Cement: ASTM C150, Type I – Normal, Type IA – Normal Air Entraining Type II – Moderate, Type IIA – Moderate Air Entraining, Portland type.
- B. Normal Weight Aggregates: ASTM C33. Light Weight Aggregates: C330. Local aggregates not complying with ASTM C33/ C330, but which have shown by special test or actual service to produce concrete of adequate strength and durability may be used.
- C. Water: Potable complying with ASTM C94.

2.2 ADMIXTURES

- A. Chlorides and additives containing chloride ions shall not be used.
- B. Air Entrainment: ASTM C260
 - a. Concrete which will be exposed to temperatures below 32 degrees F. shall be air entrained.
 - b. Average air content shall be five (5) to seven (7) percent in accordance with ACE 302IR, Table 5.2.7a.
- C. Fly Ash: ASTM C618 Class C.
- D. Admixtures complying with ASTM C494, Type A may be used as a water reducer as required for placement and workability.

2.3 FORMWORK

- A. Formwork for Exposed Concrete; shall be “Duraply” metal, metal-framed, “Duraply” metal-faced or other panel-type materials, to provide continuous, straight, smooth, exposed surfaces.
 - a. Formwork shall be furnished in the largest practicable sizes, based on the forming system used, to minimize the number of joints.
 - b. Form material shall withstand pressure of newly-placed concrete without excessive bowing or deflecting.
- B. Formwork for Unexposed Concrete; shall be formed with plywood, lumber or metal.

- a. Lumber dressed on at least two edges and one side shall be provided for tight fit.
 - b. Forms shall be of material, size, and strength to resist movement during concrete placement, and to retain horizontal and vertical alignment.
 - c. Flexible spring steel or laminated boards shall be used to form curved surfaces.
 - d. Where excavation maintains a firm clean shape and can be held true to line and grade, earth forms may be used, if allowed by code.
- C. Form-coating compounds; One of the following equal manufacturers and products may be used:
- a. Symons Manufacturing Company, "Magic Kote Form Coating" (www.symons.com)
 - b. W.R. Meadows, Inc., "Durogard Plus" (www.wrmeadows.com)
 - c. Chem-Masters Corporation, "Formlock"
 - d. Additional approved equal products shall be considered

2.4 ACCESSORIES

- A. Vapor Retarder: 6 mil thick polyvinyl chloride vapor barrier, type recommended for below grade application.
- B. Non-Shrink Grout: ASTM C1107 and CRD C621, premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2,400 psi in 48 hours and 7,000 psi in 28 days; One of the following approved manufacturers shall be used:
 - a. Master Builders, Masterflow 928.
 - b. Additional approved equal products may be considered.
- D. Waterstop; shall be Vinylex Corporation, #RSB-9-316 (www.vinylex.com) or approved equal.
- F. Dowel caps; shall be 5" long plastic or steel of diameter required by bar size.
- G. Expansion bolts; shall be wedge anchors per Federal Specification FS-FF-S-325, Group II, Type 4, Class 1.
- H. Adhesive or bonding agent shall be two component epoxy for use on dry or damp surfaces complying with ASTM C881
- I. Patching and Surface Compounds: One of the following equal manufacturers and products shall be used:

- a. H.B. Fuller, “Resiweld 7640 Serise with sand aggregate”
- b. Sika Chemical Company, “Colma Dur”
- c. Protex-A-Coat Inc., “Chemcrete”
- d. Additional approved equal products shall be considered..

2.5 JOINT DEVICES AND FILLER MATERIALS

- A. Concrete Expansion Filler: 1/4” thick asphalt impregnated compressible filler material conforming to ASTM D1751 shall be provided where slabs on grade meet vertical surfaces.
- B. Concrete Control and Construction Joints: Preformed bulkheads for slabs shall be rigid preformed material to provide indicated keyways. Control joints shall be saw-cut or tooled.

2.6 REINFORCING

- A. Bars shall comply with ASTM A615, Grade 60.
- B. Welded wire mesh shall comply with ASTM A185.
- C. Form ties shall be factory fabricated, adjustable length, removable or snap off metal, designed to prevent concrete surfaces spalling and form deflection.
 - a. Furnish units that will leave no corrodible metal closer than 1” to the plane of the exposed concrete surface.
 - b. Furnish units that, when removed, will leave holes not larger than 1” in diameter in concrete surface.
 - c. Furnish units with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing membrane.
- D. Tie wires and spirals shall be sixteen (16) gauge annealed steel wire, per ASTM A82.
- E. Chairs, spacers, supports and other accessories shall be standard manufacture conforming to ACI 315.
- F. Anchor bolts and embedded plates conforming to ASTM A36.
- E. Epoxy coated reinforcing bars shall conform with ASTM A615 and ASTM A775.

2.7 CONCRETE MIX

- A. Concrete Proportioning, and Design Mix: shall be prepared by an independent testing facility retained by Contractor and shall follow the requirements stated on the Drawings.
 - a. If no requirements existing on the Drawings, use the trial batch method as specified in

ACI 301 and ACI 318, chapter 5, "Proportioning on the basis of field experience and / or trial mixtures".

- b. Mixes shall meet the minimum requirements indicated on the Structural Drawings, and the following (whichever is greater):
 - i. Slabs on grade: 3500 psi (1800 psi at 3 days) 28 day compressive strength normal weight concrete.
 - ii. Footings, grade beams, pile caps and foundation walls: 3,500 psi 28 day compressive strength normal weight concrete.
 - iii. Composite deck fill: 4000 psi 28 day compressive strength light weight concrete.
 - iv. Other concrete: 3000 psi compressive strength normal weight concrete.
 - c. Fly ash shall be used as a pound for pound replacement for cement for up to 15 percent of the total cementitious content.
- B. Concrete Slump: Concrete shall arrive at the jobsite at 2" or 3" slump. After verification, a water reducing admixture may be added to increase slump to the specified level. Mixes shall result in concrete slump at point of placement as follows:
- a. Ramps and sloping surfaces: Not more than 3".
 - b. Reinforced foundation systems: Not less than 2" and not more than 4".
 - c. Other concrete: Not more than 4".
- C. Use accelerating admixtures in cold weather only when approved by Landmark. Use of admixtures will not relax cold weather placement requirements.
- D. Ready mix concrete shall conform to ASTM C94.
- E. Chlorides and additives containing chloride ions shall not be used.
- F. Use set retarding admixtures during hot weather only when approved by Architect.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify requirements for concrete cover over reinforcement.
- B. Verify that compacted subgrade and granular base elevations and condition is acceptable and ready to support slab on grade.
- C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

3.2 PREPARATION

- A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.

- B. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.
- C. Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories.
- D. Refer to Section 13090 – X-Ray Protection for special construction for RFI Shielding requirements and coordinate work with the Drawings for special concrete reinforcing requirements.
- E. Notify Landmark minimum 24 hours prior to commencement of concreting operations.

3.3 FORMING

- A. Formwork design shall be the responsibility of the Contractor.
- B. Place and secure forms to correct location, dimension, profile, and gradient. Clean thoroughly of all wood, sawdust, dirt and other debris prior to placing concrete. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
- C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.
- D. Form Tolerance: Alignment of vertical face shall not deviate more than 1/4" in 10'-0", and the top of forms shall not deviate more than 1/8" in 10'-0".
- E. Formwork shall be readily removable without impact, shock or damage to cast-in-place concrete surface.
- F. Coordinate openings, recesses, chases, etc. with other trades.
- F. Locate temporary openings in formwork in inconspicuous locations for interior area where formwork would make area inaccessible for Work.
- G. Form Coating:
 - a. Contact surfaces of forms shall be coated with form-coating compound prior to placement of reinforcement.
 - b. Excess form-coating material shall not be allowed to accumulate in forms or to come into contact with in-place concrete surface against which fresh concrete will be placed.
 - c. Steel forms shall be coated with non-staining, rust-preventative from oil or shall be otherwise protected against rust.
 - d. Wood forms shall be moistened immediately before placing concrete when form coatings are not used.
- H. Form Removal:

- a. Formwork not supporting weight of concrete, such as sides of beams, walls and columns, may be removed after concrete has cumulatively cured at not less than fifty (50) degrees F. for 24 hours and provided curing and protection operations are maintained.
- b. Formwork supporting weight of concrete, such as slabs and other structural elements, shall remain in place until concrete has attained seventy five (75) percent of its twenty-eight day design strength.

3.4 REINFORCEMENT

- A. Place reinforcement as indicated, and support against displacement from concrete placement.
- B. Interrupt reinforcement at contraction and expansion joints.
- C. Clean reinforcement before placement of all materials that will reduce or destroy bond with concrete. These materials shall include, but not be limited to, rust, mill scale, earth, ice, etc.
- D. Place reinforcing to obtain at least the minimum coverage for concrete protection. Wire ties shall be set directing ends into concrete, not toward exposed concrete surfaces.
- E. Welded wire fabric shall be placed in lengths as long as practicable. Adjoining pieces shall be overlapped at least one (1) mesh plus 2" and laced with wire. Adjacent end laps shall be offset to prevent continuous laps in either direction.

3.5 PLACING CONCRETE

- A. Place concrete in accordance with ACI 301.
- B. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints, are not disturbed during concrete placement.
- C. Place concrete continuously over the full width of the panel and between predetermined construction joints.
- D. Place concrete continuously between predetermined expansion, control, and construction joints.
- E. Do not interrupt successive placement; do not permit cold joints to occur.
- F. Place floor slabs in checkerboard or saw cut pattern indicated.
- G. Install vapor retarder under interior slabs on grade. Lap joints minimum 6" and seal watertight by taping edges and ends.
- H. When hot weather conditions exist, ingredients shall be cooled before mixing to maintain concrete temperature at time of placement below 90 degrees F.
- G. Concrete work shall be protected from frost and freezing actions or low temperatures. When air temperature has fallen to or is expected to fall below 40 degrees F., water and aggregates

shall be uniformly headed before mixing to obtain a concrete temperature of not less than 50 degrees F. and not more than 80 degrees F. at point of placement.

- H. Concrete shall not be placed on subgrade containing frozen materials and frozen materials shall not be used in the concrete mix.
- I. Reinforcing steel shall be covered with water soaked burlap if it becomes too hot, so that the steel temperature will not exceed the ambient air temperature immediately before embedment in concrete. Reinforcing steel, forms, and subgrade shall be fog sprayed just prior to concrete placement.
- I. Concrete shall be struck off and consolidated with a vibrator, keeping the vibrator away from side of forms. Segregation of mix shall be prevented.
- J. Bonding agent shall be used at locations where fresh concrete is placed against hardened or partially hardened concrete.
- K. Concrete shall be placed and spread in continuous operation. Construction joints shall be placed where pours are interrupted for 1/2 hour or more.
- L. Surface concrete shall be smoothed by screening and floating.
- N. Screed floors and slabs on grade level, maintaining surface flatness of maximum 1/4" inch in 10 ft.

3.6 JOINTS

- A. Locate joints to avoid impairing strength and appearance.
- B. Separate slabs on grade from vertical surfaces with 1/4" inch thick joint filler.
 - a. Install joint fill devices in accordance with manufacturer's instructions.
 - b. Extend joint filler from bottom of slab to within 1/4" inch of finished slab surface.
- C. Control and construction joints shall be at column center lines and shall have a maximum panel size of 15'-0" x 15'-0", unless otherwise indicated on the Drawings.
 - a. Joints shall be accomplished by saw cutting within 4 to 16 hours after finishing using a 3/16" thick blade cutting into 1/4 depth of the slab thickness.
 - b. Run construction joints perpendicular to main reinforcing. Reinforcing shall be continuous through wall construction joints.
- D. Keyways at least 1 1/2" deep shall be provided in construction joints in walls. Bulkheads designed for this purpose may be used in slabs on grade.
- E. Interruption of concrete placement of one hour or more will require cold joint installation.

- a. Surface laitance shall be removed and the surface slushed with a 1 to 1 cement grout or bonding agent shall be applied.
- b. Install adhesive or bonding agent in accordance with manufacturer's instructions.

3.7 FINISHING

- A. Finish concrete floor surfaces in accordance with ACI 301.
- B. Formed concrete not exposed to view shall be rough finished. Ties shall be removed, tie holes and defective areas in contact with soil shall be repaired, and patched, and fins and other projections exceeding 1/4" in height shall be rubbed down or chipped off.
 - a. Exterior concrete surfaces exposed to view, or that are to receive a finish coating, shall be smooth finish. Ties shall be removed, fins and other projections exceeding 1/4" in height shall be rubbed down or chipped off, and completely removed. Tie holes and defective areas shall be repaired and surface filled, sacked, rubbed, and left smooth with uniform texture.
 - b. Surfaces at top of walls, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces shall be struck off smooth and finished with a texture matching adjacent formed surfaces.
 - c. Exposed concrete stair treads, ramps, and landing shall receive a medium broom finish to provide a non-slip surface.
 - d. Wood float surfaces which will receive quarry tile, or ceramic tile with full bed setting system.
- C. Float and steel trowel surfaces which will receive carpeting, resilient flooring, seamless flooring, thin set ceramic tile.
- D. Float and steel trowel surfaces which are scheduled to be exposed, other than exposed stair treads, ramps, and landings.
- E. Interior equipment pads or curbs shall receive monolithic finish by stripping forms while concrete is still green and steel trowel surfaces to a hard dense finish with corners, intersections, and terminations slightly rounded.
- F. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:100 nominal, and be puddle free.

3.7 CURING AND PROTECTION

- A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period

necessary for hydration of cement and hardening of concrete.

- C. Ponding: Maintain 100 percent coverage of water over floor slab areas continuously for 4 days.
- D. Spraying: Spray water over floor slab areas and maintain wet for 7 days.
- E. Absorptive Cover: AASHTO M182, Class 2, moisture-retaining cover complying with ASTM C171.
- F. Liquid membrane forming curing compound complying with ASTM C309, Type I, Class A.
- G. Moisture curing in accordance with ACI 308.

3.8 PATCHING

- A. Defective Concrete: Concrete with honeycomb, embedded items, or not conforming to required lines, details, dimensions, tolerances or specified requirements.
 - a. Repair or replacement of defective concrete will be determined by the Landmark.
 - b. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Landmark for each individual area.
 - c. Allow Landmark to inspect concrete surfaces immediately upon removal of forms.
- B. Patch imperfections as directed and in accordance with ACI 301.
- C. Surface defects in exposed exterior concrete such as color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on surface, and stains and other discolorations that cannot be removed by cleaning shall be repaired with cement mortar immediately after removal of forms.
 - a. Patching material for exterior exposed to view surfaces to remain unfinished shall be white Portland cement and standard Portland cement blended so that, when dry, patching mortar will match surrounding color.
 - b. A test area shall be provided in an inconspicuous location to verify mixture and color match.
 - c. Mortar shall be compacted in place and struck off slightly higher than the surrounding surface.
- D. High areas in slabs that would telegraph through finish floor coverings shall be corrected by grinding after concrete has cured at least 14 days.
- E. Low areas in slabs shall be corrected during or immediately after completion of surface finishing. Repair areas shall be finished to blend into adjacent concrete.

3.9 TOLERANCES

- A. Footings/ Grade beams other than those supporting masonry construction: Variation of bearing surface from specified elevation - plus or minus 1/2".
- B. Footings/ Grade beams supporting masonry construction:
 - a. Variation of center from specified location in plan: plus or minus 1/4" in any 10' but not to exceed plus or minus 1/2".
 - b. Variation of bearing surface from specified elevation: plus or minus 1/4" in any 10' but not to exceed plus or minus 1/2".
- C. Variation in the lines and surfaces of columns, piers and walls: 1/4" in any 10'.
- D. Thickness of walls and slabs:
 - a. 12" or less: plus 3/8", minus 1/4".
 - b. Greater than 12": plus 1/2", minus 3/8".
- E. Elevation from specified elevation for walls: plus or minus 1/2".
- F. Location of anchor bolts and sleeves:
 - a. From specified location in plan: plus or minus 1/4".
 - b. From specified elevation: plus or minus 1/4".
- G. Surface of flatwork: 1/8" as measured from a 10' straightedge.

END 03300.

DIVISION 3 - CONCRETE
Section 03450 - Architectural Precast Concrete

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Exposed to view items concrete panels indicated on the Drawings alongside and below fenestration.
- B. Grout packing,
- C. Connection and supporting devices.

1.2 DESIGN REQUIREMENTS

- A. Size components to withstand dead loads and live loads as indicated on the Drawings.
- B. Maximum Allowable Deflection: 1/360 span.
- C. Design members exposed to the weather to provide for movement of components without damage, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to seasonal or cyclic day/night temperature ranges.
- D. Design system to accommodate construction tolerances, deflection of other building structural members and clearances of intended openings.

1.3 SUBMITTALS FOR REVIEW

- A. Shop Drawings: Indicate layout, unit locations, fabrication details, unit identification marks, reinforcement, connection details, support items, dimensions, openings, and relationship to adjacent materials, and sealed by a Professional Structural Engineer. Indicate design loads, deflections, cambers, bearing requirements, and special conditions.
 - a. Production Drawings:
 - i. Sections and details to indicate quantities and position of reinforcing steel, anchor, inserts, etc.
 - ii. Lifting and erection inserts.
 - iii. Dimensions and finishes.
 - iv. Estimate cambers.
 - v. Method of transportation.
 - b. Erection Drawings:
 - i. Locate and define all material furnished by the fabricator. Provide sections and details showing connections, cast-in items, and their relation to structure. Describe all loose, cast-in field hardware.
 - ii. Show field installed anchor locations.

- iii. Include erection sequences, handling requirements, bracing sequence and scheme.
 - iv. Stipulate dead, live and other applicable loads used in the design.
 - v. Data submitted shall be sufficient for approval of design by building officials, if required.
- c. Design Calculations of the precast products and description of their lifting method and erection procedure properly coordinated with the shop drawings.
- i. Where details and design of typical members are shown on the Drawings, they shall be used as a guide in developing reinforcing details for structural members not detailed on the Drawings. Design shall conform to the requirements of the Contract Documents.
 - ii. Connection detail information shown on the Drawings for typical conditions are minimum requirements. The precaster shall design connections for the loads imposed on them and submit connection design calculations and details for approval. For connection details not shown, the precaster shall use the guidelines set forth for the typical conditions and develop details and design, and submit for approval.
- d. Design Loads, include the following:
- i. Initial handling and erection stresses.
 - ii. All dead and live loads as indicated on the Drawings.
 - iii. Design and connections shall consider the forces resulting from volume changes and temperature effects as specified in Part 6, Section 6.3 and 6.4 of the PCI Design Handbook.
- e. Design Calculations:
- i. Provide design and engineering calculations by a structural engineer registered in the State where the project is located.
 - ii. Indicate all design loads (winds, live, dead loads, etc) including stresses during shipment and erection and due to loads from construction procedures.
 - iii. Submit calculations no later than four (4) weeks prior to start of fabrication.
- B. Product Data: Indicate standard component configurations, design loads, deflections, cambers, and bearing requirements.
- C. Certifications and Test Reports: Semimonthly concrete test reports (PCI Publication No. MNL-116 -77).

1.4 SUBMITTALS FOR INFORMATION

- A. Design Data: Submit design data reports indicating calculations for loadings and stresses of fabricated, and designed framing, signed and sealed by design engineer.

1.5 QUALITY ASSURANCE

- A. Design precast concrete members, and connections to support the superimposed loads and live loads required for compliance with the applicable building code.
- a. Design under direct supervision of a Professional Structural Engineer experienced in design

of this work and licensed at the place where the Project is located.

- B. Erector: Company specializing in erecting the work of this section with three (3) years documented experience.
- C. Perform Work in accordance with the following requirements:
 - a. Pre-stress Concrete Institute: PCI MNL-116, PCI MNL-117, PCI MNL -118, PCI MNL-119, PCI MNL-123, PCI MNL-120
 - b. ACI 301, "Specifications for Structural Concrete for Buildings"
 - c. ACI 318, "Building Code Requirements for Reinforced Concrete"
 - d. CRSI, "Manual of Standard Practices"
- D. Fabricator shall be a producer member of the Pre-stressed Concrete Institute (PCI) and shall participate in PCI's plant certification program, or retain an independent testing or consulting service to inspect the precast plant at on week intervals during production and issue a report, certified by a qualified registered professional engineer verifying that materials, methods, products, and quality control meet all PCI requirements necessary to become a PCI certified plant.
- E. Welder: Qualified within previous 12 months in accordance with AWS D1.1 and AWS D1.4.
- F. Calculate structural properties of framing members in accordance with ACI 301, and ACI 318.
- G. Owner Testing:
 - a. Owner shall employ and pay for a qualified testing and inspection laboratory to perform testing and inspection services during architectural precast concrete Work. Written reports of the inspections, observations, and testing shall be provided to Landmark within 48 hours of test and inspections. Landmark shall notify by phone or fax the same day if any failing test is determined.
 - b. Precast concrete shall be sample tested in accordance with PCI MNL-116 with the following exceptions:
 - i. A pour shall be defined at fifty (50) cubic yards (or fraction thereof) placed for each day of production.
 - ii. Six (6) cylinders per pour shall be cast, three (3) at the beginning and labeled "A" and three (3) at the end of the pour labeled "B".
 - iii. One "A" and one "B" cylinder cast for each pour shall be cured per MNL-116. These cylinders shall be tested at seven (7) days to verify concrete compressive strength.
 - iv. Other cylinders may be moist cured and tested at twenty eight (28) days to verify the design compressive strength.
 - v. Remaining cylinders may be discarded after fifty six (56) days if the initial tests satisfied requirements.

1.61-4 REGULATORY REQUIREMENTS

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- A. Conform to applicable building code for design load and construction requirements applicable to work of this section.
- B. Conform to UL assembly number indicated on the Drawings to achieve required rating of structure, floor, and roof assembly.

1.71-5 DELIVERY, STORAGE, AND PROTECTION

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- A. Do not ship precast units to the project site until the strength of the concrete has reached eighty five (85) percent of the specified compressive strength or until the unit can safely support the superimposed dead load of other precast units, whichever is greater.
- B. Handle precast members in position consistent with their shape and design. Lift and support only from support points.
- C. Lifting or Handling Devices: Capable of supporting member in positions anticipated during manufacture, storage, transportation, and erection.
- D. Weight of stored materials placed on a precast unit shall not exceed the total design load of that unit or of that portion of the unit loaded by the stored material.
- E. Protect members to prevent staining, chipping, or spalling of concrete.
- F. Mark each member with date of production and final position in structure. Marks shall not be visible after erection and completion of work.
- G. Precast concrete shall be stored in a clean, dry area to avoid direct or indirect contact with water or dirt.

PART 2 PRODUCTS

2.1 FORM MATERIALS

- A. Formwork and form facing materials where required shall be metal, plastic, wood, or other material that is non-reactive with concrete and will produce required finish surface.
- B. Commercial formulation form-coating compounds or form liners shall be provided that will not bond with, stain or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.2 CONCRETE MATERIALS

- A. Cement: Portland, conforming to ASTM C150 Type I or II..

- B. Aggregate, Sand, Water, Admixtures: ASTM C33, as determined by precast fabricator as appropriate to design requirements and PCI MNL-116.
 - a. Aggregate shall be provided from a single source for exposed concrete. Local aggregates not complying with ASTM C33, but which have shown by special test or actual service to produce concrete of adequate strength and durability, may be used.
- C. Ready mix concrete shall comply with ASTM C94.
- D. Chlorides and additives containing chloride ions shall not be used.

2.2 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M Grade 60, deformed steel bars.
- B. Welded Steel Wire Fabric: ASTM A185 Plain Type; 65,000 psi, unfinished.

2.3 ACCESSORIES

- A. Plates and shapes shall comply with ASTM A615, galvanized.
- B. Reinforcing steel dowels to be welded shall be ASTM A706.
- C. Inserts shall be minimum 65,000 psi, galvanized.
- D. Deformed bars shall comply with ASTM A496 and IBCO Report ER-5217.
- E. Galvanizing shall be hot dipped complying with ASTM A123 or A153.
- F. Bolts, Nuts and Washers: Quenched and tempered alloy steel type.
- G. Prime Paint: Zinc rich alkyd type.
- H. Welding electrodes shall comply with AWS standards.

2.4 FABRICATION

- A. Fabrication procedure to conform to PCI MNL-116.
- B. Minimum concrete compressive strength shall be 5,000 psi at twenty eight (28) days with six (6) plus or minus one (1) percent air entrainment.
- C. Concrete exposed to freezing and thawing shall be proportioned in accordance with Method Two, ACI 301, six (6) sacks cement (564 pounds) minimum per cubic yard of concrete.
- D. Maintain plant records and quality control program during production of precast members. Make records available upon request.

- E. Ensure reinforcing steel, anchors, inserts, plates, angles, and other cast-in items are embedded and located as indicated on the shop drawings and the Drawings.
- F. Cement, aggregate, admixtures, and water shall be from like products exposed to view shall be from the same source.
- G. All units shall have the same form cure time.
- H. After forms are stripped, precast units shall be kept in a surface damp condition at a minimum temperature of 50 degrees F. Unit shall be protected from exposure to the weather until the strength of the concrete has reached 3,500 psi minimum.
- I. Locate lift loops and erection inserts so as not be visible in the completed construction, wherever possible. All lift loops and erection inserts shall be provided with 1 1/2" minimum concrete or grout cover in the completed construction. Any lift loops or erection inserts that must be located in areas that will be exposed to view, shall be recessed and patched with a minimum of 1 1/2" non-shrink, non-staining grout to match surrounding concrete.

2.5 FINISHES

- A. Ensure exposed-to-view finish surfaces of precast concrete members are uniform in color and appearance.
- B. Cure members under identical conditions to develop required concrete quality, and minimize appearance blemishes such as non-uniformity, staining, or surface cracking.
- C. Spandrel Panels:
 - a. Exterior face and bottom: light sandblast.
 - b. Interior face, end, and top: smooth, dense "standard" surface finish
- E. Wall Panels Exterior:
 - a. Exterior face and ends: light sandblast.
 - b. Interior face: smooth, dense "standard" surface finish.

2.6 FABRICATION TOLERANCES

- A. Manufacturing tolerances are not cumulative.
- B. Position of block-outs: plus or minus 1/4".
- C. Dimension of block-outs: plus or minus 1/4".
- D. Position of sleeves and inserts: plus or minus 1/4".

- E. Position of weld plates: plus or minus 1/2".
- F. Bearing surface deviation from specified plane: 1/8".
- G. Position of handling devices: plus or minus 3".
- H. Length - per 10' of length: plus or minus 1/8"; maximum 1/4".
- I. End deviation from square or designated skew - horizontal and vertical: 1/4".
- J. Variation in cross-sectional dimensions:
 - a. Unit thickness 6" or less: plus or minus 1/8"
- K. Horizontal or vertical alignment (deviation from a straight line parallel to longitudinal centerline of member): 1/4".
- L. Bowing up to 1/4"
- M. Warpage (one corner cut of the plane of the other three) 1/4"

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that site conditions are ready to receive work and field measurements are as shown on shop drawings and the Drawings.

3.2 PREPARATION

- A. Prepare support equipment for the erection procedure, temporary bracing, and induced loads during erection.

3.3 ERECTION

- A. Erect members without damage to structural capacity, shape, or finish. Replace or repair damaged members.
- B. Align and maintain uniform horizontal and vertical joints, as erection progresses. Carefully plumb and level units and anchor securely in place.
- C. Maintain temporary bracing in place until final support is provided. Protect members from staining.
- D. Provide temporary lateral support to prevent bowing, twisting, or warping of members.
- E. Set vertical units dry, without grout, attaining joint dimension with lead or plastic spacers.

- F. Secure units in place. Perform welding in accordance with AWS D1.1.
- G. Galvanizing repair shall be provided to field welds.
- H. Defective work which cannot be repaired shall be remade or reconstructed.

3.4 ERECTION TOLERANCES

- A. Erection tolerances are not cumulative and shall be as follows:
 - a. Variation from specified location in plan: 3/8".
 - b. Deviation in plan from straight lines parallel to specified linear building lines: 3/16" per panel.
 - c. Deviation from plumb: 1/8" in 5'-0" of height, maximum for entire height.
 - d. Deviation from level: 1/4" vertical across panel, 1/8" each side of column.
 - e. Variation of specified clearance from adjacent independent unit or from specified joint width: plus or minus 1/4".
 - f. Jog in alignment of matching edges of wall panels: 1/4".
 - g. When members cannot be adjusted to conform to design or tolerance criteria, cease work and advise Landmark. Execute modifications as directed.

3.5 PROTECTION

- A. Protect members from damage caused by field welding or erection operations.
- B. Provide non-combustible shields during welding operations.

3.6 CLEANING

- A. Clean weld marks, dirt, or blemishes from surface of exposed members.

END 03450.

DIVISION 4 – MASONRY
Section 04100 – Masonry Accessories

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Mortar, grout, wall reinforcing, wall ties, pre-molded compressible filler, flashing, weep holes, mortar net or screen, and accessories.
- B. Refer to other specification sections for Execution Requirements of Masonry Accessories

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Include design mortar and grout mix, indicate whether the Proportion or Property specification of ASTM C270 is to be used, required environmental conditions, and admixture limitations.
- B. Product Data: Provide data for reinforcing, flashing, weep holes, vents, mortar net or mortar screen, and control joints.
- C. Sample: Mortar samples for color selection.
- D. Reports: Submit reports on mortar indicating conformance of mortar to property requirements of ASTM C270 and test and evaluation reports to ASTM C780.
- E. Reports: Submit reports on grout indicating conformance of component grout materials to requirements of ASTM C476 and test and evaluation reports to ASTM C1019.

1.3 QUALITY ASSURANCE

- A. Owner Testing:
 - a. Owner shall employ and pay for a qualified testing and inspection laboratory to perform mortar and grout testing and on-site inspection services during site concrete work. Written reports of the inspections, observations, and testing shall be provided to Landmark within 48 hours of test and inspections. Landmark shall be notified by phone or fax the same day if any failing test is determined.
 - b. Contractor shall provide free access to the Work.
 - c. Contractor shall submit three mortar cubes to the testing laboratory for review prior to commencement of Work.
 - i. Mortar shall be tested in accordance with ASTM C780-74.
 - d. Contractor shall submit three cylinders grout cast for each day's pour.
 - i. Grout shall be tested in standard 7 day and 28 day tests in accordance with ASTM C39-

PART 2 PRODUCTS

2.1 MORTAR

- A. Mortar; shall conform to ASTM C270 Type S, 1,800 psi compressive strength at twenty-eight (28) days. Mortar joints to be exposed shall receive a smooth tooled concave finish and are to be free of voids, pinholes, and cracks.
 - a. Mortar shall be gray Portland Cement, no color.
 - b. Mortar Color; shall be mineral oxide pigment, color as selected by Landmark.
 - c. Admixtures, pre-mixes and masonry cement are not allowed.
- B. Mortar Material:
 - a. Quality; Materials and proportions shall be the same for each type of sight-exposed masonry. Cement, lime and aggregate shall be exactly the same type from the same source.
 - b. Portland Cement; ASTM C150, Type I, gray.
 - c. Hydrated Lime; ASTM C207, Type S as manufactured by Western Lime Company or approved equal.
 - d. Aggregate; ASTM C144 natural sand.
 - e. Water; Potable.
- C. Mortar Mixing:
 - a. Thoroughly mix mortar ingredients in accordance with ASTM C270 in quantities needed for immediate use.
 - b. Maintain sand uniformly damp immediately before the mixing process.
 - c. Add [mortar color] [and] [admixtures] in accordance with manufacturer's instructions. Provide uniformity of mix and coloration.
 - d. Do not use anti-freeze compounds to lower the freezing point of mortar.
 - e. If water is lost by evaporation, re-temper only within two hours of mixing.
 - f. Use mortar within two hours after mixing at temperatures of 90 degrees F, or two-and-one-half hours at temperatures under 40 degrees F.

2.2 GROUT

- A. Grout; shall conform to ASTM C476, minimum 2,000 psi.
 - a. Admixtures are not allowed.
- B. Grout Mixing:
 - a. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476 [Fine] [Course] grout.
 - b. Do not use anti-freeze compounds to lower the freezing point of grout.

2.3 REINFORCING

- A. Horizontal Single Width Reinforcing; shall be truss type, ASTM A82, fabricated from Class 3 mil galvanized cold drawn steel wire, minimum no. 9 gauge. One of the following equal manufacturers and products may be used:
 - a. Dur-O-Wall Inc., “D/A 3100 Truss” (www.dur-o-wall.com)
 - b. Holmann and Barnard, “#120” (www.h-b.com)
 - c. Additional approved equal products shall be considered.
- B. Horizontal Cavity Wall Reinforcing; shall be truss type with eye and pintle adjustable ties, ASTM A82, fabricated from Class 3 mil galvanized cold drawn steel wire, minimum no. 9 gauge. One of the following equal manufacturers and products may be used:
 - a. Dur-O-Wall Inc., “D/A 3700 Dur-O-Eye” (www.dur-o-wall.com)
 - b. Holmann and Barnard, “#170 Lox-All” (www.h-b.com)
 - c. Additional approved equal products shall be considered.
- C. Veneer Ties for Unit Masonry; for metal stud wall panels shall be mil galvanized, adjustable type with 3/16” diameter vee ties. Wall ties shall be fastened to studs with Buildex Climaseal 3 coated self-sealing fasteners, or with fastener as recommended by manufacturer. Size of veneer tie and fastener shall be appropriate for installation. One of the following equal manufacturers and products may be used:
 - a. Hohmann and Barnard Inc., “#DW-10-X or #X-Seal” (www.h-b.com)
 - b. Heckmann, “315D” (www.heckmannbldgprods.com)
 - c. Dur-O-Wall, “D/A 210” (www.dur-o-wall.com)
 - d. Additional approved equal products shall be considered.
- D. Veneer Ties for Stone Veneer; shall be corrugated, hot dip galvanized, 7” x 7/8” x 18 ga.

Ties shall be fastened through sheathing to studs with Buildex “Climaseal 3” coated self-sealing fasteners of size required for the installation, or with fastener as recommended by manufacturer. One of the following equal manufacturers and products may be used:

- a. Hohmann & Barnard, Inc. (www.h-b.com)
 - b. Heckmann, (www.heckmannbldgprods.com)
 - c. Dur-O-Wall, (www.dur-o-wall.com)
 - d. Additional approved equal products shall be considered
- E. Dovetail Anchors and Ties and Dovetail Slots; for concrete substrates shall be 16 gauge galvanized steel anchor with 3/16” galvanized vee wire tie. Dovetail anchor slot shall be 22 guage galvanized steel. One of the following equal manufacturers and products may be used:
- a. Hohmann & Barnard, Inc. “#315 Flexible Dovetail Brick Tie” with “#305 Dovetail Anchor Slot” (www.h-b.com)
 - b. Heckmann, “100B, and 108” (www.heckmannbldgprods.com)
 - c. Dur-O-Wall, “DA 100 Series” (www.dur-o-wall.com)
 - d. Additional approved equal products shall be considered.

2.4 ACCESSORIES

- A. Thru-Wall Flashing; shall be minimum 5 oz. copper fabric. Material shall consist of a full copper sheet permanently bonded between two (2) layers of textured, woven, high tensile strength glass fabric with specially blended asphalt compound. One of the following equal manufacturers and products may be used:
- a. York Manufacturing Company, “Cop-R-Tex Duplex” (www.yorkflashing.com)
 - b. Afco Products Inc., Cop-A-Led Duplex (www.afcoproducts.com)
 - c. Holmann and Barnard, C-Kraft Duplex Flashing (www.h-b.com)
 - d. Additional approved equal products shall be consider
- B. Flashing Drip Edge; shall be 22 gauge stainless steel with a 3/8” drip edge plus a 2” horizontal leg. Flashing shall be adhered with strip of 45 mil EPDM self adhering uncured rubber between copper fabric flashing and stainless steel drip edge. One of the following equal manufacturers and products may be used:
- a. Illinois Products Corporation,
 - b. Additional approved equal products shall be considered.

- C. Weep Holes: Molded polyvinyl chloride grilles, 3/8" x 3 - 3/4" long with copper screen inserted in exterior end for insect resistance. One of the following equal manufacturers and products may be used:
- a. AA Wire Products, "AA.223K"
 - b. Dur-O-Wal, Inc.,
 - c. Heckmann Bldg. Products,
 - d. Hohmann and Barnard, Inc
 - e. Masonry Reinforcing Corporation of America,
- D. Mortar Net or Mortar Screen: Contractor has the option to use Mortar Net or Mortar Screen, and is not required to use both.
- a. Mortar Net: High Density polyethylene woven strands 1" thick by 8" tall. One of the following equal manufacturers and products may be used:
 - i. Mortar Net USA, Ltd., 3641 Ridge Road, Highland, IN 46322 Phone: (800) 664-6638
 - ii. AA Wire Produces, AA 223K
 - iii. Additional approved equal products shall be considered
 - b. Mortar Screen:
- E. Preformed Control Joints: Neoprene or Polyvinyl chloride material. Provide with corner and tee accessories, and fused joints. One of the following equal manufactures and products may be used:
- a. Dur-O-Wall, Inc., (www.dur-o-wall.com)
 - b. Hohmann and Barnard, (www.h-b.com)
 - c. Additional approved equal products shall be considered
- F. Lintels: Structural steel masonry lintels shall be provided for masonry openings as indicated on the Drawings, and as specified in Section 05120 – Structural Steel.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install masonry accessories to requirements of the specific masonry section.

END 04100.

DIVISION 4 - MASONRY
Section 04300 – Masonry Veneer

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete masonry units, face brick, and masonry with stone appearance.
- B. Installation of Masonry Accessories; specified under Section 04100 – Masonry Accessories

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data for masonry units.
- B. Masonry Sample Panel: Notify Landmark when 4'-0" x 6'-0" sample panel is ready for Review at the job site. Allow at least 7 days for the inspection, before Work begins.

1.3 QUALITY ASSURANCE

- A. Masonry Sample Panel: Prior to construction, build a 4'-0" tall x 6'-0" long sample wall panel mock-up of the typical veneer wall and include construction of all styles of masonry at a corner condition including flashing, weeps, vents, mortar net, mortar screen, joint reinforcements, sheathing, air infiltration barrier, studs, insulation, and vapor barrier.
 - a. Include cast and cut stone in the Masonry Sample Panel including mortar, anchors and accessories.
 - b. The panel shall establish the representative quality of appearance, materials, and workmanship. The wall panel shall include all coursing patterns indicated in the drawings.
 - c. After building masonry work is completed, utilize the panel to demonstrate masonry cleaning procedures.
 - d. The wall mock-up shall be removed from the site when directed by Landmark.
- B. Face brick shall be purchased in one order from one manufacturer, one batch, and in sufficient quantity to complete the project.
- C. Product Storage and Handling: Masonry materials stored at the job site shall be protected from damage, moisture and shall not be in contact with the ground.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable building code and Underwriters Laboratory requirements for fire rated masonry construction.

- B. Fire Rated Assemblies: Refer to drawings for rating and assembly requirements. Provide unit masonry which is identical in materials and construction to the units tested. Acceptable testing agencies include Underwriters Laboratories, Inc. and Warnock Hersey International, Inc.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Cold Weather Requirements:

- a. Conform to International Masonry Industry All-weather Council –Recommended Practices and Guide Specifications for Cold Weather Masonry Construction as set forth in the latest addition of “Hot and Cold Weather Masonry Construction”.
- b. Conform to ASTM C270, Article 2.

B. Hot Weather Requirements:

- a. Conform to International Masonry Industry All-weather Council –Recommended Practices and Guide Specifications for Hot Weather Masonry Construction as set forth in the latest addition of “Hot and Cold Weather Masonry Construction”.
- b. Conform to ASTM C270, Article 2.

PART 2 PRODUCTS

2.1 BRICK UNITS

- A. Face Brick shall be utility size to match existing hospital face brick, 3-5/8” x 3-5/8” x 11-5/8”. Face brick shall conform to ASTM C216, durability Grade SW, appearance Type FBS or better. Brick shall have a “not effloresced” rating per ASTM C67. Face Brick work shall be laid in running bond. Use brick equal to Glen-Grey Brick Paragon Series Tonbridge Utility.

2.3 ACCESSORIES

- A. Joint Sealer: as specified in Section 07900 – Caulk and Sealant.
- B. Mortar shall be equal to Keystone K-2045 as specified in Section 04100 Masonry Accessories.
- C. Cleaning Solution:
 - a. Type which will not harm masonry, stone, joint materials, or adjacent surfaces.
 - b. Manufacturer’s standard-strength, general-purpose cleaner designed for removing mortar and grout stains, efflorescence, and other construction stains from new masonry and stone surfaces without discoloring or damaging surfaces.
 - c. Expressly approved for intended use by masonry and stone manufacturer and expressly approved by cleaner manufacturer for use on masonry or stone and adjacent masonry

materials.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Verify items provided by other sections of Work are properly sized and located.

3.2 PREPARATION

- A. Clean masonry prior to erection. Do not use a wire brush or implements which will mark or damage exposed surfaces.
- B. Direct and coordinate placement of metal anchors supplied to other sections.
- C. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Brick Units: Oversized Brick
 - a. Bond: Running.
 - b. Coursing: Two units and two mortar joints to equal 8 inches.
 - c. Mortar Joints: Concave.

3.4 PLACING AND BONDING

- A. Perform work in accordance with Brick Institute of America.
- B. Obtain approval from Landmark prior to cutting or fitting any item not indicated on the Drawings. Do not impair appearance or strength of masonry work by cutting.
- C. Mortar Installation:
 - a. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

- b. Lay hollow masonry units with face shell bedding on head and bed joints.
 - c. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.
 - d. Remove excess mortar as Work progresses.
 - e. Mortar shall be used within two (2) hours of mixing at temperature over seventy six (76) degrees F. and within two and one-half (2 1/2) hours at temperature over fourth (40) degrees.
 - f. Retampering of mortars that have stiffened due to water loss through evaporation shall be accomplished by adding water to restore required consistency. Mortar shall not be retempered after it has achieved initial set.
 - g. Mortar shall be mixed at the job site in a manner to permit verification of proportions such as with the use of a one cubic foot box to measure sand and content.
- D. Interlock intersections and external corners.
- E. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- F. Isolate top joint of masonry walls from horizontal structural framing members and slabs or decks with compressible joint filler.
- G. Cutting and Fitting:
- a. Perform job site cutting of masonry units with proper tools to provide appropriate edges.
 - b. Prevent broken masonry unit corners or edges.
 - c. Cut and fit for conduit, sleeves, and other built-in items shall be coordinated with other sections of work to provide correct size, shape, and location.
 - d. Conceal all built-in items, conduit, and boxes.
 - e. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.
 - f. Install hollow metal frames, and fill solid with grout.
- H. Cavity Behind Veneer:
- a. Do not permit mortar to drop or accumulate into cavity air space or to plug weeps or mortar net / screen.
 - b. Maintain minimum 2" air space in cavity.
- I. Stopping and Starting Work:

- a. Stopping off shall only be done by raking back 1/2 brick length in each course and not by toothing or projecting of alternate courses.
- b. Brick shall be laid with completely filled mortar joints both vertically (except weeps and vents) and longitudinally with fully embedded ties and reinforcing.
- c. At the end of each Work day and during rain, wall tops and masonry materials on scaffolding shall be protected from moisture. Cover open cavities and material with tarp.

3.5 SEALANT JOINTS

- A. Prime ends of masonry components, insert properly sized frame backing rod and install sealant as specified in Section 07900 – Caulk and Sealant.
- B. Provide sealant at the following locations, and as indicated on the Drawings:
 - a. Joints at relieving angles.
 - b. Control Joints.

3.6 REINFORCEMENT AND ANCHORAGE

- A. Metal Stud Back-up with Masonry Veneer:
 - a. Veneer wall ties shall be spaced at a minimum of one tie for each two (2) square feet of wall area, within 1'-0" of openings at 8" o.c. around opening perimeter, and as indicated on the Drawings.
 - b. Securely anchor through sheathing to stud back-up.
 - c. Ties shall be installed to allow movement parallel to the wall vertically.
- B. Dovetail Anchors and Ties in Dovetail Slots:
 - a. Install dovetail anchors and ties in accordance with manufacturer's recommendations and instructions.
 - b. Dovetail Anchors shall be spaced at a minimum of one anchor for each two (2) square feet of wall area, within 1'-0" of openings at 8" o.c. around opening perimeter, and as indicated on the Drawings.
 - c. Securely anchor to concrete back-up in slot.
 - d. Ties shall be installed to allow movement parallel to the wall vertically.

3.7 MASONRY FLASHINGS

- A. Provided flashing at top of foundation walls, lintels, above ledge or shelf angles, at lintels, under parapet caps, and all other obstructions to the downward flow of water in cavity or veneered

walls.

- B. Turn flashing minimum 8" up the wall with top edge mechanically fastened and "stripping in" under the air barrier.
 - a. Seal to sheathing over steel stud framed back-up.
 - b. Lap end joints minimum 6" inches and seal watertight.
 - c. Seal fabric flashing at all punctures around ties and at joints with manufacturer's recommended adhesive. Complete installation shall be water tight.
 - d. Turn flashing, fold, and seal at corners, bends, and interruptions.
- C. Flashing at base of wall with basement below and with waterproofing membrane installed up and over the top of the foundation wall shall not include stainless steel drip edge or uncured strip of rubber EPDM between flashing at drip edge. Flashing at base of wall shall be trimmed back 1/4" maximum behind face of brick before stone installation.
- D. Flashing at base of wall with no basement below and with no waterproofing membrane installed up and over the top of the foundation wall shall include stainless steel drip edge and uncured strip of rubber EPDM. Install rubber on top of **stainless steel** drip edge and between flashing and stainless steel drip edge. Install stainless steel drip edge so the bent drip is flush with the edge of the brick.
- E. Flashing at widow heads shall include stainless steel drip edge and uncured strip of rubber EPDM. Install rubber on top of stainless steel and between flashing and stainless steel drip edge. Install stainless steel drip edge so the bent drip is flush with the edge of the brick.
- F. Flashing at shelf angles shall not include stainless steel drip edge or uncured strip of rubber EPDM installed between flashing and stainless steel drip edge. Install bottom of flashing so it extends beyond masonry by 3/8". Install caulk joint between steel shelf angle and masonry to hide and protect shelf angle, under flashing, holding the caulk joint as far back into the joint as possible. Caulk color shall match mortar. After caulk cures, trim back soft copper flashing flush to caulk joint.

3.8 WEEPS AND VENTS

- A. Install weeps in veneer at 1'-4" o.c. maximum horizontally above all through-wall flashing with a minimum of two weeps per cavity space.

3.9 MORTAR NET OR MORTAR SCREEN

- A. Contractor's option to provide mortar net or mortar screen in brick cavity. Both products are not required to be installed in the same cavity.
- B. Mortar Net:
 - a. Install mortar net in cavity, continuous horizontally above through-wall flashing to promote

water drainage access to weeps and vents.

b. Install in accordance with manufacturer's recommendations.

C. Mortar Screen:

a. Install mortar screen in first masonry joint above through wall flashing anchor at sheathing.

b. Install in brick joint, through the cavity, and anchor to sheathing.

c. Install in accordance with manufacturer's recommendations.

3.10 LINTELS

A. Install loose steel lintels over openings in masonry in accordance with Section 05120, and as indicated on the Drawings.

3.11 CONTROL AND EXPANSION JOINTS

A. Do not continue horizontal joint reinforcement through control or expansion joints.

B. Install preformed control joint device in continuous lengths.

D. Seal butt and corner joints in accordance with manufacturer's instructions.

E. Vertical joints shall be raked clear of mortar and shall be clean, straight and true.

F. Size control joint in accordance with Section 07900 for sealant performance and installation.

3.12 TOLERANCES

A. Maximum Variation from Unit to Adjacent Unit: 1/32".

B. Maximum Variation from Plane of Wall: 1/4" inch in 10'-0" and 1/2" in 20'-0" or more.

C. Maximum Variation from Plumb: 1/4" per story non-cumulative; 1/2" inch in two stories or more.

D. Maximum Variation from Level Coursing: 1/8" inch in 3'-0", and 1/4" in 10'-0", and 1/2" inch in 30'-0".

3.13 REPAIR AND CLEANING

A. All defective work shall be cut out and replaced, including cutting out and repointing of defective joints. When completed, repair work shall match and blend into the original work.

B. Remove excess mortar and mortar smears.

- C. Clean soiled surfaces with cleaning solution in accordance with recommendations of the Brick Institute of America, Technical Note 20.
 - a. Utilize the masonry mock-up panel to test cleaning procedures. Test using cleaning procedures, chemical solutions, and equipment proposed.
 - b. Clean all exposed to view masonry including interior and exterior face brick and concrete masonry units.
 - c. Apply cleaning solutions in accordance with manufacturer's recommendations.
 - d. Adjacent materials shall be protected during cleaning.
 - e. Thoroughly rinse masonry to remove any cleaning solution residue
 - f. Ensure cleaning solution residue does not affect aluminum finishes.
 - g. Mortar must be allowed to cure a minimum of 28 days prior to application of any cleaning solutions containing acid.
 - h. No more than 120 days shall elapse between starting of masonry work and cleaning operation.
- D. Use non-metallic tools in cleaning operations.

3.14 PROTECTION OF FINISHED WORK

- A. Without damaging completed work, provide protective boards at exposed external corners which may be damaged by construction activities.

END 04300.

DIVISION 4 - MASONRY
Section 04400 - Stone Veneer

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cast stone trim and cut limestone, metal anchors, and supports as indicated on the Drawings. Concrete panels are specified in Section 03450 Architectural Precast Concrete.
- B. Installation of Masonry Accessories; specified under Section 04100 – Masonry Accessories

1.2 SUBMITTALS FOR REVIEW

- A. Shop Drawings: Indicate layout, pertinent dimensions, anchorages, head, jamb, sill opening details, control, and expansion jointing methods. Indicate panel identifying marks and locations.
- B. Product Data: Provide data on stone units, mortar, anchors, and accessories.
- C. Test Results: Manufacturer's cast stone test results of cast stone components made previously by the manufacturer using materials from the same sources proposed for use in this project.
- C. Samples: Submit two stone samples 1'-0" x 1'-0" in size, illustrating color range and texture, markings, and surface finish.
- D. Masonry Sample Panel: Provide stone material for inclusion in the masonry sample panel required in Section 04300 – Masonry Veneer.

1.3 QUALITY ASSURANCE

- A. Design Anchors and Supports
 - a. Design under direct supervision of a Professional Structural Engineer, registered in the State of the Work.
 - b. Design anchors to resist positive and negative wind pressures and other loads as required by applicable code.
 - c. Design anchor attachment to stone with a factor of safety of 5:1 unless greater factor of safety is required by applicable code.
 - d. Design each individual anchor with a factor of safety in the vertical dead-load-bearing direction of 4:1 and in the horizontal lateral-load-bearing direction of 2:1 unless greater factor of safety is required by applicable code.
- B. Stone shall be purchased in one order from one manufacturer, on batch, and in sufficient

quantity to complete the Work.

- C. Product Storage and Handling: Stone materials stored at the job site shall be protected from damage, moisture, and shall not be in contact with the ground.
- D. Owner Testing:
 - a. Owner shall employ and pay for a qualified testing laboratory to perform cast stone testing. Written reports of the testing shall be provided to Landmark within 48 hours of test. Landmark shall notify by phone or fax the same day if any failing test is determined.
 - b. Tests of cast stone shall be performed to ensure conformance with specified requirements of compressive strength and absorption.
 - c. Contractor shall provide randomly selected specimens from plant production at a rate of three (3) per 500 cubic feet, with a minimum of three (3) per production week.

1.4 ENVIRONMENTAL REQUIREMENTS

- A. Cold Weather Requirements:
 - a. Conform to International Masonry Industry All-weather Council –Recommended Practices and Guide Specifications for Cold Weather Masonry Construction as set forth in the latest addition of “Hot and Cold Weather Masonry Construction”.
 - b. Conform to ASTM C270, Article 2.
- B. Hot Weather Requirements:
 - a. Conform to International Masonry Industry All-weather Council –Recommended Practices and Guide Specifications for Hot Weather Masonry Construction as set forth in the latest addition of “Hot and Cold Weather Masonry Construction”.
 - b. Conform to ASTM C270, Article 2.

PART 2 PRODUCTS

2.1 CAST STONE

- A. Materials:
 - a. Portland Cement: ASTM C 150, Type I, white or gray as required to match Architect’s selected color sample for the adjacent hospital building on the same site.
 - b. Coarse Aggregate: ASTM C 33, except for gradation; granite, quartz, or limestone.
 - c. Fine Aggregate: ASTM C 33, except for gradation; natural or manufactured sands.
 - d. Pigments: ASTM C 979, inorganic iron oxides.

- e. Admixtures: Per ASTM C 494.
 - f. Water: Potable.
 - g. Reinforcing Bars: ASTM 615/615M, galvanized or epoxy coated.
 - h. Anchors: Non-corrosive type, sized for conditions; Type 304 stainless steel.
- B. Fabrication:
- a. Comply with Cast Stone Institute Technical Manual, and ASTM C 1364 Standard Specifications for Architectural Cast Stone.
 - b. Casting Method: Vibrant Dry Tamp.
 - c. Compressive Strength: ASTM C 1194: 6,500 psi (44.8 MPa) minimum at twenty eight (28) days.
 - d. Absorption: ASTM C 642 or C 1195: 6 percent maximum at twenty eight (28) days.
 - e. Surface Texture:
 - i. Fine grained texture, similar to natural stone.
 - ii. No bugholes, air voids, or other surface blemishes shall be evident.
 - iii. Match architect's selected sample.
 - f. Color: Match Landmark and Architect selected color sample, Continental Cast Stone "Greystone" (1101).
 - g. Color Variation:
 - i. Viewing Conditions: Compare in direct daylight at ten (10) feet between components of similar age, subjected to comparable weathering conditions.
 - ii. Maximum Variation in accordance with ASTM D 2244:
 - iii. Hue: 2 units
 - iv. Lightness, Chroma, and Hue combined: 6 units
 - h. Reinforcing: ACI 318; Cast Stone shall be reinforced as required to withstand handling and structural stresses. Cover shall be twice the diameter of the reinforcing bars.
 - i. Cut to shape indicated on the Drawings with exposed faces dressed true and joints at right angles.
 - j. Cure in presence of carbon monoxide and carbon dioxide to provide carbonation at surface, to minimize efflorescence.
 - k. Remove cement film from exposed surfaces before packaging for shipment.
 - l. Tolerances: Fabricate cast stone components within tolerances in Cast Stone Institute

Technical Manual, unless otherwise specified.

- i. Dimension plus or minus 1/8".
- ii. Maximum Bow, Camber, or Twist: Length / 360

C. Acceptable Manufacturers:

- a. Continental Cast Stone (913) 422-7575
- b. Corinthian Cast Stone (www.CorinthianCastStone.com)
- c. American Artstone, Co.
- d. Cary Concrete Products
- e. Edwards Precast,
- f. Additional approved equal products shall be consider

2.2 LIMESTONE (ALTERNATE BID)

- A. Provide an Alternate Bid for Limestone in lieu of Architectural precast Concrete.
- B. Limestone: Indiana Oolitic Limestone; complying with ASTM C568 Classification II - Medium Density.
- C. Grade: ILI Select.
- D. Color: Gray.
- E. Grain Direction: Vertical.
- F. Surface Texture: ILI
- G. Ultimate Compressive Strength; 4000 psi minimum per ASTM C170.
- H. Modulus of Rupture; 700 psi minimum per ASTM C99
- I. Absorption; 7.5% maximum per ASTM C97
- J. Acceptable Quarries:
 - a. Indiana Limestone Company; (www.indianalimestonecompany.com)
 - b. Evans Limestone Company; (www.evanslimestone.com)
 - c. Bybee Stone Company Inc.; (www.bybeestone.com)
 - d. Additional approved equal quarries shall be considered

2.8 MORTAR

- A. Setting and Pointing Mortar: shall be non-staining type composed of one part cement ASTM C 270, Type N, one part hydrated lime, and six parts clean, sharp, washed sand which will pass a No. 16 sieve
- B. Mortar Color Additive: Keystone K-2045 to match color of the adjacent hospital building on the same site.

2.9 ANCHORS AND ACCESSORIES

- A. Joint Sealer; as specified in Section 07920 – Caulk and Sealant.
- B. Anchors, dowels, rods, straps, shims, and other components in contact with stone: Stainless steel, ASTM A167, Type 304.
 - a. Sizes and configurations: As required for vertical and horizontal support of stone and applicable loads.
 - b. Wire ties are not permitted.
- C. Support Components not in Contact with Stone: Stainless steel, ASTM A167, Type 304.
- D. Setting Buttons and Shims: Lead type.
- E. Back Coating: Bituminous.
- F. Cleaning Solution:
 - a. Type which will not harm stone, joint materials, or adjacent surfaces.
 - b. Manufacturer's standard-strength, general-purpose cleaner designed for removing mortar and grout stains, efflorescence, and other construction stains from new stone surfaces without discoloring or damaging stone surfaces.
 - c. Expressly approved for intended use by Stone manufacturer and expressly approved by cleaner manufacturer for use on Stone and adjacent masonry materials.

2.10 STONE FABRICATION

- A. Thickness: 3 5/8" to match face brick unless noted otherwise on the Drawings.
- B. Panel Size: As indicated on drawings.
- C. Fabricate units for uniform coloration between adjacent units and over the full area of the installation.
- D. Form external corners to square joint profile.

- E. Slope exposed top surfaces of stone and horizontal sill surfaces for natural wash.
- F. Cut drip slot in bottom surface of work projecting more than 1/2" over adjacent wall or window frame, and as indicated on drawings. Size slot not less than 1/4" wide and 1/4" deep; full width of projection.
- G. Fabrication Tolerances: In accordance with NBGQA Specifications.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive Work.
- C. Verify items provided by other sections of Work are properly sized and located.

3.2 PREPARATION

- A. Clean stone prior to erection. Do not use wire brushes or implements which will mark or damage exposed surfaces.
- B. Coat back and cavity surfaces with back coating. Allow coating to cure.
- C. Where limestone is used at or below grade, paint stone face with cementitious based waterproofing coating. Do not paint stone exposed to view. Tape off and protect stone to remain exposed.

3.3 PLACING AND BONDING

- A. Erect stone in accordance with stone quarry's instructions and erection drawings.
- B. Perform work in accordance with ILI Indiana Limestone Handbook.
- C. Set stone with a consistent joint width of 3/8".
- D. Stone shall be drenched in clear, potable water immediately before installation.
- E. Dowel holes and anchor slots shall be filled with mortar or non-shrink grout.
- F. Obtain approval prior to cutting or fitting any item not so indicated on Drawings. Do not impair appearance or strength of stone work by cutting.
- G. Install anchors and place setting buttons to support stone and to establish joint dimensions.
 - a. Install anchors in accordance with recommendations of the Indiana Limestone Institute and Brick Institute of America.
- H. Mortar Installation:
 - a. Lay solid stone units in full bed of mortar, with full head joints, uniformly jointed with other

work.

- b. Lay stone with face shell bedding on head and bed joints.
 - c. Buttering corners or excessive furrowing of mortar joints are not permitted.
 - d. Remove excess mortar as Work progresses.
 - e. Mortar shall be used within two (2) hours of mixing at temperature over seventy six (76) degrees F. and within two and one-half (2 1/2) hours at temperature over fourth (40) degrees F.
 - f. Retampering of mortars that have stiffened due to water loss through evaporation shall be accomplished by adding water to restore required consistency. Mortar shall not be retempered after it has achieved initial set.
 - g. Mortar shall be mixed at the job site in a manner to permit verification of proportions such as with the use of a one cubic foot box to measure sand and content.
 - h. Head joints in copings and similar components shall be left open for sealant.
 - i. Mortar joints shall be raked 3/4" for pointing. Sponge face of each stone to remove excess mortar.
 - j. Tuck point joints to a slight concave profile.
- I. Interlock intersections and external corners. [Install quirk joints with consistent joint width.]
 - J. Do not shift or tap stone units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
 - K. Isolate top joint of stone walls from horizontal structural framing members and slabs or decks with compressible joint filler.
 - L. Cutting and Fitting:
 - a. Provide job site cutting of stone units with proper tools to provide un-chipped edges.
 - b. Prevent broken stone unit corners or edges.
 - c. Cut and fit for conduit, sleeves, and other built-in items shall be coordinated with other sections of work to provide correct size, shape, and location.
 - d. Conceal all built-in items, conduit, and boxes.
 - e. Obtain approval prior to cutting or fitting stone work not indicated or where appearance or strength of stone work may be impaired.
 - f. Install hollow metal frames, and fill solid with grout. Perform job site cutting of stone units with proper tools to provide appropriate edges.

- g. Prevent broken stone unit corners or edges.
- M. Cavity Behind Veneer:
- a. Do not permit mortar to drop or accumulate into cavity air space or to plug weeps or mortar net / screen.
 - b. Maintain minimum 2" air space in cavity.
- N. Stopping and Starting Work:
- a. Stopping off shall only be done by racking back 1/2 stone length in each course and not by toothing or projecting of alternate courses.
 - b. Stone shall be laid with completely filled mortar joints both vertically (except weeps and vents) and longitudinally with fully embedded ties and reinforcing.
 - c. At the end of each Work day and during rain, wall tops and stone materials on scaffolding shall be protected from moisture. Cover open cavities and material with tarp.

3.4 SEALANT JOINTS

- A. Prime ends of cast stone components, insert properly sized frame backing rod, and install sealant specified in Section 07920 – Caulk and Sealant.
- B. Provide sealant at the following locations, and as indicated on the Drawings:
 - a. Stone components on exposed tops.
 - b. Joints at relieving angles.
 - c. Control joints.

3.5 REINFORCEMENT AND ANCHORAGE

- A. Masonry Cavity Wall with Stone Veneer:
 - a. Install horizontal joint reinforcement 16 inches oc.
 - b. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
 - c. Place joint reinforcement continuous in first and second joint below top of walls.
 - d. Lap joint reinforcement ends minimum 6 inches
- B. Metal Stud Back-up with Stone Veneer:
 - a. Veneer wall ties shall be spaced at a minimum of one tie for each two (2) square feet of wall

area, within 1'-0" of openings at 8" o.c. around opening perimeter, and as indicated on the Drawings.

- b. Securely anchor through sheathing to stud back-up.
- c. Ties shall be installed to allow movement parallel to the wall vertically.

3.6 STONE FLASHINGS

- A. Provided flashing at top of foundation walls, lintels, above ledge or shelf angles, at lintels, under parapet caps, and all other obstructions to the downward flow of water in cavity or veneered walls.
- B. Turn flashing minimum 8" up the wall with top edge mechanically fastened and "stripping in" under the air barrier.
 - a. Seal to sheathing over steel stud framed back-up.
 - b. Lap end joints minimum 6" inches and seal watertight.
 - c. Seal fabric flashing at all punctures around ties and at joints with manufacturer's recommended adhesive. Complete installation shall be water tight.
 - d. Turn flashing, fold, and seal at corners, bends, and interruptions.
 - e. Bottom of flashing shall extend beyond masonry or supporting construction to form a 3/8" positive drip.
- C. Flashing at base of wall with basement below and with waterproofing membrane installed up and over the top of the foundation wall shall not include stainless steel drip edge or uncured strip of rubber EPDM between flashing at drip edge. Flashing at base of wall shall be trimmed back 1/4" maximum behind face of brick before stone installation.
- D. Flashing at base of wall with no basement below and with no waterproofing membrane installed up and over the top of the foundation wall shall include stainless steel drip edge and uncured strip of rubber EPDM. Install rubber on top of stainless steel drip edge and between flashing and stainless steel drip edge. Install stainless steel drip edge so the bent drip is flush with the edge of the brick.
- E. Flashing at window heads shall include stainless steel drip edge and uncured strip of rubber EPDM. Install rubber on top of stainless steel drip edge and between flashing and stainless steel drip edge. Install stainless steel drip edge so the bent drip is flush with the edge of the brick.
- F. Flashing at shelf angles shall not include stainless steel drip edge or uncured strip of rubber EPDM installed between flashing and stainless steel drip edge. Install bottom of flashing so it extends beyond masonry by 3/8". Install caulk joint between steel shelf angle and stone to hide and protect shelf angle, under flashing, holding the caulk joint as far back into the joint as possible. Caulk color shall match mortar. After caulk cures, trim back soft copper flashing flush with caulk joint.

3.7 WEEPS

- A. Install weeps in veneer at 1'-4" o.c. maximum horizontally above all through-wall flashing with a minimum of two weeps per cavity space.

3.8 MORTAR NET OR MORTAR SCREEN

- A. Contractor's option to provide mortar net or mortar screen in brick cavity. Both products are not required to be installed in the same cavity.

- B. Mortar Net:

- a. Install mortar net in cavity, continuous horizontally above through-wall flashing to promote water drainage access to weeps and vents.
- b. Install in accordance with manufacturer's recommendations.

- C. Mortar Screen:

- a. Install mortar screen in first masonry joint above through wall flashing anchor at sheathing.
- b. Install in brick joint, through the cavity, and anchor to sheathing.
- c. Install in accordance with manufacturer's recommendations.

3.9 LINTELS

- A. Install loose steel lintels over openings in masonry, and as indicated on the Drawings.
- B. Provide stainless steel shim at support angles.

3.10 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths.
- D. Seal butt and corner joints in accordance with manufacturer's instructions.
- E. Vertical joints shall be racked clear of mortar and shall be clean, straight and true.
- F. Size control joint in accordance with Section 07900 for sealant performance and installation.

3.11 TOLERANCES

- A. Position of Elements: Maximum 1/4" from true position.
- B. Maximum Variation from Plane of Wall: 1/4" inch in 10'-0" and 1/2" in 50'-0" or more.
- C. Maximum Variation Between Face Plane of Adjacent Panels: 1/16"

- D. Maximum Variation from Plumb: 1/8" in 5'-0", 1/4" per story non-cumulative; 1/2" in any two stories and in 20'-0".
- E. Maximum Variation from Level: 1/8" inch in 5'-0", 1/4" in 20'-0", and 1/2" maximum.
- F. Maximum Variation of Joint Thickness: 1/4" in 3'-0".

3.12 REPAIR AND CLEANING

- A. All defective work shall be cut out and replaced, including cutting out and repointing of defective joints. When completed, repair work shall match and blend into the original work.
- B. Remove excess mortar and mortar smears.
- C. Clean soiled surfaces with cleaning solution in accordance with manufacture' recommendations, and in accordance with recommendations of the Stone Quarry.
 - a. Utilize the masonry mock-up panel to test cleaning procedures. Test using cleaning procedures, chemical solutions, and equipment proposed.
 - b. Clean all stone exposed to view.
 - c. Install cleaning solutions in accordance with manufacturer's recommendations.
 - d. Adjacent materials shall be protected during cleaning.
 - e. Thorough rinse stone to remove any cleaning solution residue
 - f. Insure cleaning solution residue does not affect aluminum finishes.
 - g. If cleaning solutions used contain acid, mortar must be allowed to cure a minimum of 28 days.
 - h. No more than 120 days shall elapse prior to any cleaning operation.
- D. Use non-metallic tools in cleaning operations.

3.13 PROTECTION OF FINISHED WORK

- A. Without damaging completed work, provide protective boards at exposed external corners which may be damaged by construction activities.

END 04400.

DIVISION 5 – METALS
Section 05120 - Structural Steel

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Structural steel for the building frame, floor structure, roof structure, framed openings, support for Owner equipment, and miscellaneous other steel as indicated on the Drawings.

1.2 SUBMITTALS FOR REVIEW

- A. Steel Shop Drawings:
 - a. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, connections, and fasteners.
 - b. Indicate cambers, and loads.
 - c. Indicate welded connections with AWS A2.0 welding symbols. Indicate net weld size, length, and type. Distinguish between shop and field welds.
 - d. Anchor bolt setting plans.
 - e. Include embedment drawings.
 - f. Steel connections indicated to comply with design loads, include structural calculations prepared by qualified professional engineer responsible for their preparation.
- B. Stair, Railing and Ladder Shop Drawings.
- C. Certification and Test Results:
 - a. Mill certificates for all structural steel.
 - b. Fabricator certification that steel represented by the submitted mill certificates was used on the project and includes all structural steel used on the project.

1.3 QUALITY ASSURANCE

- A. Perform Work in accordance with the following:
 - a. AISC “Code of Standard Practice for Steel Buildings”.
 - b. AISC Section 10.
 - c. AISC “Specification for Design, Fabrication, and Erection of Structural Steel for Buildings”.

- d. AISC “Seismic Provisions for Structural Steel Buildings”, and “Supplement No. 2”.
 - e. AISC “Specifications for Structural Steel Buildings – Allowable Stress Design and Plastic Design”.
 - f. AISC “Specification for the Design of Steel Hollow Structural Sections”.
 - g. AISC “Specification for Allowable Stress Design of Single – Angle Members”.
 - h. RCSC “Specification for Structural Joints using ASTM A325 or A490 Bolts”.
 - i. AWS D1.1 “Structural Welding Code – Steel”.
 - j. ASW “Standard Qualification Procedure”.
- B. Fabricator: Company specializing in performing the work of this section with minimum 10 years documented experience.
- C. Erector: Company specializing in performing the work of this section with minimum 10 years documented experience.
- D. Design connections not detailed on the Drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the place where the Project is located.
- E. Owner Testing:
- a. Owner shall employ and pay for a qualified testing and inspection laboratory to perform steel testing and on-site inspection services during Work. Written reports of the inspections, observations, and testing shall be provided to Landmark within 48 hours of test and inspections. Landmark shall notify by phone or fax the same day if any failing test is determined.
 - b. Contractor shall provide free access to the Work. Contractor shall notify the Owner’s independent testing laboratory of scheduled Work. If Contractor fails to notify the Owner’s independent testing laboratory, and as a result, tests are not performed, Contractor shall bear the cost of verifying that the in place steel meets the requirements of these specifications.
 - c. Testing shall verify that gaps of direction tension indicator on high strength bolts are less than gaps specified in ASTM F-959, Table 2.
 - d. Field welds in structural steel, steel joists connections and steel deck shall be visually inspected. All suspect welds shall be magnetic particle tested.
 - e. Each welder’s certification shall be inspected for conformance to electrode and type of weld prior to commencement of welding.
 - f. Testing shall verify that automatic welding of headed and dowel type stud shear

connections complies with the manufacturer's printed instructions and that completed welds meet the manufacturer's requirements for full strength development of the headed stud.

- g. Ultrasonic testing ASTM E164 shall be performed on all full penetration welds.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Structural steel for wide flange and tee shapes: ASTM A992, Grade 50.
- B. Structural steel plates, angles, channels, threaded rods, and bars: ASTM A36.
- C. Structural steel B-line clips: ASTM A36.
- D. Tube steel: ASTM A500, Grade B, $F'y = 46,000$ psi.
- E. Structural pipe: ASTM A53, Grade B, type E or S.
- F. Anchor rods shall comply with ASTM F1554, Grade 36 unless otherwise noted.
- G. Threaded rod shall comply with ASTM A36.
- H. Deformed bar anchors shall comply with ASTM A496 and ICBO Report ER-5217.
- I. High strength threaded fasteners shall be minimum 3/4" diameter and shall conform to ASTM A325 N with direct tension indicators conforming to ASTM F959, or break off - (twist-off) type bolts.
- J. Welded connections shall be made with type E70xx electrodes.
- K. Welding Materials shall comply with AWS D1.1; type required for materials being welded.
- L. Sliding bearing plates shall be Teflon coated.
- M. Headed stud shear connectors shall be cold finished carbon steel conforming to ASTM A108, Grade 1015 through 1020, Type B.
- N. Grout: As specified in specification Section 03300 – Cast-In-Place Concrete
- O. Shop and Touch-Up Primer: SSPC 15, Type 1, red oxide.
- P. Touch-Up Primer for Galvanized Surfaces: SSPC 20 Type I Inorganic

2.2 FABRICATION

- A. Fabricate and assemble structural steel in the shop to the greatest extent possible.
- B. Steel to remain permanently exposed shall be fabricated from materials which are smooth and

- free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness. Blemishes shall be removed by grinding or by welding and grinding, prior to cleaning and application of shop paint.
- C. Space shear stud connectors at as indicated on the Drawings.
 - D. Continuously seal joined members by continuous welds. Grind exposed welds smooth.
 - D. Develop required camber for members.
 - E. Plates for steel items bearing on masonry or concrete construction shall be made flat, free of warps or twists.
 - F. Shelf angles and loose lintels shall be fabricated from steel angles and shapes of sizes required to support the structural loads, and as indicated on the Drawings.
 - G. Splices and connections not shown on the Drawings shall be designed by the Contractor to develop the full strength of the largest connecting member and shall be submitted as a separate shop drawing.
 - H. Mark and match mark materials for field assembly.
 - I. Materials shall be fabricated for delivery sequence to expedite erection and minimize field handling of materials.
 - J. Connections:
 - a. Field connections may be bolted, nut and washer or welded, as indicated on the Drawings.
 - b. High strength threaded fasteners shall be used for bolted connections.
 - c. Welded connections shall comply with AWS Code for procedures, appearance and quality of welds, and for methods used in correcting welding work.
 - d. Welds shall be ground smooth where steel is to remain permanently exposed.

2.3 FINISH

- A. Prepare structural component surfaces in accordance with SSPC SP2.
- B. Shelf angles and loose angle lintels located in exterior walls and other steel exposed to the exterior such as roof screen framing shall be galvanized. Galvanizing shall be hot dipped complying with ASTM A153 or ASTM A123.
- C. Steel to remain permanently exposed to view which is not galvanized, and which is scheduled to be painted, shall be cleaned of loose rust, loose mill scale, and spatter, slag, or flux deposits prior to painting.
 - a. Steel shall be cleaned and painted in accordance with the Steel Structures Painting Council

(SSPC).

- b. One-coat shop applied primer shall be provided with dry film thickness of 1.5 mils minimum meeting requirements of Federal Specification TT-P-636D. The primer shall be factory applied.
- c. Paint in accordance with Specification Section 09900 – Painting.

D. All other steel shall be unfinished.

2.4 SOURCE QUALITY CONTROL AND TESTS

- A. Provide shop testing and analysis of structural steel sections, if required by code.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.2 ERECTION

- A. Allow for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- B. Align structural frame and adjust forming a part of a complete frame or structure before permanently fastening. Individual members shall be leveled and plumbed within specified AISC tolerances.
- C. Members shall be spliced only at designated locations indicated on the Drawings and Shop Drawings.
- D. Field weld components and shear studs indicated on Drawings and Shop Drawings.
- E. Field connect members with threaded fasteners; torque to required resistance.
- F. Do not field cut or alter structural members without approval of Landmark and Engineer.
- G. On exposed welded construction, erection bolts shall be removed and holes filled with plug welds ground smooth.
- H. Improper holes shall not be enlarged in members by burning or by the use of drift pins. Holes that must be enlarged to admit bolts shall be reamed.
- I. Gas cutting torches shall not be used in the field for correcting fabrication errors in structural framing, except on secondary members which are not under stress.
- J. Brick shelf angles welded to structural elements shall be installed string-line straight and plumb.

Juncture between adjacent angles shall be held to 3/8" apart to allow for expansion.

- K. Angles or steel support framing of size required to carry roof and equipment loads shall be provided with reinforced openings. Roof deck openings greater than 10" perpendicular to the deck flutes shall be supported.
- L. Grout under base plates and as indicated on Drawings. Trowel grouted surface smooth, splay neatly to 45 degrees.

3.3 ERECTION TOLERANCES

- A. Maximum Variation From Plumb: 1/4" per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4".

END 05120.

DIVISION 5 - METALS
Section 05210 - Steel Joists

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Structural steel joists for roof structural systems as indicated on the Drawings.

1.2 SUBMITTALS FOR REVIEW

- A. Shop Drawings:
 - a. Indicate standard designations, configuration, sizes, spacing, locations of joists, and joist leg extensions.
 - b. Joist coding, bridging, connections, attachments, and cambers.

1.3 QUALITY ASSURANCE

- A. Perform Work in accordance with Steel Joist Institute Standard Specifications, Load Tables, and Weight Tables, including headers and other supplementary framing.
- B. Welding connections shall comply with AWS “Standard Qualifications Procedures”.
- C. Manufacturer: Company specializing in performing the work of this section with minimum 5 years documented experience.
 - a. Manufacturer shall be certified by SJI to manufacture joists complying with SJI standard specifications and load tables.
- D. Erector: Company specializing in performing the work of this section with minimum 5 years documented experience
- E. Design connections not detailed on the Drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the place where the Project is located.
- E. Deflections: Design joists for a live load deflection no greater than 1/360 of the span. The total load deflection of members supporting masonry shall not exceed L/600.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Steel: Comply with SJI “Specifications” for chord and web members.

- B. Nuts, Bolts, and Washers: ASTM A307.
- C. Structural Steel for Supplementary Bearing Plates, Framing and Joist Leg Extensions: ASTM A36 and ASTM A36M.
- D. Welding Materials shall comply with AWS D1.1; type required for materials being welded.
- E. Carbon-Steel Bolts and Threaded Fasteners: ASTM A307, Grade A, carbon-steel, hex head bolts and threaded fasteners, carbon-steel nuts, and flat unhardened steel washers. Finish shall be plain, uncoated.
- F. High-Strength Bolts and Nuts: ASTM A325, Type 1, heavy hex steel structural bolts, heavy hex carbon-steel nuts, and hardened carbon-steel washers. Finish shall be plain, uncoated.
- G. Shop and Touch-Up Primer: SSPC 15, Type 1, red oxide.

2.2 OPEN WEB STEEL JOIST

- A. Steel joists shall K-Series and shall be manufactured according to “Standard Specifications for Open Web Steel Joists, K-Series,” in SJI’s “Specifications,” with steel angle top and bottom chord members, under-slung ends, and parallel top chord.
 - a. Top and bottom chord per ASTM A572.
 - b. Webs per ASTM A36.
- B. Top-Chord Extensions: Extend top chords of joists with SJI’s Type R top-chord extensions where indicated on Drawings.
- C. Extended Ends: Extend bearing ends of joists with SJI’s Type R extended ends where indicated on Drawings.
- D. Bridging: Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size and type required by SJI’s “Specifications” for type of joist, chord size, spacing, and span, and as indicated on drawings.
- E. Supply miscellaneous accessories, including splice plates and bolts required by joist manufacturer to complete joist installation.

2.3 FABRICATION

- A. Provide chord extensions as indicated on the Drawings.
- B. Fabricate to achieve end bearing of 2-1/2” on steel
- C. Frame special sized openings in joist web framing as detailed.
- D. Comply with AWS requirements and procedures for shop welding, appearance, quality of welds,

and methods used in correcting welding work.

- E. Provide holes in chord members for connecting and securing other construction to joists.
- F. Camber joists according to SJI "Specifications" for large spans to eliminate dead load deflection.
- G. Equip bearing ends with manufacturer's standard beveled ends or sloped shoes if joists slope exceeds 1/4" per 1'-0".
- H. Steel bearing plates shall be fabricated with integral anchorages of sizes and thickness indicated on the Drawings and Shop Drawings.

2.4 FINISH

- A. Prepare joist component surfaces in accordance with SSPC SP 2.
- B. Shop prime joists.
- C. Loose scale, heavy rust and other foreign materials shall be removed from joists and accessories before application of shop paint.
- D. A continuous 1.0 mil minimum thickness one-coat primer paint shall be applied to steel joists and accessories.
- E. Do not galvanize, prime, or paint surface to receive sprayed-on fire resistant material. Clean steel so it is free of oil and ready to accept sprayed on fire resistant material.
- F. Do not factory apply primer or paint on surfaces that will be field welded, or in contact with concrete.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Do not place joists until supporting Work is in place and secured.

3.2 ERECTION

- A. Erect and bear joists on supports in accordance with SJI "Specifications", and joist manufacturer's recommendations.
- B. Allow for erection loads. Provide sufficient temporary bracing to maintain framing safe, plumb, and in true alignment.
- C. Splice joists delivered in more than one piece.
- D. Delay rigidly connecting bottom-chord extensions to columns or supports until dead loads have been applied.

- E. After joist alignment and installation of framing, field weld or bolt joist seat to bearing plates or steel framework as indicated on the Drawings and Shop Drawings.
- F. Position and field weld joist chord extensions and wall attachments as detailed.
- G. Bolted Connections:
 - a. Use high strength structural bolts, unless otherwise indicated.
 - b. Comply with RCSC's "Allowable Stress Design Specification for Structural Joints Using ASTM A325 or ASTM A490 Bolts" for high-strength structural bolt installation and tightening requirements.
- H. Install bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.
- I. Frame roof openings greater than 1'-6" inches with supplementary framing.
- J. Do not permit erection of decking until joists are braced, bridged, and secured or until completion of erection and installation of permanent bridging and bracing.
- C. Do not field cut or alter structural members without approval of joist manufacturer.
- G. Field touch-up of paint is not required.

3.3 ERECTION TOLERANCES

- A. Maximum Variation From Plumb: 1/4".
- B. Maximum Offset From True Alignment: 1/4".

END 05210.

DIVISION 5 - METALS
Section 05300 – Metal Deck

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal decking for floors and roof structural systems including formed steel cant strips, eave strips, valley strips, framed openings up to 1'-6" and bearing plates.

1.2 SUBMITTALS FOR REVIEW

- A. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, and accessories.
- B. Product Data: Provide deck profile characteristics and dimensions, structural properties, and finishes.
- C. Manufacturer Certification: Steel deck manufacturer shall provide a signed product certificate certifying that products furnished satisfy the requirements of the Drawings and Specifications.

1.3 QUALITY ASSURANCE

- A. Perform work in accordance with the following:
 - a. AISI "Specification for the Design of Cold Formed Steel Structural Members".
 - b. SDI "Design Manual for Floor Decks and Roof Decks".
 - c. AWS D1.3 "Structural Welding Code – Sheet Steel".
 - d. AWS "Standard Qualification Procedure".
- B. Installer: Company specializing in performing the work of this Section with 5 years minimum documented experience.
- B. Design deck layout, spans, fastening, and joints, under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the place where the Project is located.
- C. Welding decking in place is subject to inspection and testing. Remove work found to be defective and replace with new acceptable work.
- D. Qualification of Field Welding: Quality welding processes and welding operators in accordance with "Welder Qualification" procedures of AWS D1.1.

- E. Product Storage and Handling: Stack deck on platforms or pallets and slope to provide drainage. Stored deck shall be protected with a waterproof covering and ventilated to avoid condensation.
- F. Fire rated assemblies: Decking shall be modified as required to achieve fire rated assembly construction requirements as defined under UL listings.

PART 2 PRODUCTS

2.1 DECK MANUFACTURERS

- A. Consolidated Systems, Inc.
- B. Epic Metals Corporation.
- C. Nucor Corporation, Vulcraft Division.
- D. United Steel Deck, Incorporated.
- E. Wheeling Corrugating Company.
- F. Additional approved equal manufactures shall be considered

2.2 DECK MATERIALS

- A. Roof Deck; shall be wide rib, primed, 1 1/2" deep minimum twenty-two (22) gauge steel, except below rooftop mechanical unit slabs, which shall be eighteen (18) gauge steel. Steel roof deck shall be fabricated without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck", in SDI Publication No. 29, and the following:
 - a. Prime-Painted Steel Sheet: ASTM A611, Grade C minimum, shop primed with gray or white baked-on, lead and chromate-free rust-inhibitive primer complying with performance requirements of FS TT-P-664.
 - b. Minimum design Uncoated-Steel Thickness: 0.0295 inch.
 - c. Design Uncoated-Steel Thicknesses; Deck Unit/Bottom Plate: 22 gauge - 0.0474 inch.
 - d. Span Condition: Three (3) spans.
 - e. Side Laps: Overlapped.
- B. Floor Deck; shall be minimum 2" deep, twenty (20) gauge. Deck shall be galvanized steel, composite steel deck complying with "SDI Specification and Commentary for Composite Steel Deck", in SDI Publication No. 29, and the following:
 - a. Galvanized Steel Sheet: ASTM A653, Structural Steel (SS), Grade 33, G60 zinc coating.
 - b. Minimum Design Uncoated-Steel Thickness: 20 gauge - 0.0359 inch.

- c. Span Condition: Three (3) spans.
- d. Side Laps: Overlapped or interlocking seam.

2.3 ACCESSORIES

- A. Mechanical Fasteners: Corrosion resistant low velocity power actuated or pneumatically driven carbon-steel fasteners, or self drilling self threading screws.
- B. Sid-Lap Fasteners: Corrosion resistant hexagonal washer head, self drilling, carbon steel screws, No. 10 minimum diameter.
- C. Sheet steel, minimum yield strength of 33,000 psi, not less than twenty two (22) gauge designed uncoated thickness of the same material and finish as the deck, of profile indicated or required for application.
- D. Pour Stops and Girder Fillers: Steel sheet minimum yield strength of 33,000 psi, of same material and finish as the deck, and of thickness and profile indicated on the Drawings or the Shop Drawings.
- E. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material and finish as the deck, and of thickness as the deck unless otherwise indicated on the Drawings or Shop Drawings.
- F. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, 0.0598" thick with factory-punched hole of 3/8" minimum diameter.
- G. Recessed Sump Pans: Single piece steel sheet, twelve (12) gauge, of the same material and finish as the deck, with 3" wide flanges, 1 1/2" minimum depth. Holes shall be field cut for drains.
- H. Shear Connections: ASTM A108, Grades 1010 through 1020 headed stud type, cold finished carbon steel, AWS D1.1, Type B, with arc shields.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.2 INSTALLATION

- A. Erect metal deck in accordance with SDI Manual, SDI Publication No. 29, and manufacturer's instructions.
- B. Deck bundles shall be located to prevent overloading of structural members.
- C. Deck shall not be used for storage or working platforms until permanently secured.

- D. Bear deck on steel supports with 1-1/2" minimum bearing.
 - a. Align, adjust and level for entire length of run with close alignment between cells at ends of abutting units. Deck shall be flat and square.
 - b. Ends shall be accurately aligned before permanently fastened.
 - c. Stretching or contracting side lap interlocks shall not be permitted.
 - d. Secure deck without warp or excessive deflection.
- E. Deck and accessories shall be cut and neatly fit around other work projecting through or adjacent to the decking.
- G. Weld in accordance with AWS D1.1 requirements and AWI procedures for manual shielded metal arc welding, appearance, and quality of welds, and methods used for correcting welding work.
- H. Reinforce steel deck openings from 6" to 1'-6" in size with 2" x 2" x 1/4" steel angles, unless indicated otherwise on the Drawings. Place framing angles perpendicular to flutes; extend minimum two flutes beyond each side of opening and fusion weld to deck at each flute.
- I. Connections between metal deck and structural steel shall be made with E7010 series electrodes.
 - a. Amperage for welding equipment shall be calibrated for the gauge of material used.
- J. Roof Deck Installation:
 - a. Fasten roof deck to steel supporting members by arc spot (puddle) welds of the surface diameter indicated on the Drawings, or arc seam welds with an equal perimeter but not less than 1 1/2" long and 3/4" nominal diameter.
 - b. Weld spacing shall be as indicated on the Drawings.
 - c. Side-Lap and perimeter edge fastening of panels between supports at intervals indicated on the Drawings, but not exceeding the lesser of 1/2 of the span or 1'-6", 3'-0", and as follows:
 - i. Mechanically fasten with self-drilling No. 10 diameter or larger carbon-steel screws.
 - ii. Mechanically clinch or button punch.
 - iii. Fasten with a minimum of 1 1/2" long welds.
 - d. End bearing over supporting frame with a minimum end bearing of 1 1/2" with end joints, and lapped 2" minimum.
 - e. Sump pans shall be installed over openings provided in roof deck and weld flanges to the top of the deck. Welds shall be spaced not more than 1'-0" apart with at least one (1) weld at each corner.

- f. Install 6" minimum wide sheet steel cover plates, of same thickness as deck, where deck changes direction. Fusion weld 1'-0" oc maximum.
 - g. Miscellaneous Accessories: Install ridge and valley plates, finish strips, cover plates, end closures, and reinforcing channels according to deck manufacturer's recommendation. Weld to substrate to provide a complete deck installation.
 - h. Provide metal closure strips at open uncovered ends and edges and in voids between deck and other construction. Weld into position to provide a complete decking installation. Flexible closure strips may be used in lieu of metal closures wherever their use will ensure a complete closure.
 - i. Field touchup of primed and galvanized deck is required after installation is complete.
- K. Floor Deck Installation:
- a. Fasten floor deck panels to steel supporting members by arc spot (puddle) welds as follows:
 - i. Weld Diameter: 5/8" nominal.
 - ii. Weld Spacing: Weld edge ribs of panels at each support, unless otherwise indicated on the Drawings. Space additional welds an average of 1'-0" apart but not more than 1'-6" apart.
 - iii. Weld washers shall be installed at each weld location.
 - b. Side-Lap and perimeter edge fastening of panels between supports at intervals not exceeding the lesser of 1/2 of the span or 1'-6", 3'-0", and as follows:
 - i. Mechanically fasten with self-drilling No. 10 diameter or larger carbon-steel screws.
 - ii. Mechanically clinch or button punch.
 - iii. Fasten with a minimum of 1 1/2" long welds.
 - c. End bearing over supporting frame with a minimum end bearing of 1 1/2" with end joints, and lapped 2" minimum.
 - d. Shear Connectors: Weld shear connectors through deck to supporting frame according to AWS D1.1 and manufacturer's recommendations. End joints of deck panels shall be bolted, not lapped. Arc shields shall be removed and discarded after welding shear connectors.
 - e. Pour stops and girder fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations, unless otherwise indicated on the Drawings.
 - f. Install 6" minimum wide sheet steel cover plates, of same thickness as deck, where deck changes direction. Fusion weld 1'-0" oc maximum.
 - g. Provide metal closure strips at open uncovered ends and edges and in voids between deck and other construction. Weld into position to provide a complete decking installation. Flexible closure strips may be used in lieu of metal closures wherever their use will ensure a complete closure.
 - h. Field touchup of deck galvanizing after erection is not required.

END 05300.

DIVISION 5 - METALS
Section 05400 – Cold Formed Metal Framing

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cold formed steel studs for the building exterior wall system including punched channel studs, “C” shaped load bearing studs, bridging, track, blocking, lintels, clip angles, shoes, reinforcements, fasteners and accessories for a complete metal framing system.
- B. Cold formed steel studs and joists for the buildings vestibules exterior and interior wall systems, soffits and roofs including punched channel studs, “C” shaped load bearing studs, joists, bracing, bridging, track, blocking, lintels, clip angles, shoes, reinforcements, fasteners and accessories for a complete metal framing system.

1.2 SUBMITTALS FOR REVIEW

- A. Shop Drawings: Indicate prefabricated work, component details, stud layout, framed openings, anchorage to structure, type and location of fasteners, and accessories or items required of other related work.
 - a. Submit design calculations for the Cold Formed Metal Framing systems prepared by and stamped by a Professional Engineer registered in the State of the project.
 - b. Submit design calculations for the welds between the Cold Formed Metal Framing system and the steel angles including B-Line anchors which support masonry veneer.

1.3 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.

1.4 QUALITY ASSURANCE

- A. Calculate structural properties of framing members in accordance with MFMA - Guidelines for the Use of Metal Framing and AWS D1.3 requirements.
- B. Perform Work in accordance with ASTM C754, ML/SFA 540 – Lightweight Steel Framing Systems Manual.
- C. Conform to the appropriate standards of the latest edition of the American Iron and Steel Institute (AISI) “Specifications for Design of Cold-Formed Steel Structural Members”.
- D. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.
- E. Welders: Qualified welders shall comply with American Welding Society (AWS) D1.3

“Structural Welding Code – Sheet Steel”.

- F. Design structural elements under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed at the place where the Project is located.
- G. Form, fabricate, install, and connect components in accordance with ML/SFA 540.
- H. Owner Testing:
 - a. Owner shall employ and pay for a qualified testing and inspection laboratory to perform cold-formed metal framing testing and on-site inspection services during the Work. Written reports of the inspections, observations, and testing shall be provided to Landmark within 48 hours of test and inspections. Landmark shall notify by phone or fax the same day if any failing test is determined.
 - b. Contractor shall provide free access to the Work. Contractor shall notify the Owner’s independent testing laboratory of scheduled Work. If Contractor fails to notify the Owner’s independent testing laboratory, and as a result, no tests and inspections occur, Contractor shall bear the cost of verifying that the in place Work meets the requirements of these specifications.
 - c. Field welds in cold-formed metal framing shall be visually inspected. All suspect welds shall be magnetic particle tested. Each Welder’s certification shall be inspected prior to commencement of welding.
 - d. Additional tests and inspections shall be provided, if required by code.

1.5 REGULATORY REQUIREMENTS

- A. Provide fire rated assembly for exterior wall which carry a fire rating, as indicated on the Drawings.
- B. Provide fire rated assembly which is identical in materials and construction to the systems tested.
- C. Acceptable testing agencies include Underwriters Laboratories, Inc. and Warnock Hersey International, Inc.

1.5 PERFORMANCE REQUIREMENTS

- A. Design system to support deflection loads, both positive and negative wind loads and axial loads carried by the studs.
- B. Deflection Criteria:
 - a. $L/600$ and $.3$ ” maximum when facing material is brick or masonry with simple spans (where L represents the length of the stud).
 - b. $L/600$ and $.3$ ” maximum when facing material is brick or masonry with cantilever studs (where L represents twice the length of the cantilever).

- c. L/360 and 3/8" maximum when material is glazed aluminum storefront, curtainwall, cement plaster, exterior soffit insulation and finish system, interior ceiling system, exterior roof system or pre-finished panel system.

PART 2 PRODUCTS

2.1 FRAMING MATERIALS

- A. Steel Joists, Studs and Tracks; shall be a minimum of 6" deep, galvanized sixteen (16) gauge of ASTM C955 Grade D with minimum yield of 50 ksi., and a minimum of 6" deep, galvanized eighteen (18) gauge steel track, bridging, end closers, and accessories shall be of ASTM C955 Grade A with minimum yield of 33 ksi. Galvanized material will receive a G-60 galvanized coating per ASTM A525. One of the following approved manufacturers and products may be used:
 - a. Clark Steel Framing Industries
 - b. Dale Industries, (www.daleincor.com)
 - c. Dietrich Metal Framing, (www.dietrichindustries.com)
 - d. Unimast, Inc.
 - e. Additional approved equal manufacturers shall be considered.
- B. WALL FRAMING
 - a. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
 - 1. Minimum Base-Metal Thickness: 0.0538 inch
 - b. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and same minimum base-metal thickness as steel studs.
 - c.. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, punched, with stiffened flanges, and as follows:
 - 1. Minimum Base-Metal Thickness: 0.0538 inch.
 - d. Flange widths vary with application; coordinate with wall width.
- C. ROOF FRAMING
 - a. Joists: Manufacturer's standard C-shaped steel joists, of web depths indicated, punched, with stiffened flanges, and as follows:
 - 1. Minimum Base-Metal Thickness: 0.0538 inch.

2. Flange Width: 1-5/8 inches, minimum.
- D. Steel Joist Track: Manufacturer's standard U-shaped steel joist track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
- a. Minimum Base-Metal Thickness: Matching steel joists.
 - b. Flange Width: 1-5/8 inches, minimum.

2.2 ACCESSORIES

- A This specification is based on The Steel Network, Inc. (www.steelnetwork.com) to establish function, quality, and style. The Steel Network standard vertical deflection connection, drift system clips, rigid clips, cold rolled channel, flat strap, and solid bridging shall be used. Products may be used from one of the following approved equal manufacturers:
- a. Fire-Trak Corp. (www.firetrak.com)
 - b. Metal-Lite (www.metallite.com)
 - c. Additional approved equal products shall be considered
- B. Miscellaneous Materials: Components shall be securely anchored and braced at the base and overhead with power driven fasteners, bolting, or welding.
- a. Screws; shall have Stalgard coating by Hilti
 - b. Electrodes for welding shall comply with the AWS code.
 - c. Connector Devices: The Steel Network, "VertiClip"
 - d. Repair Paint: Zinc rich paint for repair of galvanized surfaces shall comply with M.I. Spec. MIL-P-21035.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that rough-in utilities are in proper location.

3.2 PREPARATION

- A. Coordinate erection of studs with requirements of door frames, window frames, and other openings; install supports and attachments.
- B. Coordinate the installation of the steel angles which support the brick veneer.
- C. Coordinate installation of wood bucks, anchors, and wood blocking with casework, medical

equipment, toilet room accessories, electrical, mechanical etc. to be placed within or behind stud framing.

- a. Blocking: Secure wood blocking or steel channel blocking to studs.
 - b. Install blocking for -support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, hardware, opening frames, and other similar items as noted on the Drawings, and as required.
- C. Coordinate placement of insulation in stud spaces after stud frame erection.

3.3 ERECTION

- A. Install components in accordance with manufacturer's instructions.
- E. Studs shall be sixteen (16) gauge minimum when supporting structural steel lintels or shelf angles, unless noted otherwise on the drawings.
- F. Align and secure top and bottom runners at 24" oc.
- D. Install studs vertically at 1'-4" inches oc, unless noted otherwise on the Drawings.
- E. Align stud web openings horizontally.
- F. Runner tracks shall be secured at maximum 2'-0" o.c. spacing for nails, or power driven fasteners or at 1'-4" o.c. for other types of attachment. Fasteners shall be provided at corners and ends of track.
- G. Secure studs to tracks using welds or screw fasteners at both inside and outside flanges.
- H. Wall openings larger than 1'-4" square shall be framed with a minimum of two (2) double studs at each jamb. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.
- I. Locate double (minimum) stud at wall openings, door and window jambs, not more than 2 inches from each side of openings.
- J. Stud splicing shall not be permissible.
- K. Fabricate corners using a minimum of three studs.
- L. Expansion and control joints shall be framed with separate studs. The joint shall not be bridged with components of the stud system.
- M. Brace stud framing system rigid. Horizontal stiffeners (bridging) shall be installed at not more than 4'-6" o.c. vertically and shall be welded at each intersection and to supporting structure.
- N. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.

O. Panel Fabrication:

- a. Similar components shall be attached by welding.
- b. Dissimilar components shall be attached by welding, bolting, screw fasteners, as standard with the manufacturer.
- c. Wall panels shall be bolted or welded at both horizontal and vertical junctures to produce flush, even, true to line joints. Step in face and jog in alignment shall not exceed 1/16".

P. Welds: Use E60 or E70 electrodes.

Q. Damage to galvanized finish from welding or other construction activity shall be touched up with zinc-rich paint.

3.4 ERECTION TOLERANCES

A. Maximum Variation From True Position: 1/8" in 10'-0".

B. Maximum Variation From Plumb: 1/8" in 10'-0".

END 05400

DIVISION 5 - METALS
Section 05500 - Metal Fabrications

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal fabrication such as ladders, steel pipe railings, metal pan stairs, including all rough hardware and accessories for a complete installation.
- B. Schedule:
 - a. Metal pan stairs
 - b. Stair pipe railing and guardrail mesh
 - c. Elevator pit ladders and roof hatch ladders
 - d. Elevator hoistway beams, rail attachment supports and door sill angles

1.2 SUBMITTALS FOR REVIEW

- A. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - a. Submit design calculations for the stair, handrail and guardrail systems prepared by and stamped by a Professional Engineer registered in the State of the project.
- B. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.

1.3 QUALITY ASSURANCE

- A. Perform work in accordance with the following:
 - a. Welding: AWS D1.1, D1.2, or D1.3 as applicable.
 - b. Handrails and Railings; ASTM E985 for structural performance based on testing performed in accordance with ASTM E894 and E935.
 - c. Elevator Pit and Roof Access Ladders: ANSI A14.3
- B. Prepare Shop Drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the place where the Project is located.
- C. Fabricator shall be experienced in successfully producing metal fabrications similar to those specified.

1.4 REGULATORY REQUIREMENTS

- A. Stairs and railings shall comply with the Americans with Disability Act (ADA) 1990 – 28 CFR Part 36.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

- A. Steel sections: ASTM A36 and ASTM A283, Grade C.
- B. Steel sheet for cold-forming: ASTM A569
- C. Steel tubing: ASTM A500, Grade B and ASTM A513
- D. Pipe: ASTM A53, Grade B, Schedule 40
- E. Bolts, Nuts, and Washers: ASTM A325
- F. Welding Material: AWS D1.1, type required for materials being welded.
- G. Threaded Rods: ASTM A36 and 77a
- H. A minimum 2.0 mil dry film thickness shop primer shall be applied to uncoated surfaces of metal fabrications except those with galvanized finish or to be embedded in concrete or masonry.

2.2 LADDER FABRICATION

- A. Fabricate to conform to OSHA standards.
- B. Fabricate from steel of 3/8" x 2" side rails spaced at 1'-8" inches.
- C. Rungs of 1" diameter tubular rod spaced 1'-0" on center.
- D. Locate rungs 7" from wall surface with steel mounting brackets and attachments.
- E. Prime paint finish.

2.3 METAL PAN STAIRS

- A. A complete stair assemblies shall be custom fabricated or pre-engineered including metal framing, hangers, columns, and other necessary components.
- B. Prime paint exposed surfaces.
- C. Stairs shall be steel pan designed for 2" concrete infill and fabricated for a uniform 100 pound per square foot live load.

- D. Treads shall be fabricated for a concentrated load of 300 lb on an area of 4 square inches located in the center of the tread.
- E. Steel pan nosing shall extend approximately 1/2" into concrete infill at treads.
- F. Pan type treads and risers shall not be less than 14 gauge steel.
- G. Fabricate stair assembly to support live load of 100 lb/sf with deflection of stringer not to exceed 1/240 of span
- H. One of the following equal manufacturers may be used:
 - a. American Stair (www.americanstair.com)
 - b. Sharon Stairs (www.sharonstair.com).
 - c. Additional approved equal products shall be considered

2.4 EGRESS STAIR HANDRAILS. GUARDRAILS AND INFILL MESH

- A. Guardrails and handrails shall be 1 1/4" steel pipe (1.66" O.D.) with capped ends and supports at a maximum spacing of 4'-0" o.c.
 - a. Connections shall be welded and ground smooth, prime paint.
 - b. Infills shall be 1" x 1" x 10 GA welded wire fabric.
 - c. Handrails shall be provided on both sides of interior stairs mounted with Blum No. 378 brackets, or approved equal.
- B. Black pipe shall be used for interior railings and galvanized pipe and fittings shall be used for exterior railings. Exterior fasteners shall be zinc-coated.
- C. Design Requirements shall be as follows:
 - a. Top Rail of Guardrail System:
 - i. Concentrated load of 200 lb applied at any point and in any direction.
 - ii. Uniform load of 50 lb per lineal foot applied horizontally and concurrently with uniform load of 100 lb per lineal foot applied vertically downward.
 - iii. Concentrated and uniform loads above need not be assumed to act concurrently.
 - b. Handrail Not Serving as Top Rail:
 - i. Concentrated load of 200 lb applied at any point non-concurrently, vertically downward or horizontally.
 - ii. Uniform load of 50 lb per lineal foot applied non-concurrently, vertically downward or horizontally.
 - iii. Concentrated and uniform loads above need not be assumed to act concurrently.
 - c. Infill Area of Guardrail System:
 - i. Horizontal concentrated load of 200 lb applied to one (1) square foot at any

- point in the system including panels, intermediate rails balusters, or other elements composing the infill area.
- ii. Load need not be assumed to act concurrently with uniform horizontal loads on top rails of railing systems in determining stress.

2.5 FABRICATION

- A. Steel to remain permanently exposed shall have welds ground smooth and comply with AISC specifications for Architecturally Exposed Structural Steel.
- B. Fit and shop assemble items in largest practical sections, for delivery to site.
- C. Fabricate items with joints tightly fitted and secured.
- D. Continuously seal joined members which are visible in finished areas by intermittent welds and plastic filler.
- E. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- F. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- G. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- H. A minimum of 2.0 mil dry film thickness shop primer shall be applied to uncoated surfaces of metal fabrications, except those with galvanized finish or to be embedded in concrete or masonry.

2.5 FABRICATION TOLERANCES

- A. Square ness: 1/8" maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16".
- C. Maximum Misalignment of Adjacent Members: 1/16".
- D. Maximum Bow: 1/8" in 48" .
- E. Maximum Deviation From Plane: 1/16" in 48" .

2.6 FINISHES – PRIMED STEEL ITEMS

- A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- B. Do not prime surfaces in direct contact with concrete or where field welding is required.

- C. Prime paint items with one coat.
- D. Touch-up prime painted items in the field prior to painting in accordance with paint manufacturer's recommendations.
- E. Exposed steel at the canopy area including the columns, beams, joists, deck and hangers shall be sandblasted and provided with epoxy paint primer in the fabrication process and delivered to the site with epoxy primer. All welds performed in fabrication and on site shall be ground smooth and filler shall be added between welds for a consistent appearance. All filed welds and exposed steel shall be inspected and all epoxy primed areas shall be touched up.

2.9 FINISHES – FACTORY FINISHED ITEMS

- A. Clean surfaces of rust, scale, grease and foreign matter prior to finishing.
- B. Do not prime surfaces in direct contact with concrete or where field welding is required.
- C. Prime paint items with one coat.
- D. Paint items with factory applied Valspar three-coat thermocured system consisting of a specially formulated inhibitive primer and fluoropolymer top coating containing not less than 70% Kynar 500 by weight and complying with AAMA 2605. Color to match aluminum windows, and as selected by Landmark.
- E. The following items shall be factory finished:
 - a. Exterior handrails and guardrails.
 - b. Ornamental railing system supports.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply steel items required to be cast into concrete or embedded in masonry with setting templates to appropriate sections.

3.3 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

- C. Field weld components indicated on Drawings, and shop drawings.
- D. Perform field welding in accordance with AWS D1.1.
- E. Obtain approval prior to site cutting or making adjustments not scheduled.
- F. After erection, prime welds, abrasions, and surfaces not [shop primed] [galvanized], except surfaces to be in contact with concrete.

3.4 ERECTION TOLERANCES

- A. Maximum Variation From Plumb: 1/4" per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4".
- C. Maximum Out-of-Position: 1/4" .

END 05500.

DIVISION 5 - METALS
Section 05550 – Medical Equipment Support System

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Medical equipment support system including metal framing material, fittings, and related strut system accessories

1.2 SUBMITTALS FOR REVIEW

- A. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - a. Submit design calculations for the Medical Equipment Support System prepared by and stamped by a Professional Engineer registered in the State of the project.
- B. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.

1.3 QUALITY ASSURANCE

- A. Products shall be designed to meet seismic design and product requirements to meet applicable codes.
- B. Products specified shall be installed to the following criteria, unless noted otherwise on the Drawings:
 - a. Support structure members at the ceiling plane shall be located to allow installation of standard modular 2'-0" ceiling tile grid, fixtures and other equipment indicated on the Drawings.
 - b. System shall be designed to allow attachment of medical equipment at any point of the support system.
 - c. Wherever possible, attachment to ceiling structure shall be by means of embedded concrete inserts, through-bolts or by direct attachment to structural framing.
 - d. The system shall be designed to a minimum safety factor of three based on the ultimate strength under static loading conditions.

1.4 QUALIFICATIONS

- A. Prepare Shop Drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the place where the Project is located.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

- A. Steel sections: ASTM A 36 and ASTM A 283, Grade C.
- B. Steel sheet for cold-forming: ASTM A 569
- C. Steel tubing: ASTM A 500, Grade B and ASTM A 513
- D. Pipe: ASTM A 53, Grade B (Schedule 40)
- E. Bolts, Nuts, and Washers: ASTM A325
- F. Welding Material: AWS D1.1, type required for materials being welded.
- G. Threaded Rods: ASTM A 36, 77a
- H. A minimum 2.0 mil dry film thickness shop primer shall be applied to uncoated surfaces of metal fabrications except those with galvanized finish or to be embedded in concrete or masonry.

2.2 MEDICAL EQUIPMENT SUPPORT SYSTEM

- A. Channel members shall be fabricated from structural grade steel conforming to ASTM A 570 GR 33 or A 446 GR A. All fittings shall be fabricated from steel conforming to ASTM A575, A 576, A36 or A635. The mounting surfaces of the strut system shall be horizontal within the tolerance of 1/32" in 24" and within 1/16" in an 18' length. The elevation of one rail mounting surface to the other shall be within 1/16" in any 24" length of the rails.
- B. One of the following equal manufacturers and products may be used:
 - a. Unistrut Corporation (www.unistrut.com)
 - b. Additional approved equal products shall be considered

2.3 FABRICATION

- A. Steel to remain permanently exposed shall have welds ground smooth and comply with AISC specifications for Architecturally Exposed Structural Steel.
- B. Fit and shop assemble items in largest practical sections, for delivery to site.
- C. Fabricate items with joints tightly fitted and secured.
- D. Continuously seal joined members exposed to view by intermittent welds and plastic filler.

- E. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- F. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- G. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.4 FABRICATION TOLERANCES

- A. Squareness: 1/8" maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16".
- C. Maximum Misalignment of Adjacent Members: 1/16".
- D. Maximum Bow: 1/8" in 48" .
- E. Maximum Deviation From Plane: 1/16" in 48" .

2.5 FINISHES - STEEL

- A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- B. Do not prime surfaces in direct contact with concrete or where field welding is required.
- C. Prime paint items with one coat.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply steel items required to be Cast into concrete or embedded in masonry with setting templates to appropriate sections.

3.3 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

- C. Field weld components indicated on Drawings, and shop drawings.
- D. Perform field welding in accordance with AWS D1.1.
- E. Obtain approval prior to site cutting or making adjustments not scheduled.
- F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

3.4 ERECTION TOLERANCES

- A. Maximum Variation From Plumb: 1/4" per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4".
- C. Maximum Out-of-Position: 1/4" .

END 05450.

DIVISION 5 - METALS
Section 05720 – Ornamental Glass Railings

PART 1

1.1 SECTION INCLUDES

- A. Preformed and pre-finished powder coated aluminum and glass guardrails and wood handrails

1.2 SUBMITTALS FOR REVIEW

- A. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
 - a. Submit design calculations for the Cold Formed Metal Framing systems prepared by and stamped by a Professional Engineer registered in the State of the project.
- B. Samples: Aluminum samples to match curtain wall for finish selection by Landmark.

1.3 QUALITY ASSURANCE

- A. Perform work in accordance with the following:
 - a. Welding: AWS D1.1, D1.2, or D1.3 as applicable.
 - b. Handrails and Railings; ASTM E985 for structural performance based on testing performed in accordance with ASTM E894 and E935.
- B. Prepare Shop Drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the place where the Project is located.
- C. Fabricator shall be experienced in successfully producing ornamental glass railings similar to those specified.

1.4 REGULATORY REQUIREMENTS

- A. Stairs and railings shall comply with the Americans with Disability Act (ADA) 1990 – 28 CFR Part 36.
- B. Comply with applicable building codes.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. HDI Railing System, Lancaster, PA (717) 285-4088 – Model Type Optik or equal by one of the

following manufacturers:

- B. Julius Blum & Company, Inc., Carlstadt, NJ (800) 526-6293
- C. Livers Bronze Co. (www.liversbronze.com)
- C. P & P Artec, 705 Creel Drive, Wood Dale, IL 60191 Phone: (708) 860-2990
- D. ACI Distributors, 12900 Nicholson Road, Farmers Branch, TX 75234 (972) 484-3691
- E. Additional approved equal manufacturers shall be considered.

2.2 RAILING SYSTEM

- A. The intent of this specification is to provide a fully operational and complete ornamental glass railing system with the performance described below. All necessary components shall be provided, whether specified, or not, to make the system operate as described.
 - a. All components shall be from a single manufacturer.
 - b. The following components are by HDI Railing System, and have been selected to establish the style and quality. Approved equal products from one of the other approved manufacturers listed above may be used.
- B. Glass guardrail; shall be 3/4" clear tempered glass, conforming to ANSI Z97.1, dimensions and finish as indicated on the Drawings.
- C. Handrail shall be HDI Railing System 1 9/16" diameter wood with powder coated aluminum elbow mounting bracket assembly, finish as selected by Landmark, for 3'-6" high guardrail conditions mounted at 2'-10" high handrail.
- D. Wall bracket; shall match system.
- E. Fittings: shall be powder coated aluminum with miter elbows and shall have no weld marks visible.
- F. Connection sleeves; for internal corners shall be of aluminum to match.
- G. Glazing Accessories: Setting blocks and protective inserts shall be poly vinyl chloride (PVC)
- H. Fasteners: As shall be 50mm button and coordinated 2" ring with 1/4" x 20 countersunk bolt and 1 1/2" rosettes to match HDI Railing System.
- I. Design Requirements shall be as follows:
 - a. Handrail:
 - i. Concentrated load of 200 lbf applied at any point non-concurrently, vertically downward or horizontally.

- ii. Uniform load of 50 lb per lineal foot applied non-concurrently, vertically downward or horizontally.
 - iii. Concentrated and uniform loads above need not be assumed to act concurrently.
- b. Infill Area of Guardrail System:
- i. Horizontal concentrated load of 200 lbf applied to one (1) square foot at any point in the system including panels, intermediate rails balusters, or other elements composing the infill area.
 - ii. Load need not be assumed to act concurrently with uniform horizontal loads on top rails of railing systems in determining stress.

2.3 FABRICATION

- A. Fit and shop assemble components in largest practical sizes for delivery to site.
- B. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.
- C. Provide anchors, plates, and angles required for connecting railings to structure.
- D. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- F. Interior Components: Continuously seal joined pieces by intermittent welds and plastic filler.
- G. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- H. Accurately form components to suit stairs and landings, to each other and to building structure.
- I. Accommodate for expansion and contraction of members and building movement without damage to connections or members.
- J. Coordinate aluminum finish process and deliver to the site of the Project ready for installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

- A. Minimize site welding.

- B. Supply items required to be cast into concrete, and placed in partitions with setting templates, to appropriate sections.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects.
- C. Anchor railings to structure with anchors, plates, and angles as indicated on Shop Drawings.
- D. Field weld anchors as indicated on the Drawings. Grind welds smooth.
- E. Conceal bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.
- F. Assemble with spigots and sleeves to accommodate tight joints and secure installation.
- G. Repair finish as required for complete and finished appearance.

3.4 ERECTION TOLERANCES

- A. Maximum Variation From Plumb: 1/4" per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4".
- C. Maximum Out-of-Position: 1/4".

END 05720.

DIVISION 5 - METALS
Section 05810 - Expansion Joint Covers

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Preformed and pre-finished aluminum expansion joint devices for floors, wall, and between new and existing construction at tunnel below grade.

1.2 SUBMITTALS FOR REVIEW

- A. Shop Drawings: Indicate joint and splice locations, miters, layout of the work, affected adjacent construction, and anchorage locations.
 - a. Verify that field measurements are as indicated by the manufacturer.
- B. Product Data: Provide joint assembly profiles, profile dimensions, anchorage devices, and available colors and finish.

1.3 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate rough-in sizes; provide templates for cast-in or placed frames or anchors; required tolerances for item placement.

1.4 QUALITY ASSURANCE

- A. All expansion joint assemblies shall be supplied by the same manufacturer.

1.5 REGULATORY REQUIREMENTS

- A. Fire Rated Assemblies: Refer to drawings for rating and assembly requirements.
 - a. Provide expansion joint assemblies which are identical in materials and construction to the assembly tested.
 - b. Acceptable testing agencies include Underwriters Laboratories, Inc. and Warnock Hersey International, Inc.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Watson Bowman Acme (www.wbacorp.com)
- B. Balco Metalines, Inc. (www.balcousa.com)
- C. C/S Group, Inc (www.c-sgroup.com)

D. MM Systems Corporation, 4520 Elmdale Dr., Tucker, GA 30085-0326
Phone: (770) 938-7570 (www.mmsystemscorp.com)

G. Approved equal products and manufacturers shall be considered.

2.2 MATERIALS

- A. Expansion Joint Covers; Expansion joint covers shall be fabricated from aluminum and be designed for recessed installation in floors, and walls. Provide UL approved fire barrier where expansion joint cover is installed in a fire rated floor or wall assembly.
- B. All corners, tees, and cross connections shall be shop fabricated. Use sealer for butt joints as recommended by joint manufacturer.
- C. Provide manufacturer's standard anchors, fasteners, set screws, spacers, flexible water barriers and vapor seals, filler materials, drain tubes, adhesives, corners, curbs, cross connections, and other accessories compatible with materials in contact, as indicated or required for a complete installation.
- D. Provide expansion joint cover assembly of design, basic profile, materials and operation indicated on the Drawings, or as required to accommodate joint size, variations in adjacent surfaces, and structural movement.

2.3 PRODUCTS

- A. Floor Joints:
 - a. Basis of Design: MM Systems Model SSP-NB or equal by the following manufacturers:
 - b. Balco Metalines Inc.
 - c. Construction Specialties
- B. Inside Wall / Ceiling Joints:
 - a. Basis of Design: MM Systems Model USS-200 or equal by the following manufacturers:
 - b. Balco Metalines Inc.
 - c. Construction Specialties
- C. Exterior Wall, Floor and Roof Slab Compression Seals:
 - a. Basis of Design: Watson Bowman Acme Wabo Weather Seal Model WS-200 or equal by one of the following manufacturers:
 - b. MM Systems Corporation
 - c. Construction Specialties

2.4 FABRICATION

- A. Joint Covers: Aluminum cover plate, aluminum frame construction, retainers with resilient elastomeric filler strip, designed to permit joint movement indicated with full recovery.
- B. Back paint components in contact with cementitious materials with zinc chromate primer or chromatic conversion coating.
- C. Galvanize embedded ferrous metal anchors and fastening devices.
- D. Shop assemble components and package with anchors and fittings.
- E. Provide hairline mitered corners where joint changes directions or abuts other materials. .
- F. Provide joint components in single length wherever practical. Minimize site splicing.

2.5 FINISHES

- A. Floors: Non-slip surfacing of aluminum oxide.
- B. Walls and Ceilings: 0.7 mil minimum clear anodized #AA-C22A41, medium matte etched finish.
- C. Resilient Filler Exposed to View: Black.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive the Work.
- B. Verify that joint preparation and affected dimensions are acceptable.

3.2 PREPARATION

- A. Provide anchoring devices for installation and embedding.
- B. Provide templates and rough-in measurements.
- C. Exercise care in handling of all Work so as not to injure finished surface, and take proper precautions to protect the Work from damage after it is in place.

3.3 INSTALLATION

- A. Install components and accessories in accordance with manufacturer's instructions.
- B. Align work plumb and level, flush with adjacent surfaces.
- C. Provide cutting, drilling, and fitting required for installation.

- D. Rigidly anchor to substrate to prevent misalignment.
- E. Allow adequate free movement for thermal expansion and contraction of metal to avoid buckling.
- F. Set floor covers at elevation to be flush with adjacent finished floor material. If necessary, shim to level, but ensure base frames have continual support to prevent racking and vertical deflection.
- G. Locate anchors at interval recommended by the manufacturer, but not less than 3" from each end and not more than 2'-0" on center.
- H. Install flexible filler material in accordance with manufacturer's recommendations, with a minimum number of end joints, in continuous lengths for straight sections, and vulcanize or heat-seal all field splice joints to provide water tight joints.
- I. Install fire rated joints in accordance with requirements of the governing authority having jurisdiction, and provide a continuous fire resistant joint.
- J. Block-out construction as required to receive expansion joint cover and ensure flush condition.
- K. Provide insulation fill at all exterior expansion joints.
- L. Provide fire safing material at all rated expansion joints.

3.4 PROTECTION OF FINISHED WORK

- A. Do not permit traffic over unprotected floor joint surfaces.
- B. Strippable protective material shall be left in place until finish work in adjacent areas is complete.
 - a. Remove protective material before Substantial Completion.
 - b. Clean exposed metal surfaces.

END 05810.

DIVISION 6 - WOOD AND PLASTICS
Section 06100 – Rough Carpentry

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Lumber, plywood, fasteners, adhesives, preservative treatment, fire treatment, and miscellaneous other rough carpentry as indicated on the Drawings.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide technical data and application instructions on [nailable roof insulation,] wood preservative materials, and fire treatment.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with the following agencies:
 - a. Lumber Grading Agency: Certified by ALSC.
 - b. Plywood Grading Agency: Certified by APA.
- B. Grade stamp lumber and plywood in conformance with grading rules of the American Plywood Association, Western Spruce-Pine-Fir Association, and Western Wood Products Association as appropriate.
- C. In lieu of grade stamping exposed to view lumber and plywood, submit manufacturer's certificate certifying that products meet or exceed specified requirements.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Dimensional Lumber; shall be Douglas Fir-Larch No. 2, visually graded by Standards of Western Wood Products Association, and WWPA, S4S, dried to 19% maximum moisture content.
- B. Grounds, nailers, bucks, and shims; shall be Douglas Fir, White Fir, Pine, Eastern Hemlock, or Spruce, No. 1, and WWPA, S4S, dried to 19% maximum moisture content
- C. Plywood, Interior Use; shall be APA A-C, Group 1, exterior, thickness as indicated on drawings
 - a. Telephone backboards shall be 3/4" fire-rated A-C plywood mounted with "A" side exposed at 2'-0" above the floor to the bottom of the backboard.
- D. Plywood, Exterior Use; shall be APA 48/24 rated sheathing, thickness as indicated on

drawings. Provide Panel clips between supports at un-support edges of roof sheathing.

- a. The backside of parapet walls shall receive 1/2" CDX plywood sheathing.
- E. Microlam Exterior Wall Nailer; shall be 1 3/4" x 11 7/8" laminated veneer lumber (LVL) engineered wood product. One of the following equal manufacturers and products may be used:
 - a. Weyerhaeuser, "TrusJoist, Microllam" (www.microllam.com)
 - b. Additional approved equal products shall be considered
- F. Roof wood blocking shall be ACQ Type D treated lumber, installed with staggered and scarfed joints, without buckles, or warps and be screw fastened.

2.2 ACCESSORIES

- A. Fasteners and Adhesives: Bolts, Studs, Nuts, Nails, Wood Screws, Spikes, Adhesives, Anchors, and similar items shall meet federal specifications, of type, size, material, and finish as best suited for the condition of use, and as required to sufficiently draw and rigidly secure members for which they are used. Fasteners shall be galvanized or corrosion resistant at exterior locations and at all treated wood applications.
- B. Fasteners: Hot dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.
- C. Anchors: Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt or ballistic fastener for anchorages to steel.
- D. Structural Framing Connectors: Hot dipped galvanized steel, sized to suit framing conditions.

2.3 WOOD TREATMENT

- A. Preservative Treatment; shall be pressure impregnated in accordance with manufacturer's recommendations, and the maximum moisture content after treatment shall be 19 % for lumber, and 15% for plywood. Preservative treatment shall be used on dimensional lumber, grounds, nailers, bucks, and shims when material is in contact with flashing, waterproofing, masonry, concrete, or the ground. One of the following equal manufacturers and products may be used:
 - a. Koppers Company, "Wolmanized"(www.koppers.com)
 - b. Osmose Wood Preserving Company Inc., "K-33" (www.osmose.com)
 - c. Hoover Treated Wood Products Inc., "Dixie CCA" (www.frtw.com)
 - d. Additional approved equal products shall be considered
- B. Fire retardant: AWWPA Treatment C20, Interior Type, chemically treated and pressure impregnated; capable of providing a maximum flame spread/smoke development rating as

required by code. One of the following equal manufacturers and products may be used:

- a. Hoover Treatment Wood Products, Inc, "Pyro-Guard"
- b. Additional approved equal products shall be considered

PART 3 EXECUTION

3.1 FRAMING AND BLOCKING

- A. Set structural members and blocking level and plumb, in correct position.
- B. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- C. Place horizontal members, crown side up.
- D. Construct load bearing framing members full length without splices.
- E. Provide blocking, grounds, furring strips, and nailers of adequate size and strength for the intended purpose for all trim, shelving, countertop supports, reception window countertops, building directories, hardware items, etc. Minimum 16 gauge sheet metal straps or metal studs may be substituted for wood blocking.

3.2 SHEATHING

- A. Secure wall sheathing with long dimension perpendicular to wall studs, with ends over firm bearing and staggered.
- B. Install sheathing to two span continuous.
- I. Install telephone and electrical panel back boards with plywood sheathing material where required. Size the back board by 1'-0" beyond size of electrical panel.

3.3 SITE APPLIED WOOD TREATMENT

- A. Apply preservative treatment and fire retardant treatment in accordance with manufacturer's instructions.
- B. Brush apply one coat of preservative treatment on wood in contact with cementitious materials, roofing and related metal flashings. Treat site-sawn cuts.
- C. Allow preservative to dry prior to erecting members.
- D. Install fire retardant treatment in accordance with conditions and limitations listed in NER 457 as issued by the National Evaluation Services, Inc.
 - a. Do not install in areas where it is exposed to precipitation, direct wetting or regular condensation.

3.4 TOLERANCES

A. Framing Members: 1/4" from true position, maximum.

B. Surface Flatness of Floor: 1/4" inch in 10'-0" maximum, and 1/2" in 30'-0" maximum.

END 06100

DIVISION 6 - WOOD AND PLASTICS
Section 06200 - Finish Carpentry

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Interior finish carpentry materials include AWI premium grade book matched quarter sawn cherry flush paneling and trim, for base building core and shell.
 - a. Paneling includes wood furring, blocking, and shims for installing paneling, unless concealed within other construction before paneling installation.
- B. Interior finish carpentry materials include AWI custom grade sawn solid red oak shelving and trim, for tenant fit-out.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data:
 - a. Provide data on fire retardant treatment of materials and application instructions.
 - b. Provide instructions for attachment hardware, and finish hardware.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
 - a. For paneling veneered in fabrication shop, show veneer leaves with dimensions, and identification numbers indicating the flitch and sequence within the flitch for each leaf.
- C. Samples:
 - a. Submit two samples of finish plywood, 1'-0" x 1'-0" illustrating wood grain and specified finish.
 - b. Submit two samples of solid wood trim, 1'-0" x 1'-0" illustrating wood grain and specified finish.

1.3 QUALITY ASSURANCE

- A. Perform work in accordance with AWI Architectural Woodwork Quality Standards, WIC Manual of Millwork. Quality Standard: Unless otherwise indicated, comply with [AWI's "Architectural Woodwork Quality Standards."] [WIC's "Manual of Millwork."]
 - a. Provide AWI Quality Certification Program labels and certificates for woodwork, including installation.
- B. Fabricator: Company specializing in fabricating the products specified in this section with

minimum three years documented experience.

1.4 PROJECT CONDITIONS

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

PART 2 PRODUCTS

2.1 MATERIALS

- A. Interior Finish Carpentry Items:
 - a. Wood shall have a maximum moisture content of 12% for exterior finish lumber, and 9% for interior paneling and trim.
 - b. Veneer-Faced Panel Products (Hardwood Plywood): AWI premium grade book matched quarter sawn cherry - prefinished, made with adhesive containing no urea formaldehyde as detailed on the Drawings.
 - c. Interior finish carpentry; shall be plain sawn solid red oak in First and Second Grades using rectangular cross sections, unless noted otherwise on Drawings.
 - c. Solid Wood Valances; shall be maple or cherry (verify with Landmark) and shall be provided at the heads of sliding and bi-fold doors to conceal hardware tracks.

2.2 FIRE-RETARDANT-TREATED MATERIALS

- A. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Comply with performance requirements of AWPA C20 (lumber) and AWPA C27 (plywood). Use Exterior Type or Interior Type A. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Kiln-dry material after treatment.

2.3 INSTALLATION MATERIALS

- a. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, fire-retardant-treated, kiln-dried to less than 15 percent moisture content.

2.4 FASTENERS

- A. Fasteners: Of size, type, material, and finish to best suit application, and as required to sufficiently draw and rigidly secure members for which they are used.
 - a. Fasteners shall meet federal specifications.
 - b. Fasteners shall be galvanized or corrosion resistant at exterior locations and at tall treated wood applications.
 - d. Concealed Joint Fasteners: Threaded steel.

- e. Concealed fasteners shall be used wherever possible.

2.5 ACCESSORIES

- A. Primer: Alkyd primer sealer type.
- B. Wood Filler: Solvent base, tinted to match surface finish color.
- C. Coat Hook: shall be stainless steel, satin finish, installed at height to meet ADA requirements. One of the following approved manufacturers and products may be used:
 - a. American Standard, “7345”
 - b. Bobrick, “B-76727”
 - c. Additional approved equal manufacturers and products will be considered.
- D. Closet pole hardware shall include the following:
 - a. Closet Pole shall be Baer “SG 39”, or approved equal
 - b. Closet Support shall be Baer “TB 1751”, or approved equal
- E. Reglet: Equal to Fry ½” x ½” aluminum channel reglet with powder coated finish to match the architect’s sample.

2.6 FABRICATION

- A. Paneling Grade: Provide Premium grade paneling complying with referenced quality standard.
- B. Complete fabrication to maximum extent possible, before shipment to Project site. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- C. Shop assemble work for delivery to site, permitting passage through building openings.
- D. Fit exposed sheet material edges with 3/8 inch matching hardwood edging. Use one piece for full length only.
- E. Shop prepare and identify components grain matching during site erection.
- F. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

2.7 FLUSH WOOD PANELING FOR TRANSPARENT FINISH:

- A. Wood Species and Cut: Cherry, quarter sliced.
 - a. Trim and Edges: Trim and edges indicated as solid wood to be lumber same species and cut as panel faces and compatible with grain and color of panel faces.

- b. Matching of Adjacent Veneer Leaves: Book match.
- c. Matching within Panel Face: Balance match.
- d. Premium grade. Options below are listed in order of increasing cost and last option applies only to Premium grade.
- e. Panel-Matching Method: In each separate area, use sequence-matched, uniform-size sets.
- f. Provide paneling of 3/4-inch minimum thickness.

2.8 SHOP FINISHING

- A. General: Finish paneling at fabrication shop. Defer only final touchup, cleaning, and polishing until after installation.
- B. Transparent Finish: Comply with requirements indicated below for grade, finish system, staining, and sheen, with sheen measured on 60-degree gloss meter per ASTM D 523:
 - a. Grade: [Premium] [Custom] [Economy].
AWI Finish System: TR-4, conversion varnish.
 - b. Staining: Match sample.
 - c. Wash Coat for Stained Finish: Apply a wash coat sealer to woodwork made from closed-grain wood before staining and finishing.
 - d. Sheen: Satin, 30-50 gloss units.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.2 INSTALLATION

- A. Before installation, condition paneling to average prevailing humidity conditions in installation areas. Examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.
- B. Grade: Install paneling to comply with requirements for same grade specified in Part 2 for fabrication of type of paneling involved.
- C. Install paneling level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.

- a. For flush paneling, install with variations in reveal width, alignment of top and bottom edges, and flushness between adjacent panels not exceeding 1/16 inch.
- D. Scribe and cut paneling to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Anchor paneling to supporting substrate with concealed panel-hanger clips and blind nailing. Do not use face fastening unless otherwise indicated.
- F. Use only sound, thoroughly seasoned materials of the longest practical lengths and sizes to minimize joints.
- G. Trim and Moldings:
 - a. Install in single, unjoined lengths for openings and for runs of less than 10'-0". For longer runs, use only one piece which is less than 10'-0" in any straight run.
 - b. Stagger joints in adjacent members.
 - c. Cope moldings at returns and miter at corners.
- H. Set and secure materials and components in place, plumb and level. Joints shall be tight fitting and mitered. Place uniform joints providing for thermal and building movement. Blind nail where possible.
- I. Carefully scribe work abutting other components, with maximum gaps of 1/32". Do not use additional overlay trim to conceal larger gaps.
- J. Install paneling with full bed contact adhesive applied to substrate.
- K. Install hardware in accordance with manufacturer's instructions, and Shop Drawings
- L. Concealed fasteners shall be used wherever possible. All nail holes shall be countersunk and puttied flush.
- M. Shelving Installation: Supports shall be spaced not more than 3'-0" on center and within 1'-0" of end of shelf. Bottom support shall be mounted 1'-0" above the floor, unless indicated otherwise on the Drawings.
- N. Provide hardwood valances at the heads of sliding and bi-fold doors to conceal hardware tracks and match adjacent door finish.

3.3 PREPARATION FOR SITE FINISHING

- A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth. Filler shall match the finish if wood is sealed or stained
- B. Site Finishing: Refer to Section 09900 - Painting.

- C. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials.

3.4 ERECTION TOLERANCES

- A. Maximum Variation from True Position: $1/16''$.
- B. Maximum Offset from True Alignment with Abutting Materials: $1/32''$.

END 06200.

DIVISION 6 - WOOD AND PLASTICS
Section 06400 – Plastic Laminate Casework

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Modular cabinets, countertops, writing ledges, wall caps, exposed shelving, and other modular casework items as indicated on the Drawings.

1.2 SUBMITTALS FOR REVIEW

- A. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.
- B. Product Data: Provide data for hardware accessories.

1.3 QUALITY ASSURANCE

- A. Perform work in accordance with AWI and WIC Custom quality.
- B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.4 ENVIRONMENTAL REQUIREMENTS

- A. During and after installation of work of this section, maintain the same temperature and humidity conditions in building spaces as will occur after occupancy.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Wood material; shall have a maximum moisture content of twelve percent (12%) for exterior finish lumber, and nine percent (9%) for interior trim.

2.2 FINISHES

- A. PL-1: Plastic laminate shall be minimum .028" (nominal 1/32") vertical surfacing grade high pressure decorative laminate conforming to NEMA LD3-2000. One of the following approved manufacturers and products may be used:
 - a. Formica, "958-58 Beige"
 - b. Additional approved equal manufacturers and products shall be considered.
- B. PL-2: Plastic laminate shall be minimum .028" (nominal 1/32") vertical surfacing grade high

- pressure decorative laminate conforming to NEMA LD3-2000. One of the following approved manufacturers and products may be used:
- a. Formica, “837-58 Graphite”
 - b. Additional approved equal manufacturers and products shall be considered.
- C. PL-3: Plastic laminate shall be minimum .028” (nominal 1/32”) vertical surfacing grade high pressure decorative laminate conforming to NEMA LD3-2000. One of the following approved manufacturers and products may be used:
- a. Formica, “858-58 Pumice”
 - b. Additional approved equal manufacturers and products shall be considered.
- D. PL-4: Plastic laminate shall be minimum .028” (nominal 1/32”) vertical surfacing grade high pressure decorative laminate conforming to NEMA LD3-2000. One of the following approved manufacturers and products may be used:
- a. Formica, “899-58 Desert Beige”
 - b. Additional approved equal manufacturers and products shall be considered.
- E. PL-5: Plastic laminate shall be minimum .028” (nominal 1/32”) vertical surfacing grade high pressure decorative laminate conforming to NEMA LD3-2000. One of the following approved manufacturers and products may be used:
- a. Formica, “7709-58 Jute Gauze”
 - b. Additional approved equal manufacturers and products shall be considered.
- F. PL-6: Plastic laminate shall be minimum .028” (nominal 1/32”) vertical surfacing grade high pressure decorative laminate conforming to NEMA LD3-2000. One of the following approved manufacturers and products may be used:
- a. Formica, “220-58 Beige Clear Sand”
 - b. Additional approved equal manufacturers and products shall be considered.
- G. PL-7: Plastic laminate shall be minimum .028” (nominal 1/32”) vertical surfacing grade high pressure decorative laminate conforming to NEMA LD3-2000. One of the following approved manufacturers and products may be used:
- a. Formica, “7698-58 Ashen Ceramic”
 - b. Additional approved equal manufacturers and products shall be considered.
- H. PL-8: Plastic laminate shall be minimum .028” (nominal 1/32”) vertical surfacing grade high pressure decorative laminate conforming to NEMA LD3-2000. One of the following

approved manufacturers and products may be used:

- a. Formica, “7270-58 Alaskan Slate”
 - b. Additional approved equal manufacturers and products shall be considered.
- I. PL-9: Plastic laminate shall be minimum .028” (nominal 1/32”) vertical surfacing grade high pressure decorative laminate conforming to NEMA LD3-2000. One of the following approved manufacturers and products may be used:
- a. Wilsonart, “4761-60 Mystique Mountain”
 - b. Additional approved equal manufacturers and products shall be considered.

2.3 CABINETS

- A. Cabinet construction shall be flush overlay design, and shall be constructed of industrial grade particle board meeting ANSI A 208.1 Grade 1-M-2, in accordance with AWI, Section 400 requirements for laminated-clad cabinets.
- a. Vertical exposed surfaces, except for wall cabinet bottoms and tops, shall receive a minimum .028” (nominal 1/32”) vertical surfacing grade high pressure decorative laminate conforming to NEMA LD3-2000.
 - b. Wall cabinet bottoms shall receive a white melamine laminated panel.
 - c. Interior and other semi-exposed surfaces except edges, shall receive cabinet liner, or polyester or melamine laminated panels. Backs and drawer bottoms may be painted.
 - d. Edges of laminated components shall receive a plastic “T”, self edge or PVC edge matching the decorative laminate face.
 - e. Unrestrained cabinet components such as adjustable shelves shall receive the same thickness of finish material on both faces. Door insides shall receive white cabinet liner.
 - f. Thickness and materials for laminate clad cabinet components shall be as follows:

<u>Cabinet Component</u>	<u>Material</u>	<u>Minimum Thickness of Materials</u>
i. Body Members	Panels	3/4”
ii. Rails	Solid Lumber or Panel	3/4”
iii. Shelves	Panels Medium Density Particleboard or	3/4” for spans up to 36” 1” for spans up to 48”

	Fiberboard	
iv. Backs	Hardboard	3/16"
v. Drawer Sides, Backs and Subfronts	Solid Lumber or Particleboard Panel	1/2" Lumber 1/2" (50# density or more)
vi. Drawer Bottoms	Hardboard	1/4"
vii. Drawer Fronts	Panels	3/4"
viii. Doors	Panels	3/4"

2.4 COUNTERTOPS AND WRITING LEDGES

- A. Countertops and writing ledges shall be constructed of plywood, 3/4" minimum thickness.
- B. Horizontal exposed surfaces, edges and back splashes shall receive .042" plastic laminate conforming to NEMA Standards and ANSI A 161.2-1979 "Performance Standards for Fabricated High-Pressure Decorative Laminate Countertops".
- C. All post formed tops shall receive backer sheets.
- D. All edge veneer tops shall receive backer sheet or white melamine.
- E. 3-1/2" high aprons shall be provided beneath countertops at knee spaces adjacent to pencil drawers or typewriter drops.
- F. Writing ledges and reception window tops shall be 1'-0" wide and be centered on the wall or within the opening, unless otherwise shown on Drawings. All exposed edges shall be laminated.
- G. Countertop joints shall not occur at sink openings.

2.5 WALL CAPS AND SHELVING

- A. Shelving exposed to view shall be 3/4" particle board finished with minimum .028" (nominal 1/32") laminate on faces and plastic "T", self edge or PVC edge matching the decorative laminate face on all edges. Depth shall be 1'-0" unless shown otherwise on Drawings.
- B. Storage Room shelving and other shelving not exposed to view shall be 3/4" white Melamine or Kortron coated, minimum nine (9) mil thickness with finished edges. Shelving shall be 16" deep, unless otherwise shown on Drawings, mounted on adjustable brackets attached to wall mounted standards.
- C. Support hardware shall be clear anodized manufactured by Knape-Vogt. Hardware shall be furnished by the cabinet manufacturer.

- a. Standards: No. 80 – 24”, 36”, 48”, 72” and in lengths as shown on Drawings.
- b. Brackets: No. 180 – 16” coordinated with shelf depth.
- c. Shelving supports shall be spaced not more than 3’ on center and within 1’ of the end of shelving. Bottom supports shall be mounted 1’ above floor unless otherwise required.

2.6 FASTENERS

- A. Fasteners: Of size, type, material, and finish to best suit application, and as required to sufficiently draw and rigidly secure members for which they are used.
 - a. Fasteners shall meet federal specifications.
 - b. Fasteners shall be galvanized or corrosion resistant at exterior locations and at tall treated wood applications.
 - b. Concealed Joint Fasteners: Threaded steel.
 - c. Concealed fasteners shall be used wherever possible.
- B. Adhesive: Type recommended by AWI, WIC, and laminate manufacturer to suit application.

2.6 ACCESSORIES

- A. Wire Access Grommets; shall be Doug Mockett and Co. “TG-2”, or approved equal, 2” hole, 1 7/8” clear opening, black color.
- B. Keyboard Tray; shall be Articulating Arm, with height adjustment lever lock. One of the following equal manufacturers and products may be used:
 - a. Waterloo Furniture Components “No. 6170D”
 - b. Allsteel, “Lift-to-Adjust Platform” (www.allsteeloffice.com)
 - c. Additional approved equal products shall be considered

2.7 HARDWARE

- A. Pulls shall be 5/16” diameter equal to Amerock No. 868 in dull chrome finish. (www.amerock.com)
- B. Hinges shall be 3 dimensional independent adjustable, fully concealed self-closing 170 degree swing European hinges equal to Blum No. 71.6530. (www.blumhinge.com)
- C. Drawer slides shall be self-closing epoxy coated bottom mount with captive nylon rollers and one hundred (100) pound static load test rating equal to Blum 230M Series. (www.blumhinge.com)

- D. File drawer slides shall be full extension epoxy coated bottom mount with double captive nylon rollers and one hundred (100) pound static load test rating equal to Blum 430E series. (www.blumhinge.com)
- E. Shelf supports shall be double pin design with a depressible tab to prevent shelf from tilting, KV-256, as manufactured by Knape-Vogt mounted on silver finish KV-255 or KV-233 standards (4 per cabinet) (www.knapeandvogt.com) or removable nylon molded shelf clips (4 per cabinet) inserted in pre-drilled holes at the side of the cabinet equal to Handy Button.
- F. Air vents shall be 3" aluminum louvers as manufactured by Midget Louvers, "Regular Series" (www.midgetlouver.com)
- G. Cam locks shall be satin chrome assembled pin tumbler as manufactured by National Cabinet Lock.

2.8 FABRICATION

- A. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.
- B. Cap exposed plastic laminate finish edges with material of same finish and pattern.
- C. Door and Drawer Fronts: 3/4" thick; flush style.
- D. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
- E. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Locate counter butt joints minimum 2'-0" from sink cut-outs.
- F. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
- G. Mechanically fasten back splash to countertops with steel brackets at 1'-4" on center.
- H. Provide cutouts for plumbing fixtures, inserts, and fittings. Verify locations of cutouts from on-site dimensions. Prime paint cut edges.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify location and sizes of utility rough-in associated with work of this section.

3.2 INSTALLATION

- A. Install hardware in accordance with manufacturer's recommendations.
- B. Set and secure casework in place; rigid, plumb, and level.
- C. Use fixture attachments in concealed locations for wall mounted components.
- D. Use concealed joint fasteners to align and secure adjoining cabinet units and counter tops.
- E. Carefully scribe casework abutting other components, with maximum gaps of 1/32". Do not use additional overlay trim for this purpose.
 - a. Care shall be taken to install joints properly with hairline seams. Where contractor is unable to achieve a hairline seam, provide sealant in joints in color to match plastic laminate surface
- F. Secure cabinet and counter base to floor using appropriate angles and anchorages.

3.3 ADJUSTING

- A. Adjust moving or operating parts to function smoothly and correctly.
- B. Doors shall be aligned top and bottom and shall be adjusted to operate properly.

3.4 CLEANING

- A. Clean casework, counters, shelves, hardware, fittings, and fixtures in accordance with cabinet and plastic laminate manufacture's recommendations.

END 06400.

DIVISION 7 - THERMAL AND MOISTURE PROTECTION
Section 07100 - Bituminous Dampproofing

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Bituminous dampproofing on exterior side of concrete perimeter grade beams and foundation walls where finish floors occur below adjacent exterior finish grade.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide properties of primer, bitumen, mastics, and any other products to be utilized in dampproofing.

1.3 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with NRCA Waterproofing Manual.
- B. Applicator: Company specializing in performing the work of this section with minimum three years documented experience.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application until membrane has cured.

PART 2 PRODUCTS

2.1 DAMPPROOFING

- A. Dampproofing; shall be cold-applied water-based emulsified-asphalt dampproofing and vapor-retarding coatings for use on "green" or slightly damp surfaces. Dampproofing is reinforced with short fibers for application by brush or spray. Dampproofing material shall be VOC compliant. One of the following equal manufacturers and products may be used:
 - a. Degussa Building Systems, "Sonneborn, Hydrocide 700B" (www.chemrex.com)
 - b. Karnak Corporation, "#220 AF" (www.karnakcorp.com)
 - c. W.R. Meadows, "Sealmastic Type 2" (www.wrmeadows.com)

- d. Additional approved equal products shall be considered.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify substrate surfaces are durable, free of matter detrimental to adhesion or application of dampproofing system.
- B. Verify items which penetrate surfaces to receive dampproofing are securely installed.

3.2 PREPARATION

- A. Protect adjacent surfaces not designated to receive dampproofing.
- B. Clean and prepare surfaces to receive dampproofing in accordance with manufacturer's instructions.
- C. Do not apply dampproofing to surfaces unacceptable to manufacturer or applicator.
- D. Apply mastic to seal penetrations, small cracks, or minor honeycomb in substrate.

3.3 APPLICATION

- A. Prime surfaces in accordance with manufacturer's instructions.
- B. Apply bitumen as recommended by manufacturer.
 - a. Provide two coats of bituminous dampproofing to exterior sides of concrete foundation walls, from footing to a straight line 4" below grade.
 - b. Provide two coats of bituminous dampproofing on interior and exterior surfaces of precast concrete panels where panels are used below grade, are in contact with grade, or are used as retaining walls.
- C. Apply bitumen at a temperature limited by equiviscous temperature (EVT) plus or minus 25 degrees F; do not exceed finish blowing temperature for four hours.
- D. Apply from 2" below finish grade elevation to top of footings.
- E. Seal items projecting through dampproofing surface with mastic. Seal watertight.

END 07100.

DIVISION 7 - THERMAL AND MOISTURE PROTECTION
Section 07130 - Sheet Membrane Waterproofing

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Sheet membrane waterproofing and protection board on exterior side of basement concrete foundation walls and tunnel walls and roof slab below grade.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data for surface conditioner, flexible flashings, joint cover sheet, and joint and crack sealants, and all products to be utilized in waterproofing system with temperature range for application of waterproofing membrane.

1.3 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.4 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with NRCA Waterproofing Manual.
- B. Manufacturer: Company specializing in manufacturing and selling the Work of this section with minimum 10 years experience.
- C. Applicator: Company specializing in performing the Work of this section with minimum three (3) years documented experience as an approved applicator with a specified manufacturer.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application and until liquid or mastic accessories have cured.
- B. Work shall be performed only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials and products used.

1.7 WARRANTY

- A. Any defective Work occurring within a two (2) year period after Date of Substantial Completion shall be corrected immediately.

- B. Provide ten (10) year manufacturer warranty for waterproofing failing to resist penetration of water, except where such failures are the result of structural failures of building. Hairline cracking of concrete due to temperature change or shrinkage is not considered a structural failure.
- C. Provide ten (10) year manufacturer's material warranty.
- D. For warranty repair work, remove and replace materials concealing waterproofing.

PART 2 PRODUCTS

2.1 SHEET MEMBRANE WATERPROOFING

- A. Pre applied waterproofing membranes that bond internally to poured concrete for use below slabs or behind basement walls.
 - a. Basis of Design: W. R. Grace Construction Products., "Preprufe 300R" and "Preprufe 160R" (www.graceconstruction.com)
 - b. Equal products by the following manufacturers will be considered:
 - 1. W.R. Meadow's, Inc. (www.wrmeadows.com)
 - 2. Polyguard Products, Inc. (www.polyguardproducts.com)
 - 3. Carlisle Coatings and Waterproofing (www.ccwcompanies.com)
 - c. Additional approved equal products shall be considered.

2.2 ADHESIVE MATERIALS

- A. All materials shall be VOC Compliant. Provide surface conditioner, mastic, liquid membrane, tape and accessories acceptable to the manufacturer of the sheet membrane waterproofing.
- B. Surface Conditioner: Bituthane Primer WP-3000, compatible with membrane and recommended by membrane manufacturer.
- C. Adhesives: As recommended by membrane manufacturer.
- D. Thinner and Cleaner: As recommended by adhesive manufacturer, compatible with sheet membrane.
- E. Joint Tape: Preprufe Tape LT as recommended by adhesive manufacturer, compatible with sheet membrane.

2.3 ACCESSORIES

- A. Protection board; shall be provided as recommended by the manufacture, and shall be a minimum of 2" thick closed cell foam with integral drainage channels equal to

polyisocyanurate board insulation complying with ASTM C1289, Type I, Class 1 or 2 with maximum flame-spread and smoke development indexes of 75 and 450, respectively, based on tests performed on un-faced core on thickness up to 4". Provide thickness as required to achieve minimum R-10.

- B. Sealant: As recommended by membrane manufacturer.
- D. Cant Strips: Bitumen impregnated fiberboard.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify substrate surfaces are durable; free of matter detrimental to adhesion or application of waterproofing system.
- B. Verify items which penetrate surfaces to receive waterproofing are securely installed.

3.2 PREPARATION

- A. Protect adjacent surfaces not designated to receive waterproofing.
- B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions.
- C. Do not apply waterproofing to surfaces unacceptable to manufacturer or applicator.
- D. Verify manufacturer's requirements for concrete surfaces cure time.
- E. Seal cracks and joints with sealant materials using depth to width ratio, as recommended by sealant manufacturer.
- D. Apply surface conditioner at a rate recommended by manufacturer. Protect conditioner from rain or frost until dry.

3.3 INSTALLATION - SELF ADHERED

- A. Install membrane waterproofing in accordance with manufacturer's instructions.
- B. Roll out membrane. Minimize wrinkles and bubbles.
- C. Remove release paper layer. Roll out on substrate with a mechanical roller to encourage full contact bond.
- D. Lap sides and ends in accordance with membrane manufacturer's instructions.
- E. Overlap edges and ends and seal with tape and contact adhesive, minimum 3". Seal permanently waterproof.

- F. Reinforce membrane with multiple thickness of membrane material over joints, whether joints are static or dynamic.
- G. Weather lap joints on sloped substrate in direction of drainage. Seal joints and seams. Coordinate installation with Section 02620 – Foundation Drainage.
- H. Install flexible flashings. Seal watertight to membrane.
- I. Seal membrane and flashings to adjoining surfaces.
- J. Extend membrane over cants and up intersecting surfaces at membrane perimeter minimum 6” above horizontal surface for first ply and 3” at subsequent plies laid in shingle fashion.
- K. Seal items protruding to or penetrating through membrane and install counter flashing membrane material.
- L. Remove any masking materials after installation. Clean any stains on exposed surfaces.

3.4 INSTALLATION - PROTECTION BOARD

- A. Place protection board directly against membrane, butt joints, place to encourage drainage downward.
- B. Adhere protection board to substrate with mastic to tacky dampproofing surface. Scribe and cut boards around projections, penetrations, and interruptions.

3.5 PROTECTION OF FINISHED WORK

- A. Do not permit traffic over unprotected or uncovered membrane.
- B. Observe backfilling activity and insure care is taken to protect sheet membrane waterproofing system.
- C. Protect membrane waterproofing from subsequent construction activities as recommended by manufacturer.

END 07130.

DIVISION 7 - THERMAL AND MOISTURE PROTECTION
Section 07210 - Insulation

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Foundation board insulation glass and batt insulation.
- B. Rigid Insulation for Spandrel Glass Locations with firestopping and smoke seal; is specified in section 07840 – Penetration Seals.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on product characteristics, performance criteria, limitations, and ASTM Test Compliances.

1.3 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate special environmental conditions required for installation, and installation techniques.

1.4 ENVIRONMENTAL REQUIREMENTS

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.1 INSULATION MATERIALS

- A. Foundation Insulation; without drainage channels, shall be rigid, closed cell, 2” thick extruded polystyrene foam insulation board, with a minimum compressive strength of 25 psi minimum, and conforming to ASTM C578, Type IV, with an aged R-value of 5.0 per inch at 75 degrees F. and 5.4 per inch at 40 degrees F. One of the following equal manufacturers and products may be used:
 - a. Dow Chemical Company, “Styrofoam Freezmate or Styrofoam Scoreboard” (www.dow.com)
 - b. Owens-Corning Fiberglas Corporation, “Formular 250” (www.owenscorning.com)
 - c. Additional approved equal products shall be considered.
- B. Un-faced Exterior Stud Wall Insulation; shall be thermal batt type fiberglass insulation, 2”, R-6.7 and 6”, R-19, as indicated on the Drawings, complying with ASTM C665, Type III, Class A at all walls with a gypsum drywall finish. Refer to Section 07260 Vapor Retarder for vapor barrier requirements at un-faced batt insulation walls. One of the following equal

manufacturers and products may be used:

- a. Certain Teed Corp., “CentraPro AcoustaTherm” (www.certainteed.com)
 - b. Johns Manville Corp., “Easy Fit” (www.jm.com)
 - c. Owens-Corning Fiberglass Corp., “Unfaced Thermal Batt Insulation” (www.owenscorning.com)
 - d. Additional approved equal products shall be considered
- C. Semi-Rigid Insulation; shall be rectangular boards of inorganic fibrous glass insulation with foil back vapor retardant facing conforming with ASTM C612, Type 1A/1B. Insulation shall provide 3.0 pcf density, thermal rating of 4.3 per 1” of material, flame spread rating of 25 or less, and a smoke development rating not greater than 50. One of the following equal manufacturers and products may be used:
- a. Dow Chemical Company, “Styrofoam Perimate” (www.dow.com)
 - b. Owens-Corning Fiberglass Corporation, “703 FRK Faced” (www.owenscorning.com)
 - c. Additional approved equal products shall be considered.
- D. Rigid Insulation for Spandrel Glass Locations without firestopping or smoke seal; shall be foil faced polyisocyanurate board insulation complying with ASTM C1289, Type I, Class 1 or 2 with maximum flame-spread and smoke development indexes of 75 and 450, respectively, based on tests performed on un-faced core on thickness up to 4”. Provide thickness as required to achieve minimum R-10.
- a. Vapor Retarder Tape; shall be pressure-sensitive tape of type recommended by insulation manufacturer for sealing joints and penetrations in vapor retarder facings.
 - b. Adhesive for bonding insulation shall be a product that demonstrates capability to bond insulation securely to substrates indicated without damaging insulation and substrate.
 - c. One of the following equal manufactures may be used:
 - i. Atlas Roofing Corporation
 - ii. Dow Chemical Company
 - iii. Rmax, Inc.
 - iv. Additional approved equal manufacturers will be considered.
- E. Rigid insulation with fire stopping inside spandrel glass is specified in Section 07840 Penetration Seals

2.2 ACCESSORIES

- A. Adhesive: Type recommended by insulation manufacturer for application.
- B. Tape: Self-adhering type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation boards are dry and ready to receive insulation and adhesive.
- B. Verify substrate surface is flat, free of honeycomb, fins, irregularities, materials or substances that may impede adhesive bond.

3.2 PREPARATION

- A. Sequence work to ensure fireproofing, firestop, and air barrier materials are in place before beginning the Work of this section.

3.3 INSTALLATION - FOUNDATION PERIMETER

- A. Apply adhesive in three continuous beads per board length, and as recommended by manufacturer.
- B. Install boards on foundation wall perimeter, horizontally, as indicated on the Drawings.
 - a. Place boards in a method to maximize contact bedding.
 - b. Stagger side and end joints.
 - c. Butt edges and ends tight to adjacent board and to protrusions.
- C. Extend boards over control and expansion joints, unbonded to foundation 8" on one side of joint.
- D. Cut and fit insulation tight to protrusions or interruptions to the insulation plane.

3.4 INSTALLATION – VENEER WALLS

- A. Install insulation in accordance with manufacturer's instructions.
- B. Install in exterior walls and as indicated on the Drawings without gaps or voids. Do not compress insulation. Maintain integrity of insulation over entire area to be insulated.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation.
- E. Install unfaced insulation in veneer walls to receive drywall finish, and vapor barrier, as indicated on the Drawings.
- F. Install foil faced insulation in veneer walls not receiving drywall finish and vapor barrier, as indicated on the Drawings.

- a. Install with factory applied foil membrane facing warm side of building spaces.
 - b. Lap ends and side flanges of membrane over framing members.
 - d. Staple or nail facing flanges in place at maximum 6" oc.
 - e. Tape in place.
 - f. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.
- G. Coordinate work of this section with construction of vapor retarder specified in Section 07260 – Vapor Retarder & Air Infiltration Barrier.

3.5 INSTALLATION – RIGID INSULATION FOR SPANDREL GLASS LOCATIONS

- A. Install insulation in accordance with manufacturer's instructions.
- B. Clean substrates of substances harmful to insulation, including removing projections capable of puncturing foil face or of interfering with insulation attachment.
- C. Extend insulation in thickness required to achieve R-10 and to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation.
- D. For preformed insulating units, provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths.
- E. Set foil (vapor retarder) faced units with vapor retarder to warm side of construction, unless otherwise indicated.
- F. Tape joints and ruptures in foil face (vapor retarder), and seal each continuous area of insulation to surrounding construction with tape to ensure airtight installation.
- G. Retain insulation in place by metal clips and straps or integral pockets within window frames, spaced at intervals recommended in writing by insulation manufacturer to hold insulation securely in place without touching spandrel glass. Maintain cavity width of dimension indicated between insulation and glass.

3.6 PROTECTION OF FINISHED WORK

- A. Do not permit work to be damaged prior to covering insulation.

END 07210.

DIVISION 7 - THERMAL AND MOISTURE PROTECTION
Section 07240 - Exterior Insulation and Finish System

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Exterior insulation and finish system including acrylic finishes, coatings, primers, and patching compounds

1.2 SYSTEM DESCRIPTION

- A. Exterior Insulation and Finish System: EIMA Class PB Type B system.

1.3 SUBMITTALS FOR REVIEW

- A. Shop Drawings: Indicate wall and soffit joint patterns, joint details, and molding profiles.
- B. Product Data: Provide data on system materials, product characteristics, performance criteria, and limitations.

1.4 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate preparation required, installation techniques, and jointing requirements.

1.5 QUALIFICATIONS

- A. Applicator: Company specializing in performing the work of this section with minimum five years documented experience as an approved applicator of one of the specified systems.

1.6 REGULATORY REQUIREMENTS

- A. Conform to applicable building code for system fire resistance ratings, flame/smoke ratings for finish system.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect adhesives and finish materials from freezing by storing in an environment recommended by manufacturer.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Do not install finish when ambient temperature is below 40 degrees F.
- B. Maintain this temperature during and 24 hours after installation of finish.

PART 2 PRODUCTS

2.1 Exterior Insulation and Finish Systems (EIFS)

- A. EIFS; shall be a polymer based finish system, wall and soffit cladding of rigid insulation and applied coatings, Class PB, with system components as recommended and approved by the EIFS manufacturer. System shall be composed of insulation board, mechanical fasteners, cementitious base coat with embedded reinforcing fabric mesh, primer (as required) and finish coat to form an assembly. Coating shall be applied directly to gypsum board [concrete, stucco] substrate. One of the following equal manufacturers and products may be used:
 - a. Sto Corporation, "Sto Finish Systems" (www.sto.com)
 - b. Dryvit Corporation, "" (www.dryvit.com)
 - c. Additional approved equal products shall be considered

2.2 MATERIALS

- A. Extruded Polystyrene Board Insulation Type B: ASTM C578 Type VI; cellular type, conforming to the following:
 - 1. Thermal Resistance: R of 5.0.
 - 2. Thickness: Thickness indicated inch thick].
 - 3. Thickness Tolerance: 1/32 inch maximum.
 - 4. Board Size: 24 x 48 inches.
 - 5. Board Size Tolerance: 1/16 inch from square and dimension.
 - 6. Compressive Strength: Minimum 25 psi.
 - 7. Water Absorption: In accordance with ASTM D2842 0.3 percent by volume maximum.
 - 8. Edges: Square edges.
 - 9. Flame/Smoke Properties: 25 / 200 in accordance with NFPA 255..
- B. Coating Reinforcement: Glass fiber mesh type, woven, treated for improved bond with coating.
- C. Coating: Synthetic composition, Polymer base, air curing, containing chopped glass fibers, color to match architects sample.
- D. Finish: Apply over dry primed base coat, maintaining a wet edge at all times for uniform appearance, in thickness required by EIFS manufacturer to produce a uniform finish of color and texture matching approved sample and free of cold joints, shadow lines, and texture variations.
 - 1. Texture: As selected from manufacturer's full range.

2.3 ACCESSORIES

- A. Insulation Fastening: Galvanized metal channel with non-corrosive fasteners.
- B. Trim and Control Joints: Galvanized steel, with attachment flanges.

- C. Sealant Materials: Recommended by coating manufacturer.
- D. Drip Screed/Track: Prefabricated, one-piece type for attachment behind insulation with face leg extended to form a drip, of depth required to suit thickness of coating and insulation, with face leg perforated for bonding to coating and back leg.
- E. Expansion Joint: Prefabricated, one-piece V profile; designed to relieve stress of movement.
- F. Parapet Cap Flashing: Type for both flashing and covering parapet top with design complying with ASTM C 1397.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate and adjacent materials are dry.
- B. Verify substrate surface is flat, free of fins or irregularities.

3.2 INSTALLATION - INSULATION

- A. Install insulation in accordance with manufacturer's instructions.
- B. Install boards on ceiling surface, horizontally.
- C. Place boards in a method to maximize tight joints. Stagger vertical joints. Butt edges and ends tight to adjacent board and to protrusions.
- D. Secure boards to substrate by mechanical attachment to achieve a continuous flush insulation surface. Secure board mechanically at the following rate 1/sf.
- E. Provide control and expansion joints per coating and insulation manufacturers recommendations.
 - 1. Observe all building expansion joints

3.3 INSTALLATION - COATING

- A. Install primer/adhesive, base coat, coating and glass fiber mesh reinforcement in accordance with manufacturer's instructions.
- B. Apply primer/adhesive and base coat to a minimum thickness as recommended by the system manufacturer and fully embed reinforcement, wrinkle free.
- C. Lap reinforcement edges and ends 2 inches.
- D. Install trim and control joints.
- E. Install trim in full lengths only to minimize moisture intrusion; cut horizontal trim tight to vertical trim.

- F. Apply finish to a total minimum thickness as recommended by the system manufacturer. Finish to a uniform texture and color.
- G. Groove surface finish to design pattern indicated.
- H. Apply sealant at finish perimeter and control joints in accordance with system manufacturers recommendations and Section 07900 CAULK AND SEALANTS.

3.4 PROTECTION OF FINISHED WORK

- A. Do not permit finish surface to become soiled or damaged.

3.5 SCHEDULES

- A. Soffits: Existing cement plaster soffit surface, reinforcement and coating finish, smooth finish in Grey color to match the adjacent aluminum finish.

END 07240.

DIVISION 7 - THERMAL AND MOISTURE PROTECTION
Section 07260 - Vapor Retarder & Air Infiltration Barrier

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Vapor retarder, air infiltration barrier, and accessories.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data indicating material characteristics, and performance criteria.

1.3 SUBMITTAL FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate preparation and installation recommendations.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable building code for requirements of application.

PART 2 PRODUCTS

2.1 SHEET MATERIALS

- A. Polyethylene vapor retarder; shall be minimum six (6) mils thick, and shall be installed on the warm air side of exterior wall areas receiving unfaced fiberglass insulation, secured in place with adhesives. One of the following approved manufacturers may be used:
 - a. Poly-Tech,
 - b. Carlisle Plastics, "" (www.carlisleplastics.com)
 - c. Alumiseal, 2 South Park St., P.O. Box 819, Lebanon, NH 03766
Phone: (603) 443-6103
 - d. Fortifiber Corporation, 19342 Lake Montcalm Road, Howard City, MI 49329 Phone: (800) 442-2587
 - e. Griffolyn, Reef Industries, Inc., P.O. Box 750250, Houston, TX 77275
Phone: (713) 507-4200.
 - f. Additional approved equal products shall be considered
- B. Air Infiltration Barriers; shall be a flash spun-bonded olefin, non-woven, non-perforated secondary fabric air infiltration barrier system comprising of four key elements; commercial

wrap, flashing, systems, cap fasteners, and tape. One of the following equal manufacturers and products may be used:

- a. Dupont, "Tyvek Commercial Wrap" (www.tyvek.com)
- b. Additional approved equal products shall be considered

2.2 SEALANTS

- A. Sealant: As recommended by vapor barrier manufacturer
- B. Primer: Recommended by sealant manufacturer to suit application.
- C. Cleaner: Non-corrosive type; recommended by sealant manufacturer; compatible with adjacent materials.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive Work.

3.2 PREPARATION

- A. Do not install vapor retarder or air infiltration barrier until items penetrating either of these are in place.
- B. Remove loose or foreign matter which might impair adhesion or damage vapor retarder and air infiltration barrier.
- C. Clean and prime substrate surfaces to receive adhesive and sealants in accordance with manufacturers' instructions.

3.3 INSTALLATION – VAPOR BARRIER

- A. Install materials in accordance with manufacturer's instructions.
- B. Vapor Retarder For Stud Framed Walls: Secure sheet barrier to stud faces with adhesive. Lap edges over stud faces, lap ends onto adjacent construction; caulk ends to ensure complete seal.

3.4 INSTALLATION – AIR INFILTRATION BARRIER

- A. Install materials in accordance with manufacturer's instructions.
- B. Secure sheet seal to gypsum board sheathing materials with adhesive. Caulk with sealant to ensure complete seal.
- C. Apply sealant within recommended application temperature ranges. Consult manufacturer

when sealant cannot be applied within these temperature ranges.

3.5 PROTECTION OF FINISHED WORK

A. Do not permit adjacent work to damage work of this section.

END 07260.

DIVISION 7 - THERMAL AND MOISTURE PROTECTION
Section 07430 – Manufactured Metal Panels

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Preformed manufactured metal roof screen panels, trim, flashing, closures, fasteners, sealants, and miscellaneous accessories.

1.2 SUBMITTALS FOR REVIEW

- A. Shop Drawings: Indicate dimensions, layout, joints, construction details, and methods of anchorage.

1.3 SUBMITTAL FOR PROJECT CLOSEOUT

- A. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.5 WARRANTY

- A. Correct defective Work within a twenty (20) year period after Substantial Completion for degradation of panel finish including color fading caused by exposure to weather.
- B. Correct defective Work within a two (2) year period after Substantial Completion for water tightness, and integrity of seals.

PART 2 PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

- A. Basis of Design: Centria IW Series or equal products by one of the following manufacturers:
 - a. AEP Span (www.aepspan.com)
 - b. Peterson Aluminum, Pac-Clad (www.pac-clad.com)
 - c. McElroy Metals, (www.mcelroymetal.com)
 - d. Roofscreen Manufacturing, (www.roofscreen.com)
 - e. Additional approved equal products shall be considered

2.2 METAL PANEL MATERIALS

- A. Metal Roof Screen Panels:
 - a. Panel profile shall be box rib with steel conforming to 24 gauge ASTM A924 and A792 Grade 40.
 - b. Panel protective coating shall be Zincolume conforming to ASTM A792 and A50.
 - c. Panel exterior finish Duratech 5000 (7090 Kynar 500/Hylar 5000).
 - d. Panel interior finish shall be 15 mil primer with .35 ml off-white backer.
- B. Panel color shall be selected by Landmark from manufacturer's standard colors

2.2 ACCESSORIES

- A. All miscellaneous materials shall be the manufacturer's standard materials for the system specified including trim, flashing, closures, fasteners, sealants, and all other accessories.
- B. Flashing, gaskets, fasteners, and other items indicated on Drawings and the Shop Drawings shall be pre-finished to match metal panels.
- C. Field sealant, color coordinated primerless silicone or high grade, nondrying butyl as recommended by panel manufacturer.
- E. Field Touch-up Paint: As recommended by panel manufacturer.
- F. Bituminous Paint: Asphalt base.

2.3 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest practicable lengths.
- C. Fabricate corners in one continuous piece with minimum 1'-6" returns.
- D. Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall in accordance with building code.
- E. Maximum Allowable Deflection of Panel: 1/180 of span.
- F. Accommodate movement within system without damage to components or deterioration of seals, movement within system; movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; deflection of structural support framing.
- G. Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that framing members are ready to receive panel system.

3.2 INSTALLATION

- A. Install metal roof screen framing in accordance with manufacturer's instructions.
- B. Install in neat, trim, and true to line so that Work presents true finished surface of the specified profile, free of dents, deformations, creases or other noticeable defects at completion.
- C. All seams shall be aligned and straight. All seams shall be vertical, unless noted otherwise on the Drawing
- D. Panels shall be lapped away from prevailing wind direction.
- E. Protect surfaces in contact with dissimilar metals with bituminous paint. Allow to dry prior to installation.
- F. Fasten siding to structural supports; aligned, level, and plumb. Use concealed fasteners wherever possible.
- G. Locate joints over supports. Lap panel ends minimum 2".
- H. Install flashings in accordance with manufacturer's recommendations. Overlap panels minimum 6". Flashing shall be installed to allow for thermal movement.
- I. Cutting and Fitting: Cut neat, square, and true.
 - a. Torch cutting is prohibited.
 - b. Openings 6" and larger in any direction shall be shop fabricated and reinforced to maintain original load capacity.
 - c. Where cutting of panels is required due to field conditions, cut edges shall be de-burred and treated with finish material recommended by manufacturer.
- J. Provide expansion and control joints where indicated on Drawings and Shop Drawing.
- K. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.

3.3 TOLERANCES

- A. Maximum Offset From True Alignment Between Adjacent Members Butting or In Line: 1/16".
- B. Maximum Variation from Plane or Location Indicated on Drawings: 1/4".

3.4 REPAIR AND CLEANING

- A. Inspect Work and remove site cuttings from finish surfaces.
- B. Remove and replace any defective Work that cannot be properly repaired, cleaned, or touched-up.
- C. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.
- D. Clean to remove any discoloration or foreign matter.

END 07430.

DIVISION 7 - THERMAL AND MOISTURE PROTECTION
Section 07450 - Composite Metal Panels and Column Covers

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Composite metal panels assemblies trim, flashing, closures, fasteners, sealants, and all other miscellaneous accessories necessary for a complete installation.
- B. Preformed, prefinished, aluminum column covers and accessories.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on assembled panel structural capabilities.
- B. Shop Drawings: Indicate dimensions, panel profile and layout, spans, joints, construction details, methods of anchorage, method and sequence of installation.
- C. Samples: Submit two (2) manufacturer's color charts or samples, illustrating metal color and finish options, for selection by Landmark. Selection shall be from manufacturer's standard options.

1.3 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate special handling criteria, installation sequence, and cleaning procedures.

1.4 SUBMITTAL FOR PROJECT CLOSEOUT

- A. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with Aluminum Association and American Iron and Steel Institute.
- B. Installer: Company specializing in performing the work of this Section with minimum five continuous years documented experience as an approved applicator of one of the specified manufacturers.

1.5 WARRANTY

- A. Manufacturers Warranty: Correct defective Work within a twenty (20) year period after Substantial Completion for degradation of panel finish including color fading caused by exposure to weather.

Deleted: 90%

- B. Manufacturers Warranty: Correct defective Work within a five (5) year period after Substantial Completion water tightness, and integrity of seals.

PART 2 PRODUCTS

2.1 COMPOSITE METAL PANELS

- A. Composite Metal Plate Panels; shall be 3003 alloy, minimum 0.020" thick aluminum, ASTM B 209, with 0.157" overall thickness, composed of two metal sheets sandwiching a rigid plastic core formed in a continuous process with no glues or adhesives between dissimilar materials, and 1.12 psf panel weight minimum. One of the following equal manufacturers and products may be used:
 - a. Alusuisse Company., "Alucobond Plus" (www.alucobondusa.com)
 - b. Alcoa , "Reynobond PE" (www.alcoacladdingsystems.com)
 - c. Mitsubishi Kasei America., "Alpolic Composit Panels" (www.alpolic.com)
 - d. Citatdel" (www.citatdel.com)
 - e. Copper Sales, "UNA-CLAD, UNA-FAB 4,000" (www.unaclad.com)
 - f. Additional approved equal products shall be considered.

2.2 COLUMN COVERS

- A. Column Covers; shall be 3003 alloy, minimum 0.020" thick aluminum, ASTM B 209, with 0.157" overall thickness, composed of two metal sheets sandwiching a rigid plastic core formed in a continuous process with no glues or adhesives between dissimilar materials, and 1.12 psf panel weight minimum.
 - a. Fabricate to accommodate movement without buckling, joint sealant failure, undue stress on fasteners or other detrimental effects.
 - b. Columns shall be rolled to a true radius with return attachment legs formed to accommodate proper installation.
 - c. Column finish shall be Class I, anodized finish in a color to be selected by Landmark from manufacturer's standard colors.
 - d. One of the following equal manufacturers and products may be used:
 - i. Copper Sales, "UNA-FAB, Series 200 Hairline Joint System" (www.unaclad.com)
 - ii. Alcan Corporation, Alucobond (www.alucobond.com)
 - iii. Fry Reglet Architectural Metals (www.fryreglet.com)
 - iv. Additional approved equal products shall be considered.

2.3 MISCELLANEOUS MATERIALS AND ACCESSORIES

- A. All miscellaneous materials shall be the manufacturer's standard materials for the system specified.
- B. Flashing, and other items indicated on the Drawings and Shop Drawings shall be pre-finished to match metal panels and column covers.
- C. Subgirts: Profile as indicated on the Drawings and Shop Drawings to attach panel system to building sheathing or structure.
- D. Trim, Closure Pieces, Caps, Flashings, Facias, and Infills: Same material, thickness and finish as exterior sheets; brake formed to required profiles.
- E. Field sealant, color coordinated primerless silicone or high grade, nondrying butyl as recommended by panel manufacturer.
- F. Fasteners and anchors shall be as recommended by the manufacturer to provide a complete anchorage system.
- G. Gaskets: Manufacturer's standard type suitable for use with panel system, permanently resilient; ultraviolet and ozone resistant; color as selected by landmark from manufacturers standard options.
- H. Field Touch-up Paint: As recommended by panel manufacture.
- J. Bituminous Paint: Asphalt base as recommended by panel manufacturer.

2.4 FABRICATION

- A. Fabrication of primary component profiles on site is not permitted.
- B. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- C. Form pieces in longest practicable lengths.
- D. Fabricate corners in one continuous piece with minimum 1'-6" returns.
- E. Design Requirements:
 - a. Components: Design and size to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of panel as calculated in accordance with the applicable building code, as measured in accordance with ASTM E330.
 - b. Maximum Allowable Deflection of Panel: 1/90.
 - c. Movement: Accommodate movement within system without damage to system,

components, or deterioration of seals; movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; deflection of structural support framing and a mid-span slab edge deflection of 1/4 inch.

- d. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that building framing members are ready to receive panel system.
- B. Coordinate the Work for installation of sheathing, vapor retarder and air barrier seals.
- C. Coordinate the Work with installation of fire-stopping, windows, and other components or materials.

3.2 INSTALLATION

- A. Install composite column covers in accordance with manufacturer's instructions.
- B. Protect surfaces in contact with cementitious materials and other dissimilar metals with bituminous paint. Allow to dry prior to installation.
- C. Permanently fasten column covers to structural supports; aligned, level, and plumb, within specified tolerances.
- D. Locate joints over supports.
- E. Provide expansion and control joints where indicated on the Drawings.
- F. Use concealed fasteners unless otherwise approved by Architect.
- G. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.

3.3 TOLERANCES

- A. Maximum Offset From True Alignment Between Adjacent Members Butting or In Line: 1/16".
- B. Maximum Variation from Plane or Location Indicated on Drawings: 1/4".

3.4 CLEANING

- A. Remove site cuttings from finish surfaces.
- B. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.

END 07450.

DIVISION 7 - THERMAL AND MOISTURE PROTECTION
Section 07520 – Ballasted Single Ply Roofing System

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Loose laid, ballasted single ply membrane roofing, roofing insulation, and all required accessories, terminations, and fasteners for a complete and operational roofing system.
- B. Precast concrete pavers used at balconies.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide characteristics on membrane materials, flashing materials, insulation, and vapor retarders. All products to be installed as part of roofing system.
- B. Precast concrete paver product data.
- C. Shop Drawings: Tapered roof insulation layout.

1.3 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate special precautions required for seaming the membrane.

1.4 SUBMITTAL FOR PROJECT CLOSEOUT

- A. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
- B. Guaranty: Submit applicator guaranty.

1.5 QUALITY ASSURANCE

- A. Applicator: Company specializing in performing the work of this section with three continuous years documented experience as an approved applicator of the product provided-.
- B. Perform work in accordance with current published manufacturer's instructions and recommendations.
- C. Roof shall be flood tested in the presence of Landmark to assure a puddle and leak free finished surface.
- D. Provide pull-out test results to the roofing manufacture if required for warranty or recommended by manufacturer.

1.6 REGULATORY REQUIREMENTS

- A. Conform to applicable building code for roof assembly fire hazard requirements.
- B. UL 790: Class A Fire Hazard Classification.
- C. FM 4470: Roof Assembly Classification, of Class 1 Construction, wind uplift requirement of I-60, in accordance with FM Construction Bulletin 1-28.
- D. Ballasted single ply roofing system shall comply with UL 1256.
- E. Insulation shall comply with FM 4450 and UL 1256 for direct to steel attachment.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply EPDM roofing membrane during inclement weather and/or ambient temperatures below 20 degrees F or above 95 degrees F.
- B. Do not apply roofing membrane to damp or frozen deck surface.
- C. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.
- D. All SPM sealants and adhesives must be kept at 60 degrees F when the ambient temperature falls below 40 degrees.

1.8 WARRANTY

- A. Applicator: Any damage to the building resulting from failure of the roofing system, within a 2 year period after the date of Substantial Completion, shall be corrected immediately.
- B. General Contractor: To provide manufacturer's 10 year minimum total roofing system warranty for roofing system, guaranteeing the materials manufacturer will assume the costs associated with damage from and repairs to stop the leaks resulting from the natural deterioration of the membrane or from any errors in application of the membrane.
 - a. Carlisle Golden Seal Roofing System Warranty.
 - b. Firestone Red Shield Roofing System Limited Warranty.
 - c. Goodyear (Versico, Inc.), "VersiGard" EPDM Roofing System Warranty.
 - d. Warranty shall include the asphalt used to fully adhere the polyisocyanurate insulation.
- C. General Contractor: To provide manufacturer's standard 20 year guarantee/warranty for roofing membrane guaranteeing that the membrane material used in the roofing system will not deteriorate to the point of failure due to weathering.
 - a. Carlisle Syntec Incorporated 20 Year Membrane and Material Warranty; April, 1986; No. 85-5-503SM.

- b. Firestone Building Products, Roofing Membrane Limited Warranty; August 1994; 8/94 - Item No. 812R.
 - c. Goodyear (Versico, Inc.), “VersiGard”, 20 Year Limited Membrane Only Warranty.
- D. Warranties and guaranties shall start from the day of inspection by the manufacturer’s representative. The date shall be established as the date the Architect, Landmark, and the manufacturer’s representative inspect the work and find that all work is complete and forms a watertight installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS - MEMBRANE MATERIAL

- A. Ballasted Single Ply Roofing System; shall be black on black, 45 mil single ply system with washed, round and smooth stones, 3/4” to 1 1/2” diameter with majority of stones 1” in diameter (ASTM C136). One of the following equal manufacturers and products may be used:
 - a. Carlisle Syntec Systems “SureSeal” Ballasted Roofing System. (www.carlisle-syntec.com)
 - b. Firestone Building Products, “RubberGard” Ballasted Roofing System. (www.firestonebpco.com)
 - c. Goodyear (Versico, Inc.), “VersiGard” Ballasted Roofing System. (www.versico.com)
 - d. Additional approved equal products shall be considered.

2.2 ADHESIVE MATERIALS

- A. Surface Conditioner, splice cleaner, slicing cement, in-seam sealant, lap sealant, primer, tape: As recommended by membrane manufacturer, compatible with membrane.
- B. Cured EPDM Flashing, and Uncured Flashing: As recommended by membrane manufacturer.
- C. Insulation Adhesive: As recommended by insulation manufacturer.
- D. Thinner and Cleaner: As recommended by adhesive manufacturer, compatible with membrane.

2.3 SUBSTRATE COVERING MATERIALS

- A. Self adhering Vapor Retarder: Carlisle Coatings.
- B. Sheet Vapor Retarder: 10 mil polyethylene with duct tape.

2.4 INSULATION

- A. Manufacturers: One of the following equal manufacturers and products may be used:
- a. Atlas Energy Products, “AC Foam-II Rigid and Tapered Insulation”
(www.atlasroofing.com)
 - b. Firestone Building Products, “ISO 300, Polyiso Rigid and Tapered Insulation”
(www.firestonebpco.com)
 - c. Additional approved equal products shall be considered.
- B. Insulation: Flat rigid board conforming to ASTM C 165, C 209, C 518, D 1621, D 2126, E 84, E96, polyisocyanurate rigid board, both faces surfaced with fiber reinforced faces, with the following characteristics:
- a. Board Density; 2.0 lb/cu ft
 - b. Board Size; 4' - 0" x 4' - 0" or 4'-0" x 8'-0"
 - c. Board Thickness; 4”, total thickness as indicated on the Drawings
 - d. Thermal Conductivity Aged R value: 5.56 / inch minimum. Minimum total R value of 20.
 - e. Board Edges; Square
 - f. Board Compressive Resistance; 20 psi min.
 - g. Insulation shall be type approved by the membrane manufacturer.
- C. Tapered Insulation: Conforming to ASTM C165, C209, C518, D1621, D2126, E 84, E 96, polyisocyanurate rigid board, both faces surfaced with fiber reinforced faces, with the following characteristics:
- a. Board Density; 2.0 lb/cu ft
 - b. Board Size ; 4' - 0" x 4' - 0"
 - c. Board Taper; Beginning thickness - 1/2" minimum; Slope - 1/4" per 1’-0”.
 - d. Thermal Conductivity Aged R value of 5.56/inch minimum.
 - e. Board Edges; Square
 - f. Board Compressive Resistance; 20 psi min.
 - g. Insulation shall be type approved by the membrane manufacturer.

2.5 ACCESSORIES

- A. Insulation Joint Tape: Asphalt treated glass fiber reinforced; 6" wide; self adhering.
- B. Roofing Nails: Ring shank aluminum, size as required to suit application with 1" plastic washer heads.
- C. Insulation Fasteners: Appropriate for purpose intended and approved by Factory Mutual and system manufacturer; length required for thickness of material with metal washers.
- D. Sealants: As recommended by membrane manufacturer.
- E. Walkway Pads: 2'-0" x 2'-0" x 2 1/4" thick Sure Seal Rubber Pavers; Carlisle Syntex Incorporated, or approved equal.
- F. Stack Boots: Flexible boot and collar for pipe stacks through membrane by membrane manufacturer.
- G. SPM Manufacturers Water Cut-Off Mastic: Provide as needed to sheet metal manufacturer.
- H. Foam Insulation Adhesive: As recommended by insulation manufacturer, or PL200 Panel and Foam Adhesive by Rexnord Chemical Products, Minneapolis, MN.
- I. Miro Pipe Curbs. Miro Industries, 800-768-6978
 - a. Model 02 for supporting conduit and pipes up to 2" o.d.
 - b. Model 24-R for supporting pipes up to 4 1/2" and 100 lbs.
 - c. Model 48-R for supporting pipes up to 11 1/2" and 200 lbs.
- J. Stone Ballast: Washed, round and smooth.
 - a. ASTM D 448, gradation size No. 4: 3/4" to 1-1/2" diameter with a majority of stone 1" in diameter.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify deck is supported and secure.
- C. Verify deck is clean and smooth, free of depressions, waves, or projections, and properly sloped as indicated on the Drawings.
- D. Verify deck surfaces are dry and free of snow or ice.
- E. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, and wood blocking is in place.

- F. Verify that all work of subcontractors which penetrate roof deck or requires men and equipment to traverse roof deck has been completed.
- G. Do not install any roof insulation until all perimeter roof edge wood blocking is installed.

3.2 INSTALLATION

- A. Install roofing with flashing systems and accessory items in strict accordance with system manufacturer's printed instructions current at the date of bidding documents.
- B. When items of conflict arise between the manufacturer's recommendations and the contract documents, the more stringent will govern unless it violates manufacturer's warranty requirements.

3.3 VAPOR RETARDER APPLICATION

- A. Apply vapor retarder over roof deck, lap 6", and tape all joints.
- B. Extend vapor retarder under blocking to deck edge, tape in place.
- C. Cut vapor retarder at roof curbs and penetration and tape in place. Tape all cuts to prevent water vapor transmission.
- D. Lap over vapor and air barrier of wall construction to provide continuity of vapor and air barrier seal. Coordinate with Section 07260 – Vapor Retarder & Air Infiltration Barrier

3.4 INSULATION: LOOSE LAID SYSTEM

- A. Ensure vapor retarder is clean and dry.
- B. Loosely Laid Insulation: Loosely lay insulation units.

Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board- type roof insulation to deck type specified.

- a. Fasten insulation according to requirement in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
- b. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.
- C. Install in layers. Face edges of insulation running parallel with the metal roof deck flutes on the top flute], insulation to bear firmly on deck surfaces. Stagger all joints, to establish a thermal break from deck to EPDM.
- D. Lay no more insulation at any one time than can be protected from wetting or any other damage by the elements. Protect insulation in accord with the recommendations of the insulation manufacturer.
- E. Install the water cut-off at the end of each day's work. Remove water cut-offs prior to start of

next day's work.

- F. Tape joints of insulation in accordance with manufacturer's instructions.
- G. Two-way tapered saddles and tapered edge strips: Install as indicated on the Drawings and adhere in place with foam adhesive and mechanically fasten.
- H. Top layer of insulation shall have surface joints 1/4" or less in width.
- I. Tapered Insulation:
 - a. Install in accordance with the manufacturer's layout drawings. Spot adhere saddles in place.
 - b. Leading edge of tapered insulation to be 1/2".
 - c. Top layer of insulation will have surface joints 1/4" or less in width
 - d. Field cut tapered and base insulation to fit around roof curbs.
 - g. Tapered insulation shall originate at center of the roof drain and be cut perpendicular to the drain flange at the clamping ring
- J. Repair all joints or holes greater than 1/4" in diameter with same material or with spray foam insulation.
- K. Insulation which has become wet shall be removed and replaced.

3.5 MEMBRANE: LOOSE LAID SYSTEM

- A. Install 45 mil EPDM perimeter securement strip utilizing mechanical fasteners @ 8" O.C.
- B. Starting in the low areas, position the membrane without stretching over the substrate using the maximum sizes recommended by the manufacturer in an approved layout.
- C. Allow the membrane to relax for approximately 1/2 - hour before fastening or splicing.
- D. Overlap adjacent EPDM membrane sheets a minimum of 4".
- E. Position all adjoining sheets in manner specified above, water lap the edges a minimum of 3" over preceding sheet.
- F. Membrane Seaming:
 - a. Clean the seam area with a dry rag to remove talc and other contaminants.
 - b. Apply primer to the seam area of both sheets of membranes.
 - c. Apply seam adhesive to both mating surfaces at the rate recommended by manufacturer.
 - d. Just prior to closing the seam, apply a bead of in-seam sealant approximately 1/8" in

diameter a minimum of 1/2" from the inside edge of the bottom membrane, as well as a minimum of 2" from the lead edge at the end roll section (the width of the membrane).

- e. Roll the top membrane sheet onto the mating surface and roll with 2" wide steel roller. Wait a minimum of 2 hours and apply a 1/4" diameter bead of lap sealant. Feather the lap sealant to completely cover the seam edge.
- G. Adhere field sheet to perimeter securement strip with splice adhesive.
- H. Membrane shall be extended up and over perimeter wood blocking and down 1" minimum over the top of the masonry, and shall be fully adhered to the perimeter wood blocking with bonding adhesive.
 - a. Nailed 6" on center.
 - b. Edges to be covered with SPM lap sealant on a daily basis.
- I. Exposed corners of the perimeter wood blocking are to be flashed with uncured EPDM extending down over the top of masonry 1", nailed at 6" on center and edges sealed with SPM lap sealant.
- J. Install the water cut-offs at the end of the day's work utilizing water cut-off mastic. Remove water cut-off, prior to start of next day's work.
- K. Where applicable, fold the EPDM field sheet into corners and create "pig's ear" and to eliminate excess material. Do not cut membrane. Adhere "pig's ear" to EPDM.
- L. Lap joints shall be a minimum of 5'-0" from roof drains.
- M. Seams shall be water lapped.

3.6 SPLICES

- A. Shingle lay membrane towards the roof drain.
- B. Splice laps in accordance with manufacturer's written specifications. All splicing and bonding surfaces shall be dry and clean.
- C. Clean top of seam with manufacturer's approved cleaner. Apply splice adhesive followed by a bead of lap sealant completely covering splice edge and feather with specially formed putty knife or trowel.
- D. Lap caulking application is to be completed on all the laps by the end of each day.
- E. Cover all "T" joints with a 12" x 12" piece of uncured EPDM. Apply lap sealant to patch edges.
- F. Cover field seams that transverse elevation changes with 12" x 12" piece of uncured EPDM. Apply lap sealant and patch edges.

3.7 SEAM TAPE SPLICES

- A. Shingle lay membrane 5" towards the roof drain.
- B. Mark 1" to the low side of the overlapping sheet with crayon.
- C. Tack back the overlaying sheet with primer at 4'-0" on center.
- D. Thoroughly clean and prime membrane both on the overlap and the under-lap conditions. Allow to dry.
- E. When washing and priming seam, be sure to wash lengthwise across the sheet, except at factory seams where you should wash in direction of factory seam to remove talc.
- F. Install tape improper alignment so it will protrude out 1/4" to 1/2" beyond the overlaying sheet.
- G. Roll seam tape with 4" hand roller. Hand pressure alone, without the use of a roller, is not acceptable.
- H. Bring overlapping membrane over the top of the seam tape and release the paper.
- I. Remove release paper by pulling at a 45 degree angle.
- J. At seam tape laps, lap seam tape 1".
- K. Un-tack the EPDM sheet and allow it to fall into place.
- L. Following removal of the release paper, broom membrane into sealant tape.
- M. Roll seam with 1 1/2" silicone roller at 45 degree angle to the seam.
- N. All products used in seam must be supplied by membrane manufacturer.
- O. All SPM field lap seams to be covered with 6" uncured EPDM, self-adhering EPDM cover strips.
- P. In irregular areas where 1/4" seam tape is not shown and at tee-joints, patch of uncured EPDM will be required.
- Q. At tee-joints, cut out portion of membrane below cover piece to offer full adherence of all pieces of membrane. Following this, install 6" x 6" patches of uncured EPDM over same. Use a soft bristle push broom.
- R. Following approval by Landmark, and / or membrane manufacturer, clean and prime top of completed seam at the edge and install a continuous bead of SPM lap sealant.

3.8 ROOF CURB AND BASE FLASHING

- A. Secure membrane by screwing through metal anchor bar at 6" o.c. with approved screw fasteners,

or to reinforced 60 mil EPDM securement strip previously fastened.

- B. Extend roofing membrane up wall or vertical surface or over wood blocking nailer, as indicated.
- C. Nail top of base flashing to wood nailer strip at 6" on center with 1" hard roofing nails with 1" washer heads.
- D. All flashings and termination shall be done in accord with the manufacturer's standard details or as detailed, whichever is more stringent.
- E. Cover anchor bar strips with cured EPDM flashing, extending above anchor bar and 6" out on horizontal roof surface.
- F. Apply appropriate adhesive to both the SPM flashing, the roofing membrane, and the curb wall.
- G. After the lap cement dries to a point where it does not string or stick to the dry finger touch, roll the base flashing into the adhesive and roll with steel roller to achieve positive bonding.
- H. Uncured EPDM flashing shall be installed and molded into all the corners, using splice adhesive on membrane, and bonding adhesive on wood and masonry.
- I. Clean the edges of completed SPM flashing laps and edges with an approved splice wash. Then apply the lap sealant along both edges of the SPM flashing. Feather.
- J. All vertical splice laps shall be covered with a 6" minimum cover strip of uncured EPDM, extend 3" horizontally on the flat.
- K. Fold SPM flashing into corners to create a "pig's ear" and eliminate excess material. Do not cut off membrane. Adhere "pig's ear" to SPM.
- L. Cover the vertical surfaces of end wall flashing with the uncured EPDM flashing. Apply SPM lap sealant to exposed edges of uncured EPDM flashing.
- M. Terminate top of flashing on masonry with 1/8" aluminum termination bar with manufactured approved expansion anchors at [6"] to top of termination bar [12"] on center.
 - a. Install water cut-off mastic between masonry and SPM, prior to installation of termination bar.
 - b. Cut EPDM flush to top of termination bar.
 - c. Install SPM lap sealant.
- N. Terminate vertical flashing ends on masonry with _" aluminum termination bar with mfr approved expansion anchors at 4 inches on center.
 - a. Install the water cut-off mastic between masonry and SPM prior to installation of the termination bar.
 - b. Cut EPDM flush to top of termination bar.

- c. Install SPM lap sealant to top of termination bar.
- O. The " thick aluminum termination bar must be installed atop base flashing on day base flashing is installed.
- P. Cover termination bar with metal counterflashing.

3.8 PIPE PENETRATIONS

- A. Flash pipe with premolded pipe flashings where installation is possible.
- B. Where the molded pipe flashings cannot be installed, use field fabricated flashing techniques using uncured EPDM.
- C. Verify that all pipe penetrations extend to a minimum of 8" above the finished surface of the roof.
- D. Apply lap sealant at all flashing edges.
- E. Provide water cut-off mastic between the pipe and molded pipe flashing.
- F. Install stainless steel clamping ring around pipe at top of premolded pipeflashing.
- G. Install SPM lap sealant at top pipe boot/field flashing.
- H. Premolded pipe boot:
 - a. When flashing must be cut to fit pipe penetration, and top of premolded boot is below 8" above SPM, pipe penetration is to be wrapped in uncured EPDM.
 - b. Top edge is to be a minimum of 8" above the SPM. Premolded pipe boot is then to be installed.
 - c. Wrap all gas vent pipe penetration with cured EPDM membrane following completion of field flashing.
- I. Field Flashings: Install Stainless Steel rain cap around pipe and over tip of field flashing.

3.9 ROOF DRAINS

- A. Insert base insulation and tapered insulation under drain extension ring. Twist extension ring tight into insulation.
- B. Originate tapered insulation at center of the drain. Cut high density wood fiber board insulation perpendicular to drain flange at the clamping ring.
- C. Seal between the membrane and drain flange with water cut-off mastic, as indicated in manufacturer's standard details.

3.10 BALLAST INSTALLATION

- A. Aggregate Ballast: Apply dry at 1,000 lb/square, evenly distributed.
- B. Evenly distribute aggregate cover.
- C. Do not install ballast until SPM is adhered and nailed to all perimeter wood blocking.
- D. Do not overload any roof section with large amount of stone.
- E. Protect EPDM under gravel hopper with 3/4" plywood on 1 1/2" rigid insulation.
- G. Place protection 8'-0" in front and back of hopper.

3.11 RUBBER WALKWAY PADS

3.12 REPAIR AND CLEANING

- A. Inspect Work, and correct identified defects and irregularities.
- B. In areas where finished surfaces are soiled by Work of this section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.
- C. Repair or replace defaced or disfigured finishes caused by Work of this section.

3.13 PROTECTION OF FINISHED WORK

- A. Protect building surfaces against damage from roofing work.
- B. Avoid heavy traffic on completed work. Where traffic must continue over finished roof membrane, protect surfaces.

END 07520.

DIVISION 7 - THERMAL AND MOISTURE PROTECTION
Section 07600 – Flashing and Sheet Metal

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Flashing and sheet metal including gravel stops, roof edge flashing, counter flashing, scuppers, sumps, and all required accessories, and fasteners for a complete and operational flashing system.

1.2 SUBMITTALS FOR REVIEW

- A. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- B. Product Data: Provide data on sheet metal material and prefabricated components.

1.6 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Warranty: Submit manufacturer's 20 year material warranty. Ensure forms have been completed in Owner's name and registered with manufacturer.
- B. Warranty: Submit contractor's two year workmanship warranty.

1.7 QUALITY ASSURANCE

- A. Sheet Metal Flashings: Conform to the following criteria of SMACNA "Architectural Sheet Metal Manual."
- B. Gutter and Downspout Components: Conform to applicable building code for size and method of rain water discharge.
- C. Roofing Manufacturer Warranty: Conform to the roofing manufacturers recommendations in support of securing the roofing system warranty.

1.8 WARRANTY

- A. Sheet Metal Contractor shall issue a guarantee of workmanship to correct defective work occurring within a two year period after Date of Substantial Completion. Defective work includes, but is not limited to, failure of water-tightness or seals, and oil canning due to rupture, restricted expansion/contraction, or faulty workmanship.
- B. Material warranty from the sheet metal manufacturer for a period of 20 years against deterioration of color, chalking and film integrity.

PART 2 PRODUCTS

2.1 SHEET MATERIALS

- A. Roof edge: shall be 0.050" formed pre-finished aluminum. Extruded aluminum systems are required for Factory Mutual FM 1-90 rating, color as selected by Landmark from manufacturers standard colors.. Provide continuous cleat, and mitered corners of welded construction. Provide spillout scupper with perforated screen welded in place, and with 4" deep x 10" long spillout tray. One of the following equal manufacturers and products may be used:
- a. W.P. Hickman "Econosnap Roof Edging with spillout scupper". (www.wph.com)
 - b. Metal Era Roof Edge Systems, "Perma-Tite Fascia System 200 with spillout scupper type SSB, flat" (www.metalera.com)
 - c. Peterson Aluminim, Pac-clad, "Pac-1-Ply Gravel Stop with spillout scupper" (www.pac-clad.com)
 - d. Additional approved equal products shall be considered...
- B Metal flashing: Metal Flashings shall be of .040" aluminum for up to 8" wide and .050" for greater than 8" wide, and .063" for greater than 12" wide, pre-finished aluminum, color as selected by Landmark from manufacturers standard colors. All fasteners locations shall have pre-drilled holes.

2.2 ACCESSORIES

- A. Fasteners: Same material and finish as flashing metal with soft neoprene washers.
- B. Protective Backing Paint: FS TT-C-494, Bituminous.
- C. Sealant: Polyurethane type. One of the following equal manufacturers and products may be used:
- a. Tremco: Dymeric
 - b. Sonnoborn: NPI.
 - c. Additional approved equal products shall be considered...
- D. Plastic Cement: ASTM D4586, Type I.
- E. 1/8" x 1" Stainless Steel bar stock.
- F. Reglets: Surface mounted type when out of view, and recessed type when in view, galvanized steel; face and ends covered with plastic tape

2.3 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Fabricate continuous cleats of same materials as coping minimum 3 inches wide, interlocking with sheet a min. of 1/2".
 - a. Drill pilot holes at 4" o.c. for attachment to wood.
 - b. Drill pilot holes at 6" o.c. for attachment to masonry or concrete.
- C. All fastener locations shall have predrilled pilot holes:
 - a. Nails - 1/4" diameter @ 4" o.c.
 - b. Screw Fasteners - 5/16" diameter @ 1'-0" o.c.
- D. Form pieces in longest possible lengths.
- E. Hem exposed edges on underside 1/2"; miter and seam corners.
- F. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- G. Fabricate vertical faces with bottom edge formed outward 1/2" and hemmed to form drip.
- H. Fabricate flashings to allow toe to extend 2" over roofing gravel. Return and brake edges.
- I. Seal metal joints.

2.4 FACTORY FINISHING

- A. Finish: Primed and finished on one side with a fluoropolymer coating 1.0 +/- 0.1 mil total dry film thickness. A wash coat, having dry film thickness of 0.3 / 0.4 mil shall be applied to the unfinished side of the sheet metal. Re-finishing at the welds shall be with Valspar Air Dry Kynar Spray, or approved equal system. Color as selected by Landmark from manufacturers standard colors.
- B. All metal materials to be delivered to the site with protective, strippable plastic film.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.
- C. Verify that surfaces to receive sheet metal are smooth and clean will not impinge upon the integrity of the sheet metal.

- D. Verify that all wood blocking to receive sheet metal is properly installed, anchored without warps and covered with EPDM.
- E. Do not start sheet metal work until conditions relevant to sheet metal work are acceptable. Commencing of work will indicate acceptance of condition.

3.2 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Install surface mounted reglets true to lines and levels. Seal top of reglets with sealant.
- C. Lay out joints to be symmetrical about the building corners. May require more than one run be cut down to attain symmetry.
- D. Paint dissimilar metals with bituminous paint to form a complete barrier.

3.3 INSTALLATION

- A. Secure flashings in place using concealed fasteners.
- B. Apply plastic cement compound between metal flashings and felt flashings.
- C. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles. Install work watertight, without buckles, warps, fastening stresses or distortion. Allow for expansion and contraction.
- D. Extreme care should be taken by Sheet Metal Contractor not to puncture the roofing membrane with metal. All metal trimmings shall be placed in an on-roof-top container.
- E. Verify height of aluminum roof base flashing termination bar allows for installation of counterflashing and sealant below weep holes and throughwall flashing.
- F. Continuous Cleats:
 - a. Set in water cut-off mastic supplied by the Roofing Contractor or sealant.
 - b. Secure to the surface with nail fasteners through 1/4" predrilled pilot holes at 4" on center.

3.4 INSTALLATION – ROOF EDGE

- A. Set continuous cleat in full bed of water cut-off mastic supplied by Roofing Contractor. Secure with nails at 4" on center through 1/4" pre-drilled pilot holes.
- B. Set the outside and inside corners. Secure with nails at 4" o.c. through 1/4" pre-drilled pilot holes.
- C. Lay out fascia joints symmetrical about corners. May require multiple cutting to achieve lengths of 10'-0".

- D. Install backer plates at joint locations in full bed of water cut-off mastic supplied by Roofing Contractor. Nail through pre-drilled pilot holes. Install bond breaker tape down the center, as indicated on drawings.
- E. Apply continuous sealant to backer plate vertical and horizontal surfaces as indicated in drawings.
- F. Apply continuous sealant to top of backer plate.
- G. Running joints at $\pm 10'-0"$, except where the cut pieces are required for symmetry between the existing corners.
- H. Secure fascia to continuous cleat and nail at 4" o.c. through $\frac{1}{4}"$ pre-drilled pilot holes.
- I. Install cover plates as detailed.

3.5 INSTALLATION - COUNTERFLASHING

- A. Overlap the base flashing a minimum of 3".
- B. Install continuous butyl caulk tape to vertical portion of the counterflashing.
- C. Secure to the masonry with 1 $\frac{1}{4}"$ x $\frac{3}{16}"$ tapcons with climaseal corrosion resistive coating and neoprene washers at 1'-0" on center through $\frac{5}{16}"$ pre-drilled pilot holes. Cover with sealant.
- D. Lap counterflashing pieces 3", provide bead of sealant and between pieces.
- E. Cover fastener heads with sealant after the Architect's approval.
- F. Fill sealant reservoir with sealant to shed water.
- G. Counterflashing Corner Pieces: Install pieces per requirements listed above.

3.6 INSTALLATION – END WALL FLASHING

- A. Set in full bed of water cut-off mastic.
- B. Secure with screw fasteners through $\frac{1}{4}"$ pre-drilled pilot holes as indicated on drawings.
- C. Coordinate installation with roofing contractor.
- D. Have the roofing contractor flash in vertical flange of end wall flashing.
- E. Install coping, or standing seam siding, over the end wall flashing by either:
 - a. Securing to vertical flange of end wall flashing and pulling coping over the wood blocking of the roof edge.
 - c. Securing to the continuous clip and laying against mansard.

3.7 INSTALLATION – THRU WALL FLASHING

- A. Coordinate with masonry contractor.
- B. Set backer plates.
- C. Set thru wall flashing atop masonry over EPDM flashing, lap 2" and set lopped pieces in sealant. Set in sealant over backer plate.
- D. Notch and remove portion of receiver so that horizontal flanges lap 3" and receivers butt. Set lap in sealant and pop rivet. Cover lap with ice and water shield.
- E. At corners, lap horizontal flanges in sealant and pop rivet.
- F. Following installation of tile coping piece, install counterflashing up into receiver.

3.8 INSTALLATION – SCUPPERS

- A. Fit scupper sections in place. Lock seams.
- B. Nail flanges over wood blocking.
- C. Secure trim flanges utilizing tapcon screw fasteners with climaseal corrosion resistive coating and neoprene washers at 4" on center.
- D. Position the conductor box below, centered on scupper.
- E. Secure with tapcon screw fasteners utilizing climaseal corrosion resistive coating and neoprene washers through the back flange.
- F. Install aluminum bar clad with .032 aluminum prefinished steel, brass bracket supports set in sealant utilizing tapcon screw fasteners with climaseal corrosion resistive coating and neoprene washers.

3.9 CLEANING

- A. Leave material clean and free of stains.
- B. Remove all sheet metal debris from roof top daily.
- C. Remove all sheet metal debris from site daily.

END 07620.

DIVISION 7 - THERMAL AND MOISTURE PROTECTION
Section 07700 - Roof Specialties and Accessories

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Roof access hatches.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on unit construction, sizes, configuration, jointing methods and locations when applicable, and attachment method.

1.3 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate special installation criteria, interface with adjacent components.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable building code and UL and FM requirements as applicable to fire rated roof hatches, heat and smoke vents.

PART 2 PRODUCTS

2.1 ROOF HATCH

- A. Roof access hatches; shall be prefabricated hatch with release hardware as required by code, 30" by 96" as shown on drawings.
 - a. All hardware shall be zinc plated and chromate sealed and shall be manufacturer's standard hardware.
 - b. Scuttle shall be completely assembled with heavy pintle hinges, positive snap latch with turn handles and padlock hasps inside and outside and a mechanically returned thermoplastic rubber gasket.
 - c. Operation shall not be effected by temperature.
 - d. Cover shall be equipped with an automatic hold open arm complete with red vinyl handle.
 - e. Provide roof hatch safety post.
 - f. One of the following equal manufacturers and products may be used:
 - i. Bilco, "Type L" (www.bilco.com) or equal by the following manufacturers
 - ii. Milcor, (www.milcorinc.com)

- iii. Additional approved equal products shall be considered.
- C. Roof curbs; shall be prefabricated aluminum, 11 gauge, mill finished, double wall insulated with a 1” rigid insulation, with integral cap flashing to receive roof flashings, and with extended flange for mounting. Curbs shall be a constant flat elevation at a minimum of 12” above roof membrane.

2.2 ALTERNATING TREAD STAIR

- A. Alternating stair shall be metal and shall be configured as indicated on the Drawings. Provide handrail extension mounted on underside of roof hatch. Prime finish in factor for field applied paint.
- B. One of the following equal manufacturers and products may be used:
 - a. Lapeyre Stair, 68° model (www.lapeyrestair.com)
 - b. Vestil Manufacturing Company, (www.vestilmafg.com)
 - c. Additional approved equal products shall be considered.

2.3 FABRICATION

- A. Fabricate components free of visual distortion or defects. Weld corners and joints.
- B. Provide for removal of condensation occurring within components or assembly.
- C. Fit components for weather tight assembly.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify conditions at the job site which affect this Work and obtain accurate dimensions in order to ensure proper fit and installation.
- B. Examine all surfaces to which this portion of the Work is applied or connected. Notify the Architect of any defects or unacceptable conditions which might adversely affect the work of this section. Starting of work implies acceptance of conditions.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Coordinate installation of the aluminum interior liner around and over the steel angles and roof deck prior to the installation of the roof hatch.
- C. Coordinate with installation of roofing system and related flashings for weather tight installation.
- D. Apply bituminous paint on surfaces of units in contact with cementitious materials or dissimilar

metals.

E. Adjust hinges for smooth operation.

F. Install safety post to interior ladder at roof hatch locations.

END 07700.

DIVISION 7 - THERMAL AND MOISTURE PROTECTION
Section 07810 - Sprayed-On Fireproofing

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Sprayed on fireproofing at metal deck, structural steel, and joists as indicated on the Drawings.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data indicating product characteristics, performance criteria, limitations of use, and rating requirements.

1.3 SUBMITTALS FOR INFORMATION

- A. Test Reports: Reports from reputable independent testing agencies for proposed products, indicating the following:
 - a. Bond Strength of Fireproofing: ASTM E736.
 - b. Bond Impact: ASTM E760.
 - c. Compressive Strength: ASTM E761.
 - d. Fire test reports of fireproofing application to substrate materials, including primers, similar to project conditions, conducted in conformance to ASTM E84 and ASTM E119.
- B. Manufacturer's Installation Instructions: Indicate special procedures, and conditions requiring special attention.
- C. Certificate of Compliance: Provide for fireproofing materials to authority having jurisdiction, if required, indicating approval for use on this project

1.4 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the work of this section, with minimum five continuous years of documented experience as an approved application of one of the specified.
- B. Owner Testing
 - a. Owner shall employ and pay for a qualified testing and inspection laboratory to perform fireproofing testing and on-site inspection services during the Work. Written reports of the inspections, observations, and testing shall be provided to Landmark within 48 hours of test and inspections. Landmark shall notify by phone or fax the same day if any failing test is determined.

- b. Contractor shall provide free access to the Work. Contractor shall notify the Owner's independent testing laboratory of scheduled Work. If Contractor fails to notify the Owner's independent testing laboratory, and as a result, no tests are taken, Contractor shall bear the cost of verifying that the in place fireproofing meets the requirements of these specifications.
- c. Testing of completed fireproofing shall take place in successive stages in each bay, 10,000 square feet of floor area, or total floor area, whichever produces the greatest number of test areas. Fireproofing of next area shall not proceed until test results for previous completed fireproofing show compliance with requirements.
- d. The testing agency shall randomly select one structural member of each type (primary beam, secondary beam, joist, truss, steel deck and column). And test fireproofing as follows:
 - i. For cohesion and adhesion per ASTM E736.
 - ii. For thickness per ASTM E605.
 - iii. Lower flanges and webs of beams, column webs, column flanges, and floor deck for density per ASTM E605 or Appendix A "Alternate Method for Density Determination" of AWCI Technical Manual 12-A.
- e. If testing paid for by the Owner discovers fire proofing not in compliance with requirements, all retesting to verify compliance, and all additional random testing in the area of non-compliance to determine extent of noncompliance, shall be paid for by the Contractor.

1.5 REGULATORY REQUIREMENTS

- A. Fire Rated Assemblies: Provide fire rated assembly rating conforming to the applicable building code. Refer to drawings for rating and assembly requirements.
- B. Provide sprayed on fireproofing which is identical in materials and construction to the system tested.
- C. Acceptable testing agencies include Underwriters Laboratories, Inc. and Warnock Hersey International, Inc.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Sprayed on Fireproofing shall not be installed when ambient or substrate temperatures are forty (40) degrees F. and falling unless temporary protection and heat is provided.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Isolatek International, "Blaze-Shield" (www.isolatek.com)
- B. Grace Construction Products, "Monokote" (www.na.graceconstruction.com)

- C. A/D Fire Protection Systems, “A/D Type 5GP” (www.adfire.com)
- D. Additional approved equal U.L. assembly products shall be considered.

2.2 FIREPROOFING

- A. Low Density Cementitious Type: Factory mixed, cementitious material blended for uniform texture with vermiculite or lightweight synthetic aggregate, and conforming to the following requirements:
 - a. Bond Strength: ASTM E736, 200 psi when set and dry.
 - b. Bond Impact: ASTM E760, no cracking, flaking or delamination.
 - c. Dry Density: ASTM E605, minimum average density of 14 lb/cu ft, with minimum individual density of any test sample of 13 lb/cu ft.
 - d. Compressive Strength: ASTM E761, minimum 7.0 psi.
 - e. Surface Burning Characteristics: Maximum flame spread of 0 and maximum smoke developed of 0, per ASTM E84.
- B. Materials shall be asbestos-free. One of the following equal manufacturers and products may be used:

2.3 ACCESSORIES

- A. Primer and Adhesive Coating: If required, of type recommended by fireproofing manufacturer.
- B. Water: Clean, potable.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive fireproofing.
- B. Verify that clips, hangers, supports, sleeves, and other items required to penetrate fireproofing are in place.
- C. Verify that ducts, piping, equipment, or other items that would interfere with application of fireproofing have not been installed.
- D. Verify that voids and cracks in substrate have been filled. Verify that projections have been removed where fireproofing will be exposed to view as a finish material.

3.2 PREPARATION

- A. Do not allow roof traffic during installation of roof fireproofing and drying period.

- B. Do not install on roof deck until roofing Work is completed.
- C. Perform tests as recommended by fireproofing manufacturer in situations where adhesion of fireproofing to substrate is in question.
- D. Remove incompatible materials that could affect bond by scraping, brushing, scrubbing, or sandblasting.
- E. Prepare substrates to receive fireproofing in strict accordance with instructions of fireproofing manufacturer.
- F. Apply fireproofing manufacturer's recommended bonding agent on primed steel.
- G. Protect surfaces not scheduled for fireproofing and equipment from damage by overspray, fall-out, and dusting.
- H. Close off and seal duct work in areas where fireproofing is being applied.

3.3 APPLICATION

- A. Install metal lath over structural members as indicated or as required by the fire rated assembly Design Numbers.
- B. Apply fireproofing and accessories in accordance with manufacturer's instructions.
- C. Apply fireproofing in sufficient thickness and density to achieve required ratings, with as many passes as necessary to cover with monolithic blanket of uniform density and texture.
- D. In areas where fireproofing has been disturbed because of installation of other building systems or other additional construction, fireproofing shall be reapplied in accordance with manufacturer's instructions. Patch the areas as required to conform with requirements of the system UL design.

3.4 CLEANING

- A. Remove excess material, overspray, droppings, and debris.
- B. Remove fireproofing from materials and surfaces not required to be fireproofed.

3.5 SCHEDULE

- A. Spray on Fireproofing shall be provided as noted on the Drawings.

END 07810.

DIVISION 7 - THERMAL AND MOISTURE PROTECTION
Section 07840 – Penetration Seals

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Firestopping, fire safing insulation, smoke seal, and accessories to maintain the designated fire resistance rating of the floor, wall, or roof assembly.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on product characteristics, performance, limitation criteria, and test results.
- B. System Description: Provide a complete UL approved system identification and description for each application of penetration seals.

1.3 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.

1.4 QUALITY ASSURANCE

- A. Applicator: Company specializing in performing the work of this section with minimum three (3) years documented experience.
- B. Firestopping material shall be asbestos free.

1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable building code, and UL listing for fire resistance ratings and surface burning characteristics.
- B. Fire Rated Assemblies: Refer to the Drawings for rating and assembly requirements. Provide penetration seals of fire rating equal to that of the construction within the actual depth and thickness of the construction.
- C. Provide penetration seal which is identical in materials and construction to the system tested. Acceptable testing agencies include Underwriters Laboratories, Inc. and Warnock Hersey International, Inc.
- C. Firestopping material; shall comply with applicable building codes and shall have been tested in accordance with UL 1479 or ASTM E 814.
- D. Spandrel / curtain wall edge of slab firestopping material shall comply with applicable building codes and shall have been tested in accordance with Underwriters Laboratories (UL) designated systems.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when temperature of substrate material and ambient air is below 40 degrees F. Maintain a minimum of 40 degrees F. temperature of substrate for 24 hours before, during and 24 hours after application of firestopping materials.
- B. Provide ventilation in areas to receive solvent cured materials, and as recommended by manufacturer.

PART 2 FIRESTOPPING PRODUCTS

2.1 MANUFACTURERS

- A. Dow Corning
- B. 3M
- C. Bio Fireshield
- D. Additional approved equal manufacturers shall be considered.

2.2 PRODUCTS

A. <u>Metal pipe or conduits through round opening:</u>	<u>Dow Corning</u>	<u>3M</u>	<u>Bio</u> <u>Fireshield</u>
	C-BJ-1001	C-AJ-1001	W-L-0001
	C-BJ-1005	C-AJ-1007	W-L-1012
	C-AJ-1009	C-AJ-1013	C-AJ-1031
	C-AJ-1010	C-AJ-1014	C-AJ-0033
	C-AJ-1012	C-AJ-1015	
B. <u>Insulated metal pipe through round opening:</u>	<u>Dow Corning</u>	<u>3M</u>	<u>Bio</u> <u>Fireshield</u>
		C-AJ-5001	C-AJ-5006
		F-A-1002	
C. <u>Metal pipes or conduit through large opening:</u>	<u>Dow Corning</u>	<u>3M</u>	<u>Bio</u> <u>Fireshield</u>
	W-J-1003	C-AJ-1006	W-L-0001
	C-BJ-1002	F-A-1001	W-L-1012
			C-AJ-1031
			C-AJ-0033
D. <u>Busway through rectangular opening:</u>	<u>Dow Corning</u>	<u>3M</u>	<u>Bio</u> <u>Fireshield</u>
		F-A-6001	
		C-AJ-6001	
E. <u>Cables through opening:</u>	<u>Dow Corning</u>	<u>3M</u>	<u>Bio</u> <u>Fireshield</u>
	W-J-3003	C-AJ-3001	

	W-J-3004	C-AJ-3002	C-BJ-3004
	C-BJ-3001	F-B-3002	C-BJ-3005
	C-AJ-3007		C-BJ-3006
	C-AJ-8002		W-L-3011
			C-AJ-3024
F. <u>Metal pipe or conduit and cables through large opening:</u>	<u>Dow Corning</u>	<u>3M</u>	<u>Bio</u>
	C-BJ-1003	C-BJ-1015	<u>Fireshield</u>
	C-BJ-1004		C-BJ-3004
	C-AJ-8003		C-BJ-3005
	C-AJ-8004		
G. <u>Cable tray:</u>	<u>Dow Corning</u>	<u>3M</u>	<u>Bio</u>
	C-BJ-4001	C-BJ-4011	<u>Fireshield</u>
	C-BJ-4002	C-AJ-4003	W-K-4002
	C-BJ-4003	F-B-4002	W-K-4003
	C-BJ-4004		C-BJ-4006
	C-BJ-4005		C-BJ-4007
			C-AJ-4010
H. <u>Glass pipe through opening:</u>	<u>Dow Corning</u>	<u>3M</u>	<u>Bio</u>
		C-AJ-2006	<u>Fireshield</u>
			C-AJ-0033
I. <u>Blank opening:</u>	<u>Dow Corning</u>	<u>3M</u>	<u>Bio</u>
	W-J-0001	C-AJ-0001	<u>Fireshield</u>
	C-BJ-0001	C-AJ-0002	C-AJ-0033
	C-BJ-0002	C-AJ-0004	
	C-AJ-0034		
J. <u>Non-metallic (plastic) pipe through opening:</u>	<u>Dow Corning</u>	<u>3M</u>	<u>Bio</u>
		C-AJ-2001	<u>Fireshield</u>
			Device per
			UL XHCR
K. <u>Metal pipe or conduit through gypsum board wall:</u>	<u>Dow Corning</u>	<u>3M</u>	<u>Bio</u>
		W-L-0001	<u>Fireshield</u>
		C-AJ-1031	
L. <u>Non-metallic (plastic) pipe through gypsum board wall:</u>	<u>Dow Corning</u>	<u>3M</u>	<u>Bio</u>
		W-L-2004	<u>Fireshield</u>
			Device per
			UL XHCR
M. <u>Cables through gypsum board:</u>	<u>Dow Corning</u>	<u>3M</u>	<u>Bio</u>
		W-L-3001	<u>Fireshield</u>
			W-L-3011

N. Insulated metal pipe:

Dow Corning 3M
W-L-1001

Bio
Fireshield
C-AJ-5006

2.3 FIRESTOPPING AND SMOKE SEAL AT EXTERIOR WALL AND FLOOR LINE

A. Spandrel Glass / Curtain Wall Firestopping At Floor Lines:

- a. Firesafing and smoke seal system at spandrel glass / curtain wall seal to floor lines shall be part of an overall system compliant with UL No. CW-D-2001, or approved equal system.
- b. Rigid Insulation for Spandrel Glass Locations with firestopping and smoke seal; shall be "???" thick mineral wool batt insulation faced on one side with aluminum foil / scrim vapor retarder, meeting the requirements of the UL number listed for the firestopping and smoke seal indicated on the Drawings.
- c. Vapor Retarder Tape; shall be pressure-sensitive tape of type recommended by insulation manufacturer for sealing joints and penetrations in vapor retarder facings.
- d. Adhesive for bonding insulation shall be a product that demonstrates capability to bond insulation securely to substrates indicated without damaging insulation and substrate.
- e. One of the following equal manufactures may be used:
 - i. Manufacturers indicated in the UL number listed for firestopping and smoke seal indicated on the Drawings.
 - ii. Additional approved equal manufacturers will be considered.
- f. Horizontal forming safing insulation shall be nominal 4 pcf density mineral wool batt insulation.
- g. Hat channel insulation support framing shall be provided in section 09250 – Gypsum Drywall Partitions and Ceilings.

B. Steel Stud Firestopping At Floor Lines:

- a. Firesafing and smoke seal system at steel stud to floor line shall be part of an overall system compliant with Omega Point Laboratories system CEJ 121P, or approved equal system by Underwriters Laboratories.
- b. Provide thermal attachment clips required to hold forming material in place.

C. Mineral Wool; One of the following equal manufacturers may be used:

- a. Thermafiber
- b. 3M Companies
- c. Additional approved equal manufacturers will be considered.

D. Fire and Smoke Seals; One of the following equal manufacturers may be used:

- a. Specified Technologies, “SpecSeal AS200 Elastomeric Spray”
- b. Additional approved equal manufacturers will be considered.

2.4 ACCESSORIES

- A. Primer: Type recommended by firestopping manufacturer for specific substrate surfaces.
- B. Dam Material: Mineral fiberboard, of fiber matting.
- C. Installation Accessories: Clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify openings are ready to receive the work of this section.

3.2 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter which may affect bond of firestopping material.
- B. Remove incompatible materials which may affect bond.
- C. Install damming materials to arrest liquid material leakage.

3.3 INSTALLATION

- A. Install material at walls or partition openings which contain penetrating sleeves, piping, ductwork, conduit and other items, requiring firestopping.
- B. Holes and voids made by penetrations in non-rated assemblies shall be sealed to ensure an effective smoke barrier.
- C. Where floor openings area 4” or more in width and subject to traffic or loading, install firestopping materials capable of supporting the same load as the floor.
- D. Apply primer and materials in accordance with manufacturer's instructions.
- E. Apply firestopping material in sufficient thickness to achieve rating.
- F. Compress fibered material to achieve a density of 40 percent of its uncompressed density.

3.4 FIRESTOPPING AND SMOKE SEAL INSTALLATION AT EXTERIOR WALL AND FLOOR LINES

- A. Install in accordance with manufacturer's instructions and in strict accordance with designated Testing Laboratory requirements.
- B. Clean substrates of substances harmful to insulation, including removing projections capable of puncturing foil face or of interfering with insulation attachment.
- C. Cut and fit tightly around obstructions and fill voids with insulation.
- D. Set foil (vapor retarder) faced units with vapor retarder on warm / interior side of construction, unless otherwise indicated on the Drawings.
- E. Tape joints and ruptures in foil face (vapor retarder) and seal each continuous area of insulation to surrounding construction with tape to ensure air tight installation.
- F. Attach insulation to hat channels per UL designated system.

3.5 CLEANING

- A. Clean adjacent surfaces of firestopping materials.
- B. Remove damming materials after curing if made of other than fire resistant materials.

3.6 PROTECTION OF FINISHED WORK

- A. Protect adjacent surfaces from damage by material installation.
- B. Protect Work from damage on surfaces subject to traffic.

END 07840

DIVISION 7 - THERMAL AND MOISTURE PROTECTION
Section 07900 – Caulk and Sealants

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Caulk, sealant, and backer rods for joints as indicated on the Drawings.
 - a. Seal around exterior frames and sills of all windows, storefront, curtain wall, doors, louvers, other openings in exterior walls, control and expansion joints and changes in material in exterior wall construction to prevent leakage and other locations indicated on the Drawings.
 - b. Caulk around interior frames, plumbing fixtures, casework, and other locations indicated on the Drawings.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.
- B. Manufacturers standard color charts for color selections.

1.3 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate special procedures, surface preparation, and perimeter conditions requiring special attention.

1.4 SUBMITTAL FOR PROJECT CLOSEOUT

- A. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

- A. All caulk and sealant shall be supplied by the same manufacturer, except for joints greater than 1" and for fire resistive joints.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.7 WARRANTY

- A. Defective Work occurring within a 10 year period after Date of Substantial Completion shall be corrected immediately.

- B. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, and / or watertight seal, and exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.1 EXTERIOR SEALANTS

- A. For joints between metal frames and masonry, cast-in-place or precast concrete, shall be silicone weatherproof sealant, one-part neutral-cure architectural sealant to form a durable, flexible silicone rubber seal. An equal product from one of the following manufacturers may be used:
 - a. Dow Corning, “790” (www.dowcorning.com)
 - b. Tremco Inc., “Spectrem 4” (www.tremcosealants.com)
 - c. GE “Silpruf”.
 - d. Additional approved equal products shall be considered.
- B. For joints in cast stone and other masonry to masonry, or masonry to cast-in-place or precast concrete, shall be one-part neutral-cure architectural sealant to form a durable, flexible silicone rubber seal. An equal product from one of the following manufacturers may be used:
 - a. Dow Corning, “790” (www.dowcorning.com)
 - b. Tremco Inc., “Spectrem 4” (www.tremcosealants.com)
 - c. GE “Silpruf”.
 - d. Additional approved equal products shall be considered.
- C. For joints where wood or materials other than metal abut or join masonry, cast-in-place or precast concrete, shall be one-part neutral-cure architectural sealant to form a durable, flexible silicone rubber seal. An equal product from one of the following manufacturers may be used:
 - a. Dow Corning, “790” (www.dowcorning.com)
 - b. Tremco Inc., “Spectrem 4” (www.tremcosealants.com)
 - c. GE “Silpruf”.
 - d. Additional approved equal products shall be considered.
- D. For joints at brick shelf angles shall be silicone weatherproof sealant, one-part neutral-cure architectural sealant to form a durable, flexible silicone rubber seal. An equal product from one of the following manufacturers may be used:
 - a. Dow Corning, “790” (www.dowcorning.com)

- b. Tremco Inc., “Spectrem 4” (www.tremcosealants.com)
 - c. GE “Silpruf”.
 - d. Additional approved equal products shall be considered.
- E. For cross joints in flashings and sheet metal, shall be silicone weatherproof sealant, one-part neutral-cure architectural sealant to form a durable, flexible silicone rubber seal. An equal product from one of the following manufacturers may be used:
- a. Dow Corning, “790” (www.dow.com)
 - b. Tremco Inc., “Spectrem 4” (www.tremcosealants.com)
 - c. GE “Silpruf”.
 - d. Additional approved equal products shall be considered.
- F. For expansion joints in concrete sidewalks adjacent to buildings and other structures, shall be silicone self leveling weatherproof sealant, one-part neutral-cure architectural sealant to form a durable, flexible silicone rubber seal. An equal product from one of the following manufacturers may be used:
- a. Dow Corning “890-SL”
 - b. Additional approved equal products shall be considered.
- G. For all EIFS joints, shall be silicone weatherproof sealant, one-part neutral-cure architectural sealant to form a durable, flexible silicone rubber seal. An equal product from one of the following manufacturers may be used:
- a. Dow Corning, “790” (www.dow.com)
 - b. Tremco Inc., “Spectrem 3” (www.tremcosealants.com)
 - c. Additional approved equal products shall be considered.
- H. For exterior and interior expansion and control joints, shall be silicone weatherproof sealant, one-part neutral-cure architectural sealant to form a durable, flexible silicone rubber seal. An equal product from one of the following manufacturers may be used:
- a. Dow Corning, “790” (www.dow.com)
 - b. Tremco Inc., “Spectrem 1” (www.tremcosealants.com)
 - c. GE “Silpruf”.
 - d. Additional approved equal products shall be considered.
- I. For expansion joints between buildings greater than 1”:

- a. GE “Silpruf”.
 - b. Additional approved equal products shall be considered.
- K. Fire resistance Joints:
- a. Tremco Dymeric.
 - b. Additional approved equal products shall be considered.

2.2 INTERIOR CAULKS

- A. For hidden and exposed metal to metal joints and metal to gypsum board joints, shall be silicone weatherproof sealant, one-part neutral-cure architectural sealant to form a durable, flexible silicone rubber seal. An equal product from one of the following manufacturers may be used:
- a. Dow Corning, “791” (www.dowcorning.com)
 - b. Tremco Inc., “Spectrem 4” (www.tremcosealants.com)
 - c. GE “Silpruf”.
 - d. Additional approved equal products shall be considered.
- B. For exposed metal to metal or metal to gypsum board joints:
- a. Dow Corning, “891” (www.dowcorning.com)
 - b. Additional approved equal products shall be considered.
- C. For wet sanitary areas, joints shall be silicone weatherproof sealant, one-part neutral-cure architectural sealant to form a durable, flexible silicone rubber seal. An equal product from one of the following manufacturers may be used:
- a. Tremco Inc, “Tremsil 200” (www.tremcosealants.com)
 - b. Additional approved equal products shall be considered.
- C. For expansion and control joints:
- a. Dow Corning, “790”. (www.dowcorning.com)
 - b. Tremco Inc., “Spectrem 4” (www.tremcosealants.com)
 - c. GE, “Silpruf”
 - d. Additional approved equal products shall be considered.

2.3 ACCESSORIES

- A. Primer: Required, non-staining type, as recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Fillers; shall be compatible with sealant used. For elastomeric sealants, backer rod shall be extruded closed-cell polyethylene foam or polyethylene jacketed polyurethane foam, non-bleeding, non-staining, oversized to 30 – 50%. An equal product from one of the following manufacturers may be used:
 - a. Contech Sonneborn Building Products, “Sonofoam backer rod”
 - b. Dow Corning, “Ethafoam”
 - c. W.R. Meadows Inc, “Backer Rod”
 - d. Additional approved equal products shall be considered.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate surfaces and joint openings are ready to receive work.

3.2 PREPARATION

- A. Remove loose materials and foreign matter which might impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Protect elements surrounding the work of this section from damage or disfiguration.

3.3 INSTALLATION

- A. Perform installation in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer [, except where specific dimensions are indicated].

- D. Prime joint surfaces to come in contact with sealants.
- E. Install bond breaker where joint backing is not used.
- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- H. Tool joints concave, unless noted otherwise on the Drawings.
- I. Precompressed Foam Sealant: Do not stretch; avoid joints except at corners, ends, and intersections; install with face 1/4" below adjoining surface.
- J. Compression Gaskets: Avoid joints except at ends, corners, and intersections; seal all joints with adhesive; install with face 1/4" below adjoining surface.

3.4 CLEANING

- A. Clean adjacent soiled surfaces.

3.5 PROTECTION OF FINISHED WORK

- A. Protect caulks and sealants until cured

END 07900.

DIVISION 8 - DOORS AND WINDOWS
Section 08100 – Hollow Metal Doors and Frames

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Work Includes: Stock hollow metal doors, frames, and accessories.
- B. Refer to specification section 13090 – X-Ray Radiation Protection for lead lined hollow metal frame requirements.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Indicate door configurations, location of cut-outs for hardware reinforcement.
- B. Shop Drawings: Indicate door and frame elevations, internal reinforcement, and cut-outs for glazing.

1.3 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate special installation instructions.

1.4 QUALITY ASSURANCE

- A. Conform to requirements of Steel Door Institute, “Recommended Specifications: Standard Steel Doors and Frames” (SDI-100) and ANSI A117.1
- B. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.5 REGULATORY REQUIREMENTS

- A. Fire Rated Door, Frame, and Panel Construction: Conform to ASTM E152, NFPA 252, and UL 10B.
- B. Provide doors and frames which are identical in materials and construction to the systems tested.
- C. Installed Door, Frame, and Panel Assembly: Conform to NFPA 80, and UL fire rated label for fire rated class as scheduled on the Drawings.

PART 2 PRODUCTS

2.1 DOORS

- A. Interior Hollow Metal Doors:

- a. Type SDI, Type II, unless noted otherwise on the Drawings
- b. Flush style, beveled front edge for proper swing.
- c. Doors shall be mortised and reinforced to receive hardware.
- d. Openings for lights shall be provided when shown on Drawings.

2.2 FRAMES

- A. Exterior Hollow Metal Door Frames or Door Frames in Masonry; shall be welded, cold-rolled 16 gauge, factory G-60 galvanized hollow metal with strike boxes.
- B. Shell and Core Interior Hollow Metal Door Frames; shall be drywall wrap-around type, welded, cold-rolled, factory primed, 18 gauge for openings to 4'-0"; 16 gauge for openings greater than 4'-0".
- C. Borrowed-Light Frames; shall be drywall wrap-around type, welded, cold-rolled, factory primed, 18 gauge.
- D. Special Procedure Room Hollow Metal Door Frames; such as surgical rooms, cardiac catheterization laboratories, CT Scan, and other rooms which require a sterile environment, shall be drywall wrap-around type, welded, cold-rolled, factory primed, 14 gauge with hospital stops at 45 degrees and capped.
- E. All Other Interior Hollow Metal Door Frames; shall be drywall wrap-around type, knock down, cold-rolled, factory primed, 18 gauge for openings to 4'-0"; 16 gauge for openings greater than 4'-0".

2.3 ACCESSORIES

- A. Glass: In accordance with Section 08800 – Glass and Glazing
- B. Primer: Zinc chromate type.

2.2 FABRICATION

- A. Fabricate doors with hardware reinforcement welded in place.
- B. Finish Hardware Preparation:
 - a. All frames shall be die cut and reinforced for 4-1/2" x 4-1/2" template hinges.
 - b. Hinge reinforcement shall be seven (7) gauge, 1-1/2" wide x 6" longer than the hinge secured by not less than six (6) spot welds.
 - c. Frames shall be reinforced for closers and all necessary hardware and shall be punched for 4-7/8" strike plate.

- d. Frames shall be drilled for 3 GJ-64 or Hager 307D silencers on single swing frames and 2 GJ_64 or Hager 307D silencers on heads of double swing frames, except for frames to receive weatherstripping.
- e. Frames shall be furnished with strike boxes.
- C. Attach fire rated label to each fire rated door unit.
- D. Configure exterior doors with special profile to receive recessed weatherstripping.
- E. Fabricate hollow metal units to be rigid, neat in appearance and free from defects, accurately formed to the required sizes and profiles.
- F. Wherever possible, fit and assemble units in the manufacturer's plant. Clearly identify work that cannot be factory assembled before shipment, to assure proper assembly at the project site.
- G. Weld and dress all welded joints on exposed surfaces flush and smooth, to be invisible when prime painted.
- H. Use of metallic filler to conceal manufacturing defects is not acceptable.
- I. Bevel front edge of all doors for proper swing.

2.3 FINISH

- A. Clean, treat, and prime paint all surfaces of fabricated hollow metal units in shop, including galvanized surfaces, whether concealed or exposed in the finished work. Cleaning process shall be compatible with prime paint and other requirements of products listed in Section 09900 Painting.
- B. Remove mill scale, rust, oil, grease, dirt and other foreign materials before application of the shop coat of paint.
- C. Apply shop coat of baked-on prime paint of even consistency to provide a uniform finished surface ready to receive field applied paint.
- D. Paint: In accordance with Section 09900 – Painting.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that opening sizes and tolerances are acceptable.

3.2 PREPARATION

- A. Coordinate frame installation with size, location, and installation of service utilities.
- B. Coordinate the work with door opening construction, door frame, and door hardware installation.

- C. Coordinate the throat dimension of the frame with the partition thickness.
- D. Sequence installation to ensure wire connections are achieved in an orderly and expeditious manner.

3.3 INSTALLATION

- A. Install doors and frames in accordance with SDI-100 and DHI.
- B. Coordinate installation of glass and glazing.
- C. Doors shall be installed with uniform 3/32" jamb and head margins and 1/8" sill clearance above the threshold.
- D. Provide three anchors per jamb, at hinge and strike levels, in masonry construction.
- F. Touch-up factory primer.

3.4 ERECTION TOLERANCES

- A. Maximum Diagonal Distortion: 1/16" measured with straight edge, corner to corner.
- B. Do not erect members which are observed to be warped, bowed, deformed, or otherwise damaged or defaced to such extent as to impair strength or appearance. Remove and replace members which have been damaged in the process of erection.

3.5 ADJUSTING

- A. Adjust door for smooth and balanced door movement.

END 08100.

DIVISION 8 - DOORS AND WINDOWS
Section 08220 – Plastic Laminate Doors

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Flush plastic laminate doors and accessories.
- B. Refer to specification section 13090 – X-Ray Radiation Protection for lead lined plastic laminate door requirements.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- B. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, blocking for hardware, plastic laminate selection, and cutouts for glazing.

1.3 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate special installation instructions.

1.4 QUALITY ASSURANCE

- A. Perform work in accordance with AWI Quality Standard Section 1300, Custom Grade.
- B. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- C. All interior plastic laminate doors shall be supplied by the same manufacturer.

1.5 SUBMITTAL FOR PROJECT CLOSEOUT

- A. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.6 REGULATORY REQUIREMENTS

- A. Fire Rated Door, Frame, and Panel Construction: Conform to ASTM E152, NFPA 252, UL 10B, and AWI type "FD" construction.
- B. Provide doors and frames which are identical in materials and construction to the systems tested.
- C. Installed Door, Frame, and Panel Assembly: Conform to NFPA 80, and UL fire rated label for fire rated class as scheduled on the Drawings.

1.7 WARRANTY

- A. Manufacturers standard warranty for not less than 2 year, guaranteeing the material and lamination of veneer, warping beyond installation tolerances, defective material and telegraphing core construction.
- B. Manufacturer's standard written lifetime warranty.

PART 2 PRODUCTS

2.1 PLASTIC LAMINATE DOORS

- A. General:
 - a. All flush door facing shall be high pressure decorative laminate general purpose Grade 50 (GP50 - .050" thick) complying with NEMA Standard LD-3.
 - b. Interior Doors shall be factory finished in color selected by Landmark. A maximum of two plastic laminate colors shall be used throughout the building.
- B. Interior hinged plastic laminate doors; shall be
 - a. Flush, 1-3/4" particleboard core meeting or exceeding ANSI A208.1 for I-LD-2 door core and conforming to AWI type "PC" construction.
 - b. Stiles and rails shall be bonded to the core. Provide UL labeling for 20, 45, and 60 minute fire rated applications.
- C. Interior sliding, bi-fold and pocket doors;
 - a. Flush, 1-3/8" hollow core.

2.2 FINISHES

- A. PLD-1: One of the following approved manufacturers and products may be used:
 - a. Formica or equal, color as selected by the Architect from the full range of manufacturers standards.
 - b. Additional approved equal manufacturers and products shall be considered.

2.3 ACCESSORIES

- A. Glazing Stops: Plastic Laminate of same color and pattern as door facing, with metal clips for rated doors, rolled steel channel shape with mitered corners, prepared for countersink style tamper proof screws.
- B. Glass: In accordance with Section 08800 – Glass and Glazing

2.4 FABRICATION

- A. Provide lock blocks at lock edge, and top of door for closer for hardware reinforcement.
- B. Vertical Exposed Edge of Stiles: Of same plastic laminate color as facing.
- C. Fit door edge trim to edge of stiles after applying veneer facing.
- D. Bond edge banding to cores.
- E. Factory machine doors for finish hardware in accordance with hardware requirements and dimensions. Do not machine for surface hardware. Provide solid blocking for through bolted hardware.
- F. Factory fit doors for frame opening dimensions identified on Shop Drawings.
- G. Provide edge clearances in accordance with AWI 1600.
- H. Smoke tight and fire rated doors shall be fabricated to close the opening with the minimum clearance necessary for operation and as required to meet the code requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that opening sizes and tolerances are acceptable.
- B. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.2 PREPARATION

- A. Coordinate the work with door opening construction, door frame and door hardware installation.

3.3 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions.
- B. Install fire rated doors in accordance with AWI Quality Standard, and NFPA and building code requirements.
- C. Door Clearances:
 - a. Allow 1/8" clearance between door and frame at head and jambs, and undercut 1/2" from concrete floors to provide clearance of resilient tile, carpet, and ceramic floor finish.
 - b. Extent of undercut at other floor finishes shall be verified with Contractor.
 - c. Trim non-rated door width by cutting equally on both jamb edges.

- d. Trim door height by cutting bottom edges to a maximum of 3/4". Trim fire door height at bottom edge only, in accordance with fire rating requirements.
- D. Machine cut for hardware and lights.
- E. Coordinate installation of glass and glazing.

3.4 INSTALLATION TOLERANCES

- A. Conform to AWI requirements for fit and clearance tolerances.
- B. Conform to AWI Section 1300 requirements for maximum diagonal distortion.

3.5 ADJUSTING

- A. Adjust door for smooth, balanced, and snug fit door movement without rattling.
- B. Adjust closer for full closure.

END 08220.

DIVISION 8 - DOORS AND WINDOWS
Section 08310 - Access Doors

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal access doors, fasteners and accessories for a complete installation.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
- B. Shop Drawings: Indicate exact position of all access door units.

1.3 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate installation requirements, and rough-in dimensions.

1.4 REGULATORY REQUIREMENTS

- A. Provide fire rated access doors in walls and ceilings which carry a fire rating, as indicated on the Drawings.
- B. Fire Rated Access Door Construction: Conform to ASTM E152, NFPA 252, and UL 10B.
- C. Provide doors and frames which are identical in materials and construction to the systems tested.
- D. Installed Door, Frame, and Panel Assembly: Conform to NFPA 80, and UL fire rated label for fire rated class as scheduled on the Drawings.

PART 2 PRODUCTS

2.1 WALL AND CEILING UNITS

- A. Wall and Ceiling Metal Access Doors: Shall be provided in all drywall ceilings, soffits or partitions that do not require a fire rating, and shall be one of the following approved manufacturers and products:
 - a. Milcor Incorporated, "DW" (www.milcorinc.com)
 - b. J.L. Industries, "Model WB" (www.jlindustries.com)
 - c. Karp Associates, "Model KDW" (www.karpinc.com)

- d. Additional equal manufacturers and products may be considered.
- B. Fire Rated Wall and Ceiling Metal Access Doors: Shall be provided in fire-rated ceilings, soffits, or partitions, and shall bear a UL rating conforming to the rating requirements of the wall or Soffit as indicated on the Drawings. One of the following approved manufacturers and products may be used:
 - a. Milcor Incorporated, “URF” (www.milcorinc.com)
 - b. J.L. Industries, “Model FDWB” (www.jlindustries.com)
 - c. Karp Associates, “DRP 450FR” (www.karpinc.com)
 - d. Additional equal manufacturers and products may be considered

2.2 FABRICATION

- A. Access Doors; shall be flush panel style, with concealed hinges, factor primed painted with cylinder locks all keyed alike.
 - a. Access doors shall be provided with a flange that will accept drywall compound for a concealed frame appearance.
 - b. Provide two keys per lock.
- B. Weld, fill, and grind joints to ensure flush and square unit.
- C. Hardware:
 - a. Hinge: 175 degree steel piano hinge with removable pin concealed constant force closure spring type.
 - b. Lock: Screw driver slot for quarter turn cam lock

2.3 FINISHES

- A. Base Metal Protection: Prime coat units with baked on primer.
- B. Finish: In accordance with Section 09900 – Paint.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that rough openings for door and frame are correctly sized and located.

3.2 PREPARATION

- A. Coordinate the work with all other work requiring access doors.
- B. Access doors shall be provided in gypsum board, plaster, and EIFS ceilings, soffits, and partitions where required to access fire or smoke dampers, plumbing shutoffs, equipment, and cleanouts. Refer to the Drawings for finish materials.

3.3 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in opening. Secure rigidly in place.
- C. Position unit to provide convenient access to concealed work requiring access.

END 08310.

DIVISION 8 - DOORS AND WINDOWS
Section 08410 - Aluminum Entrances and Storefronts

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Aluminum entrances and storefronts including all components, anchors, fasteners, for a complete and operational system.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide component dimension, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, and internal drainage details.
- B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work and expansion and contraction joint location and details.

1.3 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with AAMA SFM-1 and AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.
- B. Conform to requirements of ANSI A117.1.
- C. Installer: Company specializing in manufacturing aluminum glazing systems with minimum three years documented experience.
- D. Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State where the Project is located.
- E. Entrances and storefronts shall be supplied by the same manufacturer.
- F. Entrances and storefronts shall be supplied by the same manufacturer supplying aluminum windows.
- G. Coordinate installation to comply with fire rated safing and smoke seals requirements at floor line as required in section 07840 – Penetration Seals.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Do not install sealants when ambient temperature is less than 40 degrees F during and 48

hours after installation.

1.6 WARRANTY

- A. Warranty: Include coverage for complete system for any failure to meet specified requirements.
- B. Workmanship: Defective Work occurring within a five (5) year period after date of Substantial Completion shall be corrected immediately.
- C. Provide manufacturer written three (3) year guarantee for aluminum entrance doors.
- D. Provide manufacture written two (2) year guarantee for aluminum entrance and storefront system material. Include coverage for product failure and finish warranty.
- E. Provide manufacturer written ten (10) year guarantee for insulated glass.
- F. Glazing: Written five (5) year joint guarantee from the glazing contractor and general contractor for aluminum entrance and storefront including glazing water-tightness.

PART 2 PRODUCTS

2.1 STOREFRONT SYSTEM

- A. Aluminum Storefront with Un-Insulated Glazing: shall be installed on the interior of the building, and shall consist of 1 3/4" x 4 1/2" frame members and shall accept 1/4" or 3/8" infills. Front glass applications, with glazing on the inside of the building. One of the following approved manufacturers and products may be used:
 - a. Kawneer Company, Inc., "TrifabVG 450" (www.kawneer.com)
 - b. YKK, "45FI" (www.ykkap.com)
 - c. EFCO Corporation, "System 401" (www.efcocorp.com)
 - d. Vistawall Architectural Products, "FG 2000" (www.modu-line.com)
 - e. Tubelite, "450" (www.tubelite.net)
 - f. Additional equal manufacturers and products may be considered

2.2 ENTRANCE DOORS

- A. Aluminum Entrance Doors: shall be narrow stile entrance with 2 1/8" vertical stile, 2 1/4" top rail and 3 7/8" bottom rail. Door operation shall be single acting. Door frame widths and depths shall match adjacent store front. Door infill shall be 1" for the exterior building doors, and 1/4" for the interior building doors. Door shall meet ADA accessibility requirements. One of the following approved manufacturers and products may be used:
 - a. Kawneer Company, Inc., "190 Narrow Stile" (www.kawneer.com)

- b. YKK, “20D Narrow Stile (www.ykkap.com)
 - c. EFCO Corporation, “System D200 Narrow Stile” (www.efcocorp.com)
 - d. Vistawall Architectural Products, “212 Narrow Style” (www.modu-line.com)
 - e. Tubelite, “Modified Narrow Style” (www.tubelite.net)
 - f. Additional equal manufacturers and products may be considered
- B. Aluminum Entrance Door Components: The following component specification is based on the Kawneer Swing Entrance Door, “190 Narrow Stile”, to establish style and quality. All components shall be supplied by a single manufacturer. Equal components from one of the other approved manufacturers listed above shall be acceptable.
- a. Weather-stripping; shall be provided on exterior building doors and shall be equal to Sealair and EPDM blade gasket sweeps.
 - b. Sill Sweep Strips: Retracting resilient seal type, of neoprene compound.
 - c. Thresholds; shall be aluminum mill finished, complying with applicable handicapped codes. One of the following approved manufacturers and products may be used
 - i. Reese #S245A
 - ii. National Guard Products #325
 - iii. Hager #431SAL
 - d. Exterior Building Door hardware:
 - i. Kawneer top and bottom offset pivots.
 - ii. Kawneer Dor-o-matic 1990 concealed rod panic devices with cylinder.
 - iii. Kawneer Style CO-9 Pull.
 - iv. Kawneer Concealed SAM II (single acting manual) with Husky PN 37-624 overhead closers with adjustable closing and latching speeds and adjustable operating resistance (8 ½ pound pull maximum). Closers shall be provided without hold open feature.
 - e. Interior Vestibule Building Door Hardware:
 - i. Kawneer top and bottom offset pivots.
 - ii. Kawneer Style CO-9 Pull with CP-II Push Bar.
 - iii. Kawneer Concealed SAM II with Husky PN 37-621 overhead closers with adjustable closing and latching speeds and adjustable operating resistance (5-1/2 pound pull maximum). Closers shall be provided without hold open feature.

2.3 GLASS AND GLAZING MATERIALS

- A. Glass and Glazing Materials: As specified in Section 08800 – Glass and Glazing

- B. Glass shall be replaceable from the interior.
- C. Spandrel glass shall be replaceable from the exterior.
- D. Provide flush neoprene gaskets on both sides.

2.4 SEALANT MATERIALS

- A. Sealant Material: As specified in Section 07900 – Caulk and Sealants.

2.5 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Prepare components to receive anchor devices. Fabricate anchors.
- D. Arrange fasteners and attachments to conceal from view.
- E. Reinforce interior horizontal head rail to receive blind track brackets and attachments.
- F. Prepare components with internal reinforcement for door hardware and door operator hinge hardware.
- G. Reinforce framing members for imposed loads.
- H. Permit internal drainage weep holes and channels to migrate moisture to exterior.
- I. Provide internal drainage of glazing spaces to exterior through weep holes

2.6 FINISHES

- A. Aluminum Finish and Color; shall be factory applied polyvinylidene fluoride based with resin to contain a minimum of 50 percent PVDF at interior and 70 percent PVFD at exterior.
- B. Shop and Touch-Up Primer for Steel Components: SSPC Paint 25 red oxide.
- C. Apply one coat of bituminous paint to concealed aluminum and steel surfaces in contact with treated wood, cementitious, or dissimilar materials.
- C. Aluminum finish and color shall match aluminum windows and curtainwall, Valspar Fluoropan Classic II Zinc, unless otherwise noted.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify wall openings and adjoining air and vapor seal materials are ready to receive work of this Section.

3.2 PREPARATION

- A. Coordinate the work of the power door operator at the main entry doors including exterior door and interior vestibule door.

3.3 INSTALLATION

- A. Install water tight in accordance with ASTM E331, E1105, and E283.
- B. Install wall system in accordance with manufacturer's instructions and AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.
- C. Hidden dissimilar metals and cementitious materials shall be separated with bituminous paint, gaskets, nonabsorptive plastic or elastomeric tape or a suitable sealant to prevent corrosion.
- D. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- E. Provide alignment attachments and shims to permanently fasten system to building structure.
- F. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, and aligning with adjacent work.
- G. Provide thermal isolation where components penetrate or disrupt building insulation.
- H. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- I. Coordinate attachment and seal of perimeter air and vapor barrier materials.
- J. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- K. Set thresholds in bed of mastic and secure.
- L. Install hardware using templates provided. Refer to Section 08700 – Finished Hardware for installation requirements.
- M. Install glass and infill panels in accordance with Section 08800 – Glass and Glazing,
- N. Install perimeter sealant, backing materials, and installation criteria in accordance with Section 07900 – Caulk and Sealants.

3.4 ERECTION TOLERANCES

- A. Maximum Variation from Plumb: 1/16" every 3'-0", non-cumulative or 1/8" per 12'-0", 1/4" in any total length, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/16".
- C. Maximum out-of-plane offset of framing at corners shall not exceed 1/32".

3.5 ADJUSTING AND CLEANING

- A. Adjust operating hardware for smooth operation.
- B. Remove protective material from pre-finished aluminum surfaces.
- D. Exposed fasteners and unfinished metal shall be touched up to match the frame finish color.
- E. Clean all surfaces in accordance with manufactures recommendations.
 - a. If manufacturer does not provide recommendations, wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths.
 - b. Take care to remove dirt from corners.
 - c. Wipe surfaces clean.
- E. Remove excess sealant by method acceptable to sealant manufacturer.

3.7 PROTECTION OF FINISHED WORK

- A. Protect finished Work from damage.

END 08410.

DIVISION 8 - DOORS AND WINDOWS
Section 08460 – Automatic Sliding Entrance Doors

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Automatic sliding entrance doors, sidelights, fasteners and accessories for the main exterior and interior vestibule entries, for a complete installation.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
 - a. Include information on vision glass, door hardware, and perimeter sealant.
- B. Shop Drawings: Indicate exact position of all access door unit components.

1.3 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate installation requirements, and rough-in dimensions.

1.4 SUBMITTAL FOR PROJECT CLOSEOUT

- A. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.5 WARRANTY

- A. Warranty: Include coverage for complete system for any failure to meet specified requirements.
- B. Workmanship: Defective Work occurring within a five (5) year period after date of Substantial Completion shall be corrected immediately.
- C. Provide manufacturer written three (3) year guarantee for aluminum entrance doors.
- D. Provide manufacture written two (2) year guarantee for aluminum entrance and storefront system material. Include coverage for product failure and finish warranty.
- E. Provide manufacturer written ten (10) year guarantee for insulated glass.
- F. Glazing: Written five (5) year joint guarantee from the glazing contractor and general contractor for aluminum entrance and storefront including glazing watertightness.
- G. Correct defective Work within a five (5) year period after date of Substantial Completion.

PART 2 PRODUCTS

2.1 AUTOMATIC SLIDING ENTRANCE DOORS

- A. Sliding Automatic doors; shall be equal bi-parting door systems with two panel breakout, fixed side panels, concealed header operator, surface applied motion detectors, reduced width selector switch and with mill finish aluminum thresholds for exterior doors. Provide operator, motion detecting and presence sensors, signal regulating electronic controller. Control settings and power switch shall be a key style mechanism for authorized use only. Provide weatherstripping, glazing systems, hardware and a cylinder keyed lockset with interior thumb-turn. Doors shall be provided with panic hardware, and not the break away feature to eliminate unauthorized access and improve security. One of the following approved manufacturers and products may be used:
 - a. Besam, Inc, "Unislide" (www.besam.com)
 - b. Stanley, "Dura-Glide 2000" (www.stanleyaccesstechnologies.com)
 - c. Horton Automatic, a Division of Overhead Door Corp., "Profilor 2000" (www.hortondoors.com)
 - d. Nabco Entrances Inc., GyroTech, "GT1175 Whisper Slider" (www.nabcoentrances.com)
 - e. Additional equal manufacturers and products may be considered
- B. Glass and glazing; shall be as specified in Section 08800 – Glass and Glazing.
 - a. Use insulated glazing at exterior.
 - b. Use tempered non-insulated glass at interior doors.
- C. Sealant Materials; shall be as specified in Section 07900 – Caulk and Sealant.
- D. Hardware:
 - a. Thresholds; shall be either recessed or double beveled to comply with ADA and applicable handicapped codes.
 - b. Weatherstripping, sill sweep, hinges, push / pull handles, panic device, closer, and other hardware shall be manufacturers standard type suited for application, finish to match
 - c. Cylinder (thumb turn) lock shall be door manufacturers standard cylinder lockset.

2.2 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.

- C. Prepare components to receive anchor devices. Fabricate anchors.
- D. Arrange fasteners and attachments to conceal from view.
- E. Prepare components with internal reinforcement for door hardware and door operator hinge hardware.
- F. Reinforce framing members for imposed loads.

2.6 FINISHES

- A. Window Finish and Color; shall be factory applied polyvinylidene fluoride based with resin to contain a minimum of 50 percent PVDF and 70 percent PVFD at exterior.
- B. Shop and Touch-Up Primer for Steel Components: SSPC Paint 25 red oxide.
- C. Apply one coat of bituminous paint to concealed aluminum and steel surfaces in contact with treated wood, cementitious, or dissimilar materials.
- D. Aluminum finish and color shall match aluminum windows and curtainwall, Valspar Fluorpan Classic II Zinc, unless otherwise noted, unless noted otherwise.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that rough openings for door and frame are correctly sized and located.
- B. Verify wall openings and adjoining air and vapor barrier materials are ready to receive the Work of this section.

3.2 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in opening. Secure rigidly in place.
- C. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- D. Provide alignment attachments and shims to permanently fasten system to building structure.
- E. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances.
- F. Provide thermal isolation where components penetrate or disrupt building insulation.
- G. Install flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- H. Coordinate attachment and seal of perimeter air and vapor barrier materials.

- I. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- J. Set thresholds in bed of mastic and secure.
- K. Install hardware using templates provided.
- L. Install glass and infill panels in accordance with Section 08800.
- M. Install perimeter sealant and backing materials in accordance with Section 07900.

3.3 ERECTION TOLERANCES

- A. Maximum Variation from Plumb: 0.06" every 3 ft, non-cumulative or 1/16" per 10'-0", whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32".

3.4 ADJUSTING AND CLEANING

- A. Adjust operating hardware [and sash] for smooth operation.
- B. Remove protective material from pre-finished aluminum surfaces.
- C. Clean all surfaces in accordance with manufactures recommendations.
 - a. If manufacturer does not provide recommendations, wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths.
 - b. Take care to remove dirt from corners.
 - c. Wipe surfaces clean.
- D. Remove excess sealant by method acceptable to sealant manufacturer.

END 08460.

DIVISION 8 - DOORS AND WINDOWS
Section 08520 - Aluminum Windows

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Aluminum fixed windows including all components, anchors, fasteners, for a complete and operational system.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide component dimensions; describe components within assembly, anchorage and fasteners, glass and infill, door hardware, and internal drainage details.
- B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work and expansion and contraction joint location and details.

1.3 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with AAMA 101, AAMA SFM-1 and AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.
- B. Conform to requirements of ANSI A117.1.
- C. Installer: Company specializing in manufacturing aluminum glazing systems with minimum three years documented experience.
- D. Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State where the Project is located.
- E. Windows shall be supplied by the same manufacturer supplying entrances and storefronts.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Do not install sealants when ambient temperature is less than 40 degrees F during and 48 hours after installation.

1.6 WARRANTY

- A. Warranty: Include coverage to repair or replace as required, the complete system for any

failure to meet specified requirements.

- B. Workmanship: Defective Work occurring within a five (5) year period after date of Substantial Completion shall be corrected immediately.
- C. Provide manufacture written two (2) year guarantee for aluminum entrance and storefront system material. Include coverage for product failure and finish warranty.
- D. Provide manufacturer written ten (10) year guarantee for insulated glass.
- E. Glazing: Written five (5) year joint guarantee from the glazing contractor and general contractor for aluminum entrance and storefront including glazing water-tightness.
- F. Defective Work occurring within five (5) year period after date of Substantial Completion shall be corrected immediately.

PART 2 PRODUCTS

2.1 WINDOW SYSTEM

- A. Aluminum Windows: Window units shall be thermally broken for insulating glass. Framing members shall provide for flush neoprene glazing on both sides. Strip window installations (window openings greater than 10'-0") shall utilize "Screw-Spline" with head receptors and individual or short length installations (window openings less than 10'-0") shall utilize "Shear-Block". Front glass applications, with glazing on the inside of the building. One of the following approved manufacturers and products may be used:
 - a. Kawneer Company, Inc., "Trifab VG 451 T" (www.kawneer.com)
 - b. YKK, "YES 45 TU" (www.ykkap.com)
 - c. EFCO Corporation, "System 403 T" (www.efcocorp.com)
 - e. Vistawall Architectural Products, "FG 3000" (www.modu-line.com)
 - e. Additional equal manufacturers and products may be considered
- B. Aluminum Windows with Insulated Butt Glazing: Window units shall be thermally broken for insulating glass. Framing members shall provide for flush neoprene glazing on both sides for the head, sill and jamb. Strip window installations (window openings greater than 10'-0") shall utilize "Screw-Spline" with head receptors and individual or short length installations (window openings less than 10'-0") shall utilize "Shear-Block". Butt glazing application for all interior mullions, with glazing on the outside of the building. One of the following approved manufacturers and products may be used:
 - a. Kawneer Company, Inc., "Trifab VG 451 T" (www.kawneer.com)
 - b. EFCO Corporation, "System 403 T" (www.efcocorp.com)

- c. Vistawall Architectural Products, "FG 3000" (www.modu-line.com)
 - d. Additional equal manufacturers and products may be considered.
- C. Window Components: The following component specification is based on the Kawneer Trifab VG 451 T to establish style and quality. All components shall be supplied by a single manufacturer. Equal components from one of the other approved manufacturers listed above shall be acceptable.
- a. Aluminum Trim Accessories; for head and jamb closures and mullion covers shall be .062" thick and shall be factory pre-finished to match the window frame color.
 - b. Aluminum sill flashing; shall be factory pre-finished and match the window frame color unless otherwise shown on Drawings and shall be .050" thick for widths up to 4", .062" thick for widths greater than 4" but less than 7" and .090" thick for widths greater than 7".

2.2 GLASS AND GLAZING MATERIALS

- A. Glass and Glazing Materials: As specified in Section 08800 – Glass and Glazing
- B. Glass shall be replaceable from the interior.
- C. Spandrel glass shall be replaceable from the exterior.
- D. Provide flush neoprene gaskets on both sides.

2.3 SEALANT MATERIALS

- A. Sealant Material: As specified in Section 07900 – Caulk and Sealants.

2.4 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Prepare components to receive anchor devices. Fabricate anchors.
- D. Arrange fasteners and attachments to conceal from view.
- E. Reinforce interior horizontal head rail to receive blind track brackets and attachments.
- F. Reinforce framing members for imposed loads.
- G. Provide internal reinforcement in mullions to maintain rigidity.
- H. Permit internal drainage weep holes and channels to migrate moisture to exterior.

- I. Provide internal drainage of glazing spaces to exterior through weep holes

2.5 FINISHES

- A. Window Finish and Color; shall be factory applied polyvinylidene fluoride based with resin to contain a minimum of 50 percent PVDF and 70 percent PVFD at exterior.
- B. Shop and Touch-Up Primer for Steel Components: SSPC Paint 25 red oxide.
- C. Apply one coat of bituminous paint to concealed aluminum and steel surfaces in contact with treated wood, cementitious, or dissimilar materials.
- D. Aluminum finish and color shall match aluminum entrances and storefront and curtainwall, Valspar Fluropan Classic II Zinc, unless otherwise noted, unless noted otherwise.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify wall openings and adjoining air and vapor seal materials are ready to receive work of this Section.

3.2 INSTALLATION

- A. Install wall system in accordance with manufacturer's instructions and AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Hidden dissimilar metals and cementitious materials shall be separated with bituminous paint, gaskets, nonabsorptive plastic or elastomeric tape or a suitable sealant to prevent corrosion.
- D. Provide alignment attachments and shims to permanently fasten system to building structure.
- E. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- F. Provide thermal isolation where components penetrate or disrupt building insulation.
- G. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- H. Coordinate attachment and seal of perimeter air and vapor barrier materials.

- I Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- J. Install glass and infill panels in accordance with Section 08800 – Glass and Glazing,
- K. Install perimeter sealant, backing materials, and follow installation criteria in accordance with Section 07900 – Caulk and Sealants.

3.3 ERECTION TOLERANCES

- A. Maximum Variation from Plumb: 1/16” every 3’-0”, non-cumulative or 1/16” per 10’-0”, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32”.

3.4 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Clean all surfaces in accordance with manufactures recommendations.
 - a. If manufacturer does not provide recommendations, wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths.
 - b. Take care to remove dirt from corners.
 - c. Wipe surfaces clean.
- C. Remove excess sealant by method acceptable to sealant manufacturer.

3.5 PROTECTION OF FINISHED WORK

- A. Protect finished Work from damage.

END 08520.

DIVISION 8 - DOORS AND WINDOWS
Section 08600 –Aluminum Curtain Wall

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Aluminum curtain wall systems including all components, anchors, fasteners, for a complete and operational system.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, and internal drainage details.
- B. Design Data: Provide framing member structural and physical characteristics, and dimensional limitations.
- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, anticipated deflection under load, affected related Work, weep drainage network, expansion and contraction joint location and details, and field welding required.
 - a. Submit design calculations for the Curtain Wall support systems prepared by and stamped by a Professional Engineer registered in the State of the project.

1.3 SUBMITTAL FOR PROJECT CLOSEOUT

- A. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with AAMA SFM-1 and AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.
- B. Conform to requirements of ANSI A117.1.
- C. Installer: Company specializing in manufacturing aluminum glazing systems with minimum three years documented experience.
- D. Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the state where the Project is located.
- E. Coordinate installation to comply with fire rated safing and smoke seals requirements at floor line as required in section 07840 – Penetration Seals.

1.5 PERFORMANCE REQUIREMENTS

- A. System Design: Design and size components to withstand dead loads and live loads caused by positive and negative wind loads acting normal to plane of wall as calculated in accordance with the applicable building code, and as measured in accordance with AAMA Series No. 11 and ASTM E330.
 - a. Wind load testing shall be in accordance with ASTM E330.
 - b. No material failures or permanent deformation of structural members shall occur.
 - c. Structural test pressure shall be equal to 150 percent of the inward and outward acting design wind pressure.
 - d. Allowable stresses for all metal structural elements of the work shall conform to the minimum standard as published in the Aluminum Association “Aluminum Construction Manual – Specifications for Aluminum Structures”, dated April 1982.
 - e. Provide for special provisions for all corner glazed wall system mullions: Pressure acting on one face of the building with no pressure acting on the adjacent face or one-half the pressure as specified, acting on one face and one-half suction on adjacent face of the building, whichever is greater.
- B. Seismic Loads: Design and size components to withstand seismic loads and sway displacement as calculated in accordance with building code.
- C. Deflection: Limit mullion deflection to flexure limit of glass, with full recovery of glazing materials.
 - a. Deflection of framing members perpendicular to the plane of the wall shall not exceed $1/240$ of its clear span or $3/4$ ”, whichever is less.
 - b. Deflection of metal panels perpendicular to the plane of the wall shall not exceed $1/120$ of the span or $3/4$ ”, whichever is less. Deflection shall be measured relative to horizontal and vertical support members; use the lesser dimension to determine allowable deflection.
 - c. Deflection of members parallel to the plane of the wall, when carrying its full dead load, shall not exceed an amount that will reduce glass bite by less than 75 percent of the design dimension and shall not reduce edge clearance between itself and the panel, glass, or other fixed member immediately below to less than $1/8$ ”.
- D. System Assembly: Accommodate without damage to system, components or deterioration of seals, movement within system, movement between system and perimeter framing components, dynamic loading and release of loads, deflection of structural support framing, tolerance of supporting components, inter-story drift and a mid-span edge deflection of 1”.
- E. Air Infiltration: Limit air infiltration through assembly to 0.06 cfm per minute per square feet of wall area, measured at a reference differential pressure across assembly of 1.57 psf as measured in accordance with AAMA 501 and ASTM E283.

- F. Vapor Seal: Limit vapor seal with interior atmospheric pressure of 1" sp, 72 degrees F, 40 percent RH without seal failure.
- G. Expansion / Contraction: System to provide for expansion and contraction within system components caused by a cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental affect to system components.
- H. System Internal Drainage: Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network.
- I. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound. If a thermal-break construction is required, the glazed wall system shall have been tested in accordance with AAMA 1502.7 and certified by the manufacturer to provide a condensation resistance factor of at least forty five (45).
- J. Water Penetration: There shall be no uncontrolled water leakage through the curtain wall system, as defined in AAMA 501, when tested in accordance with ASTM E331 at a minimum static air pressure differential of 1.57 lb per square feet.
- K. Sound Transmission: The average sound transmission loss through the glazed wall system shall be a minimum of 30 db for the standard frequency range of 125 to 4000 Hz when tested in accordance with ASTM E90 with the glass type indicated.
- L. Window Washing Accessories: Reinforce curtain wall system to accommodate window washing guide rails. Provide anchors sufficiently rigid to resist loads caused by equipment platform, without damage to wall system.
- M. Not Permitted: Vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not install sealants when ambient temperature is less than 40 degrees F. during and 48 hours after installation.

1.7 WARRANTY

- A. Warranty: Include coverage to repair or replace as required, complete system for any failure to meet specified requirements.
- B. Workmanship: Defective Work occurring within a five (5) year period after date of Substantial Completion shall be corrected immediately.
- C. Provide manufacture written two (2) year guarantee for aluminum curtain wall system material. Include coverage for product failure and finish warranty.

- D. Provide manufacturer written ten (10) year guarantee for insulated glass.
- E. Glazing: Written five (5) year joint guarantee from the glazing contractor and general contractor for aluminum entrance and storefront including glazing water-tightness.

PART 2 PRODUCTS

2.1 CURTAIN WALL SYSTEM

- A. Aluminum Curtain Wall with Insulated Glazing: shall be manufacturer's stock system with the applied decorative feature adapted to the application indicated on the Drawings. Design in accordance with codes, and ACSE "Minimum Design Loads for Buildings and Other Structures". Completed system shall be water tight as defined in ASTM E 331; E 1105 and E 283. System shall consist of 2 1/8" x (as required) frame members and shall accept up to 1 1/8" infills. Front glass application with glazing from the inside. One of the following approved manufacturers and products may be used:
 - a. Kawneer Company, Inc., "2250" (www.kawneer.com) or equal by the following manufacturers:
 - b. YKK (www.ykkap.com)
 - c. EFCO Corporation (www.efcocorp.com)
 - d. Vistawall Architectural Products (www.modu-line.com)
 - e. Tubelite, "" (www.tubelite.net)
 - f. Additional equal manufacturers and products may be considered
- B. Aluminum Curtain Wall with Insulated Butt Glazing: shall be manufacturer's stock system adapted to the application indicated on the Drawings. Design in accordance with codes, and ACSE "Minimum Design Loads for Buildings and Other Structures". Completed system shall be water tight as defined in ASTM E 331; E 1105 and E 283. System shall consist of 2 1/8" x (as required) frame members and shall accept up to 1 1/8" infills. Butt glass application. One of the following approved manufacturers and products may be used:
 - a. Kawneer Company, Inc., "2250" (www.kawneer.com) or equal by the following manufacturers:
 - b. EFCO Corporation (www.efcocorp.com)
 - c. Vistawall Architectural Products (www.modu-line.com)
 - d. Tubelite, "" (www.tubelite.net)
 - e. Additional equal manufacturers and products may be considered

2.4 GLASS AND GLAZING MATERIALS

- A. Glass and Glazing Materials: As specified in Section 08800 – Glass and Glazing
- B. Glass shall be replaceable from the interior.
- C. Spandrel glass shall be replaceable from the exterior.
- D. Provide flush neoprene gaskets on both sides.

2.2 SEALANT MATERIALS

- A. Sealant Material: As specified in Section 07900 – Caulk and Sealants.

2.3 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Prepare components to receive anchor devices. Fabricate anchors.
- D. Arrange fasteners and attachments to conceal from view.
- E. Reinforce interior horizontal head rail to receive blind track brackets and attachments.
- F. Reinforce framing members for imposed loads.
- G. Provide internal reinforcement in mullions to maintain rigidity.
- H. Permit internal drainage weep holes and channels to migrate moisture to exterior.
- I. Provide internal drainage of glazing spaces to exterior through weep holes

2.7 FINISHES

- A. Window Finish and Color; shall be factory applied polyvinylidene fluoride based with resin to contain a minimum of 50 percent PVDF and 70 percent PVDF at exterior.
- B. Shop and Touch-Up Primer for Steel Components: SSPC Paint 25 red oxide.
- C. Apply one coat of bituminous paint to concealed aluminum and steel surfaces in contact with treated wood, cementitious, or dissimilar materials.
- D. Aluminum finish and color shall match aluminum entrances and storefront and windows, Valspar Fluopan Classic II Zinc, unless otherwise noted, unless noted otherwise.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify wall openings and adjoining air and vapor seal materials are ready to receive work of this Section.

3.2 INSTALLATION

- A. Install wall system in accordance with manufacturer's instructions and AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Hidden dissimilar metals and cementitious materials shall be separated with bituminous paint, gaskets, nonabsorptive plastic or elastomeric tape or a suitable sealant to prevent corrosion.
- D. Provide alignment attachments and shims to permanently fasten system to building structure.
- E. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances.
- F. Provide thermal isolation where components penetrate or disrupt building insulation.
- G. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- H. Coordinate attachment and seal of perimeter air and vapor barrier materials.
- I. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- J. Set thresholds in bed of mastic and secure.
- K. Coordinate installation of fire stop at each floor slab edge.
- L. Install glass and infill panels in accordance with Section 08800 – Glass and Glazing,
- M. Install perimeter sealant and backing materials in accordance with Section 07900 – Caulk and Sealants.

3.3 ERECTION TOLERANCES

- A. Maximum Variation from Plumb: 1/16" every 3'-0", non-cumulative or 1/8" per 12'-0", 1/4" in any total length, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/16".
- C. Maximum out-of-plane offset of framing at corners shall not exceed 1/32".

3.4 ADJUSTING AND CLEANING

- A. Adjust operating hardware for smooth operation.
- B. Remove protective material from pre-finished aluminum surfaces.
- E. Exposed fasteners and unfinished metal shall be touched up to match the frame finish color.
- F. Clean all surfaces in accordance with manufactures recommendations.
 - a. If manufacturer does not provide recommendations, wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths.
 - b. Take care to remove dirt from corners.
 - c. Wipe surfaces clean.
- E. Remove excess sealant by method acceptable to sealant manufacturer.

3.5 FIELD QUALITY CONTROL TESTS BY CONTRACTOR

- A. Testing Services: Testing and inspecting of representative areas of glazed aluminum curtain walls shall take place as installation proceeds to determine compliance of installed assemblies with specified requirements.
 - a. If retaining first two subparagraphs below, verify with qualified testing agencies that Project conditions will allow satisfactory static-pressure field testing for air infiltration and water penetration. Coordinate static-pressure field-test performance requirements with static-pressure laboratory-test performance requirements specified in Part 1.
 - b. ASTM E 783 requires using a static-air-pressure differential of 1.57 lbf/sq. ft. unless otherwise indicated, which is equivalent to a 25-mph wind. A static-air-pressure differential of 6.24 lbf/sq. ft. is equivalent to a 50-mph wind.
 - c. Air Infiltration: Areas shall be tested for air leakage of 1.5 times the rate specified for laboratory testing in "Performance Requirements" Article, but not more than 0.50 cfm/sq. ft. of fixed wall area when tested according to ASTM E 783 at a minimum static-air-pressure differential of 1.57 lbf/sq. ft.
- B. Test Area: One bay wide, but not less than 30 feet (9.1 m), by one story of glazed aluminum curtain wall.
 - a. Perform tests in each test area as directed by Architect. Perform at least three tests, prior to 10, 35, and 70 percent completion.
 - b. Water Penetration: Areas shall be tested according to ASTM E 1105 at a minimum [uniform] [and] [cyclic] static-air-pressure differential of [0.67 times the static-air-pressure differential specified for laboratory testing in "Performance Requirements" Article, but not less than 6.24 lbf/sq. ft. (300 Pa)] <Insert pressure>, and shall not evidence water penetration.

- c. Water Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
 - d. See Division 1 Section "Quality Requirements" for retesting and reinspecting requirements and Division 1 Section "Execution Requirements" for requirements for correcting the Work.
- C. Glazed aluminum curtain walls will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

3.6 PROTECTION OF FINISHED WORK

- A. Protect finished Work from damage.

END 08600.

DIVISION 8 - DOORS AND WINDOWS
Section 08700 - Finished Hardware

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Finish hardware including hinges, butts, pivots, locksets, latches, bolts, closers, and other miscellaneous hardware.

1.2 SUBMITTALS FOR REVIEW

- A. Shop Drawings:
 - a. Indicate locations and mounting heights of each type of hardware, schedules, catalog cuts, electrical characteristics and connection requirements.
 - b. Submit manufacturer's parts lists, and templates.
 - c. Submit riser diagrams and wiring diagrams for all electrical hardware items.

1.3 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.

1.4 SUBMITTALS AT PROJECT CLOSEOUT

- A. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
- B. Keys: Deliver with identifying tags to Landmark by security shipment direct from hardware supplier.
- C. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
- D. Maintenance Products:
 - a. Provide special wrenches and tools applicable to each different or special hardware component.
 - b. Provide maintenance tools and accessories supplied by hardware component manufacturer.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with the following requirements:

- a. AWI.
- b. BHMA A156 series.
- c. DHI - A115 series.
- d. DHI - WDHS.3.
- e. NFPA 80.
- f. NFPA 101.
- g. NFPA 252.
- h. UL 10B.
- i. Americans with Disabilities Act (ADA) 1990-28 CFR Part 36.
- j. Handicapped accessibility requirements adopted by the authority having jurisdiction.
- k. ANSI 117.1

1.6 REGULATORY REQUIREMENTS

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc., as suitable for the purpose specified and indicated.
- B. Listed and labeled hardware shall be provided for fire rated door openings complying with NFPA 80 and NFPA 101. Labeling shall satisfy requirements of code authorities having jurisdiction.
- C. Conform to applicable building code and ANSI A117.1 for requirements for the physically handicapped for provisions for the disabled.
- D. Conform with UL 10C and UB7-C positive pressure requirements.

1.7 DELIVERY, STORAGE, AND PROTECTION

- A. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

1.8 WARRANTY

- A. Provide minimum five year manufacturer warranty for door closers.
- B. Provide minimum ten year manufacturer warranty for cylinder locksets.
- C. Provide minimum five year manufacturer warranty for mortise locksets.

D. Provide minimum five year manufacturer warranty for exit devices

PART 2 PRODUCTS

2.1 MATERIAL

A. Hinges, Butts and Pivots: All 7'-0" high hinged doors, except for lead lined or special procedure room doors, shall be provided with one and one half pair 4 1/2" x 4 1/2" square cornered US 26D finish with stainless steel pins. One of the following approved manufacturers and products may be used:

	<u>Stanley #</u> www.stanleyhardware.com	<u>McKinney #</u> www.mckinneyhinge.com	<u>Hager #</u> www.hagerco.com
a. Hollow metal exterior doors up to 40" wide:	FBB-191-NRP	TB-2314-NRP	BB1191-NRP
b. Hollow metal exterior doors in excess of 40" wide (5" x 4 1/2" hinge):	FBB-199-NRP	T4B-3386-NRP	BB1199-NRP
c. Reverse handed locked interior doors:	FBB-179-NRP	TB-2714-NRP	BB1279-NRP
d. Ball bearing butts for interior doors doors greater than 36" and doors with closers:	FBB-179	B-2714	BB1279
e. Standard butts for all other doors not specified:	F-179	T-2714	BB1279

B. Pivot hinges for lead lined or special procedure room doors shall be US 26D as follows (lead-lined pivot hinges are only required where indicated in physics' report and where lead-lined doors do not have two sheets of lead under each skin of the door):

	<u>Rixson #</u>	<u>Dorma #</u>
a. Top and bottom:	L147	OP-2
b. Side jamb intermediate:	ML19	G-7415

C. Pivot hinges for toilet room emergency rescue assistance (double swing) doors shall be US 26D as follows :

	<u>Stanley #</u> www.stanleyhardware.com	<u>Rixson #</u>	<u>Dorma #</u>
a. Emergency rescue toilet room	Pivot DAP-3		
	Stop ES-1		

D. Locks, Latches and Bolts: Door hardware shall be lever design Institutional Grade #1, dull

chrome (US 26D) with standard (2-3/4") backset. Provide interchangeable cores. One of the following approved manufacturers and products may be used:

	<u>Corbin/ Russwin #</u>	<u>Sargent #</u>	<u>Schlage #</u>	<u>Best #</u>
	www.corbin-russwin.com	www.sargentlock.com	www.schlage.com	www.bestaccess.com

- | | | | | |
|---|----------|----------|-----------|-------------|
| a. Key locksets for suite entry | CL 3351 | 10G05-LL | D53PD-RHO | 93K-AB-15D |
| b. Key locksets (6 pin) (Classroom) | CL 3355 | 10G37-LL | D70PD-RHO | 93K-R-15D |
| c. Passages sets | CL 3310 | 10U15-LL | D10S-RHO | 93K-N-15D |
| d. Privacy sets | CL 3320 | 10U65-LL | D40S-RHO | 93K-L-15D |
| e. Half (single) dummy trim including strike and pressure latch mounted at the head of door and frame | CL3350 | 10U93-LL | D17O-RHO | 93K-1DT-15D |
| f. Key lockset for elevator equipment room and doors equipped with an electric strike | CL 3357 | 10GO4-LL | D80PD-RHO | 93K-D-15D |
| g. Lead lined hardware | ML2030 | 8265 | L9040 | 45H-L-15D |
| h. Strike, 4-7/8" with 1-1/4" lip | Standard | 808 | 10-025 | S3 |
| i. Hardware Usage (unless indicated otherwise on Drawings): | | | | |
| i. Locksets: Suite entry doors from public corridors, mechanical rooms, janitor closets and exterior metal doors. | | | | |
| ii. Privacy sets: Toilet rooms for individual occupancy, dark rooms, X-ray rooms, EKG rooms, waiting room doors into suite corridors, consultation and private offices. | | | | |
| iii. Passage sets: All other hinged wood doors except multiple occupancy toilet rooms and doors with panic devices. | | | | |
| iv. Full dummy trim: All pairs of closet doors. | | | | |

E. Electro-Mechanical Cylinder Lock, Latch and Bolt - Key Pad and Card Reader:

- a. Door hardware shall be lever design Institutional Grade, dull chrome (US 26D) with standard (2-3/4") backset. Door hardware on fire rated door shall provide code required

latch at all times.

- b. Provide interchangeable cores.
- c. Keypad and proximity reader operated product with minimum of 100 user codes. Locking, and unlocking, shall be done with motor-drive battery powered unit.
- d. Inside lever is always free for egress.
- e. Provide lever design which matches the rest of the building.
- f. Provide 25 HID Proximity Cards, and coordinate card reading capabilities with existing hospital cards.
- g. Insure existing hospital card system will work with these locks.
- h. One of the following approved manufacturers may be used:

Corbin/
Russwin # Sargent # Schlage # Best #
(www.corbin-russwin.com) (www.sargentlock.com) (www.schlagelock.com) (www.bestaccess.com)

- i. Product as required to meet specification listed above.

F. Exit Device Hardware: Concealed vertical rod applications

Corbin/
Russwin # Sargent # Von Duprin #
(www.corbin-russwin.com) (www.sargentlock.com) (www.vonduprin.com)

- a. Wood Door Panic Hardware:
Surface mounted vertical rods. 4000 Series 8400 Series 33A Series
- b. Hollow Metal Door Panic Hardware:
Surface mounted vertical rods. 5000 Series 80 Series 98 Series II
- c. Exit Device Usage: Use where required by the building code and as called out in the drawings.

G. Closers and Door Control Devices: shall be sized as required for door size, with adjustable closing and latching speeds, and operating resistance. Closers on doors required to be fire rated shall be listed for the opening requirements.

Norton # Corbin/
Russwin # Russwin # LCN #
(www.nortondoortcontrols.com) (www.russwin.com) (www.lcnclousers.com)

- a. Door Closers 8501 Series 6000 Series 4041 Series
- b. Closer Usage: Waiting room to public corridor, doors leading directly from suite corridors to public corridors, stair, exterior hollow metal entrance, public toilet, doors

separating corridors, and fire-rated doors. Closer arm adjustment must meet ADA requirements.

H. Other Hardware:

- a. Wall Mounted Door Stops: Shall be provided at all doors swinging against partitions. US 26D finish

<u>Ives #</u> www.iveshardware.com	<u>Hager #</u> www.hagerco.com	<u>Glynn Johnson #</u> www.glynn-johnson.com
WS407CVX	236W	60C

- b. Hard Surface Floor Mounted Door Stops: Shall be provided at doors without adjacent partition, mounted 1'-6" from the hinge edge of door swing into room, US 26D finish

<u>Ives #</u> www.iveshardware.com	<u>Hager #</u> www.hagerco.com	<u>Glen Johnson #</u> www.glynn-johnson.com
FS436	2411	FB14

- c. Carpet Floor Mounted Door Stops: Shall be provided at doors without adjacent partition, mounted 1'-6" from the hinge edge of door swing into room, US 26D finish

<u>Ives #</u> www.iveshardware.com	<u>Hager #</u> www.hagerco.com	<u>Glen Johnson #</u> www.glynn-johnson.com
FS438	241 F	FB14R

- d. Light and Sound Seal Gasket: Shall be provided at toilet room doors with emergency rescue hardware, dark room, elevator equipment room, compressor room, and audio room doors, and where noted on Drawings.

	<u>Reese #</u> www.reeseusa.com	<u>Pemko #</u>	<u>National Guard #</u> www.ngpinc.com
i. Door jambs and head:	33C	379	---
ii. Door bottom:	330C	4301	---
iii. 20 Min. Door Gasket (where required by code)	---	PF114ZPS	PF-180

- e. Door Silencers; shall be provided for all hollow metal door frames, except those scheduled to receive weatherstripping. Provide three (3) per side at typical doors, plus two (2) at the head of double doors.

	<u>Ives #</u> www.iveshardware.com	<u>Hager #</u> www.hagerco.com
i. Door Silencer	No.20	GJ-64

- f. Sweep and Weather-stripping; shall be aluminum mill finish, and provided at exterior hollow metal doors.

	<u>Reese #</u> www.reeseusa.com	<u>Pemko#</u>	<u>National Guard #</u> www.ngpinc.com
i. Sweep	323A	315	200NA
ii. Weatherstripping	815A	303PK	160SA

- g. Aluminum Thresholds; shall be aluminum mill finish, and provided at exterior hollow metal doors. Comply with ADA and applicable handicap codes.

	<u>Reese #</u> www.reeseusa.com	<u>Pemko #</u>	<u>National Guard #</u> www.ngpinc.com
i. At Carpet, Entrance Mat, or Hard Tile	S245A	229	325
ii. At Resilient Floor	S205A	170	425

- h. Sliding Door Hardware; shall be Stanley, "8900" (www.stanleyhardware.com)

- i. Adjustable floor guide; shall be Stanley, "121"
- ii. Bumper stops; shall be Stanley, "116"
- iii. Pulls; shall be Ives, "22B26D"

- i. Bi-folding Door Hardware; shall be Stanley heavy duty folding door hardware, "2900" (www.stanleyhardware.com)

- i. Hinges; shall be one and one half pair 3 1/2" x 3 1/2" hinges, US26D finish, Stanley "F117 or Hager "1279"
- ii. Pulls; shall be 1 1/2" Ives, "522B US26D finish with special length screws.

- j. Pocket Door Hardware; shall be Stanley, "40-3940" (www.stanleyhardware.com)

- i. Pulls; shall be 1 1/2" Ives, "522B US26D finish with special length screws.
- ii. Edge pull; shall be Ives, "230B26D".

- k. Astragals; shall be Reese, "92", (www.reeseusa.com) unless otherwise required by code.

- l. Door coordinator; shall be provided on pairs of doors with astragals, and without a center mullion, and shall be Ives, "Cor Series" (www.schlagelock.com) with USP and painted to match frame finish.

- m. Push / Pull Plates; Push plates shall be McKinney PO52 provided on toilet room doors with more than two fixtures, and shall be 15" x 3 1/2". Pulls shall be McKinney DP502 with 5 1/2" grip for the pull side, US26D finish.

2.2 KEYING

- A. Key Control Box: with a position for each lockset and 150% future expansion. Each pair of keys shall be individually tagged and placed in the box. One of the followings approved manufacturers and products may be used:
 - a. American Device Manufacturing Co., “K96” (www.americanmailbox.com)
 - b. Lund, “1204A”
- B. Two nickel silver keys stamped “Do Not Duplicate” for each lock shall be provided with keying requirements as follows:
 - a. Each suite shall be keyed differently from every other suite and all locks within any one suite will be keyed alike.
 - b. All building entrance doors to public areas shall be keyed alike and master keyed so that individual suite keys will open them.
 - c. All janitor closet and mechanical room locks shall be keyed alike, so that no individual suite key will open them.
 - d. All locks shall be grand mastered so that a grand master key opens all locks in the building.
 - e. Final keying to be determined by Landmark.
 - f. Provide temporary cores during construction.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that doors and frames are ready to receive work and dimensions are as indicated on Shop Drawings.
- B. Verify that electric power is available to power operated devices and is of the correct characteristics.

3.2 PREPARATION

- A. Coordinate the work with other directly affected sections involving manufacture or fabrication of internal reinforcement for door hardware and recessed items.
- B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.
- C. Coordinate Owner's keying requirements during the course of the Work.

3.3 INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions.
- B. Use templates provided by hardware item manufacturer.
- C. Unless otherwise noted on the Drawings, mounting heights for hardware from finished floor to center line of hardware item shall be as follows:
 - a. Locksets: Standard hollow metal door frame / door locations
 - b. Push/Pulls: 3'-10"
 - c. Dead Locks: 46" to meet ADA
 - d. Exit Devices: 40" or manufacturer's recommended location

3.3 ADJUSTING

- A. Adjust hardware for smooth operation.

3.4 PROTECTION OF FINISHED WORK

- A. Do not permit adjacent work to damage hardware or finish.

END 08700.

DIVISION 8 - DOORS AND WINDOWS
Section 08710 – Power Door Operators

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Power door operators.

1.2 SUBMITTALS FOR REVIEW

- A. Shop Drawings:
 - a. Indicate layout and dimensions; head, jamb, and sill conditions; elevations; components, anchorage, recesses, materials, and finishes, electrical characteristics and connection requirements.
 - b. Identify installation tolerances required, assembly conditions, routing of service lines and conduit, and locations of operating components and boxes.
- B. Product Data: Provide data on system components, sizes, features, and finishes.

1.3 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and manufacturer's hardware and component templates.

1.4 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Operation and Maintenance Data: Include manufacturer's parts list and maintenance instructions for each type of hardware and operating component.
- B. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable building code for automatic release of control drive unit to permit manual opening of doors.
- B. Conform to NFPA 101.
- C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc.
- D. Listed and labeled hardware shall be provided for fire rated and emergency exit door openings complying with NFPA 80.

1.6 WARRANTY

- A. Provide five (5) year manufacturer warranty for operating unit.

PART 2 PRODUCTS

2.1 POWER DOOR OPERATOR

- A. Electro-mechanical devices for door push, and manual push plate operation.
- B. The operator shall comply with ANSI A 156.19 for low energy (handicap assist) door operation.
- C. The operator shall be sized as recommended by the manufacturer for the door size, weight and movement, for condition of exposure, and for long-term maintenance free operation.
 - a. Operator control shall be the manufacturer's standard semi-flush wall mounted push plate for operation by touch of elbow by occupants.
 - b. Operator shall be fully adjustable for opening, closing, and checking speed, and for length of time door is to remain open.
- D. Door shall open manually, or with movement of three (3) degrees, it shall automatically open.
- E. One of the following approved manufacturers and products may be used:
 - a. LCN Closer / Dor-O-Matic, "Benchmark" (www.lcnclosers.com)
 - b. Stanley, "Magic Access Operator" (www.stanleyaccessstechnologies.com)
 - c. Additional equal manufacturers and products may be considered

2.2 PUSH PLATE CONTROL DEVICE

- A. Standard wall mounted, recessed momentary contact type.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces, openings, and recesses are ready to receive work and dimensions are as indicated on the Shop Drawings., and as instructed by the manufacturer.
- B. Verify that electric power is available and of the correct characteristics.

3.2 PREPARATION

- A. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

3.3 INSTALLATION

- A. Install equipment in accordance with manufacturer's instructions.
- B. Provide for thermal expansion and contraction of door and frame units and live and dead loads that may be transmitted to operating equipment.
- C. Provide for dimensional distortion of components during operation.
- D. Coordinate installation of components with related and adjacent work; level and plumb.

3.4 ADJUSTING

- A. Adjust door equipment for correct function and smooth operation.

3.5 CLEANING

- A. Remove temporary protection, clean exposed surfaces.

END 08710.

DIVISION 8 - DOORS AND WINDOWS
Section 08800 – Glass and Glazing

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Glazing materials and accessories.
- B. Refer to specification section 13090 – X-Ray Radiation Protection for lead barium glass requirements.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
- B. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.
- C. Samples: Submit two samples 1'-0" x 1'-0" minimum in size, exemplifying glass coloration and design.

1.3 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Warranty: Submit manufacturer's warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with FGMA "Glazing Manual", FGMA "Sealant Manual", SIGMA and Laminators Safety Glass Association "Standards Manual" for glazing installation methods.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.
- C. Quality Control Testing: Contractor shall perform one field water test on a major portion of the glazed wall or window system in a location determined by Landmark.
 - a. The test shall be conducted in accordance with AAMA 501.2-83 "Field Check of Metal Curtain Walls for Water Leakage."
 - b. Glazing failing the test shall be corrected or replaced, and necessitate an additional test in a location determined by Landmark to be conducted by Contractor.

1.5 REGULATORY REQUIREMENTS

- A. Fire Rated Windows: Conform to ASTM E152, NFPA 252, and UL 10B.
- B. Provide windows which are identical in materials and construction to the systems tested.
- C. Installed Window Assembly: Conform to NFPA 80, and UL fire rated label for fire rated class as scheduled on the Drawings.
 - a. Wire glass as tested per ASTM E163 and which is labeled and listed shall be provided in fire-rated openings to the rating noted on the Drawings.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not install glazing when ambient temperature is less than 50 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.7 WARRANTY

- A. Provide a minimum five 5 year warranty to include coverage for sealed glass units from seal failure, interpane dusting or misting, and replacement of same.
- B. Provide a minimum five 5 year warranty to include coverage for delamination of laminated glass and replacement of same.

PART 2 PRODUCTS

2.1 EXTERIOR AND VESTIBULE GLAZING MATERIALS

- A. Aluminum entrances, automatic sliding entrance doors, storefront, and storefront sidelights – Exterior of Building: shall be glazed with minimum 5/8” overall thickness insulated glass consisting of parallel glass sheets of 3/16” tempered glass with air space between panes, hermetically sealed at the periphery with a dual seal process, Class C, conforming to ASTM E774. Provide low emissivity radiant heat reflective coating on the interior side surface.
- B. Aluminum entrances, automatic sliding entrance doors, storefront, and storefront sidelights - Interior of Building: shall be glazed with minimum 1/4” tempered float glass conforming to ANSI 297.1 and 16 CFR 1201-I,II. Tinted glass to match window glazing for exterior aluminum entrances and store fronts shall be provided.
- C. Aluminum Windows and Curtain Wall Frames; shall be glazed with 1” overall thickness insulating glass consisting of parallel glass sheets of 3/16” float glass with air space between panes, hermetically sealed at the periphery with a dual seal process, Class C, conforming to ASTM E774. Provide low emissivity radiant heat reflective coating on an interior surface. Tempered float glass shall be provided where required by code.
 - a. Glass shall have a minimum U-value of 0.34 and a maximum shading coefficient of 0.48.
- D. Spandrel glass; shall be harmonious with window glazing tint. Spandrel glass shall be heat

treated glass, Condition B, Type I, Class I, Quality Q3, conforming to ASTM C1048, with fused opaque ceramic enamel coating, insulating glass with the tint on second surface and the ceramic coating on the fourth surface. Tempered float glass shall be provided where required by code.

a. Glass shall have a minimum U-value of 0.34 and a maximum shading coefficient of 0.48.

E. Window Glazing Tint; shall be solar bronze

2.2 INTERIOR GLAZING MATERIALS

- A. Rated Clear Glass; shall be Fire Lite, premium grade, as manufactured by Nippon Electric Glass Co. Ltd. Or approved equal.
- B. Non-rated interior glazing; for sidelights, windows where rated glass is not required, glass areas within 18" of floors, lights in doors or other hazardous locations shall be minimum 1/4" tempered float glass or laminated safety glass. Other interior glazing shall be 1/4" clear float glass.
- C. Reception by-pass window assemblies; for tenant reception desks, shall be glazed with 1/4" tempered float glass or laminated safety glass installed in mill finish aluminum teflon coated top and bottom tracks with cylinder locks and finger grips. Exposed glass edges shall be polished.

2.3 GLAZING COMPOUNDS

- A. Modified Oil: ASTM C669, non-hardening, knife grade consistency; Grey color.
- B. Butyl Sealant: ASTM C920, single Component; Shore A hardness of 10 to 20 black color; non-skinning.
- C. Acrylic Sealant: ASTM C920, Type S, Grade NS, single component, solvent curing, non-bleeding; cured Shore A hardness of 15 to 25 color as selected by Landmark.
- D. Polysulfide Sealant: ASTM C920, Type M, Grade NS, two component; chemical curing, non-sagging type; cured Shore A hardness of 15 to 25; color as selected by Landmark.
- E. Polyurethane Sealant: ASTM C920, Type S, Grade NS, single component, chemical curing, non-staining, non-bleeding, Shore A Hardness Range 20 to 35; color as selected by Landmark.
- G. Silicone Sealant: ASTM C920, Type S, Grade NS, single component; chemical curing; capable of water immersion without loss of properties; non-bleeding, non-staining, cured Shore A hardness of 15 to 25; color as selected by Landmark.

2.2 GLAZING ACCESSORIES

- A. Setting Blocks: ASTM C864 Neoprene, 80 to 90 Shore A durometer hardness, length of 0.1 inch for each square foot of glazing or minimum 4" x width of glazing rabbet space minus 1/16" x height to suit glazing method and pane weight and area.

- B. Spacer Shims: ASTM C864 Neoprene, 50 to 60 Shore A durometer hardness, minimum 3" long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.
- C. Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10 to 15 Shore A durometer hardness; coiled on release paper; black color.
- D. Glazing Gaskets: ASTM C864 Resilient polyvinyl chloride extruded shape to suit glazing channel retaining slot; black color.
- E. Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that openings for glazing are correctly sized and within tolerance.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.2 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant.
- D. Install sealant in accordance with manufacturer's instructions.

3.3 INSTALLATION - EXTERIOR DRY METHOD (TAPE AND GASKET SPLINE GLAZING)

- A. Cut glazing tape to length; install on glazing pane. Seal corners by butting tape and sealing junctions with butyl sealant.
- B. Place setting blocks at 1/4 points with edge block no more than 6" from corners.
- C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.
- D. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.
- E. Trim protruding tape edge.

3.4 INSTALLATION - EXTERIOR BUTT GLAZED METHOD (SEALANT ONLY)

- A. Temporarily brace glass in position for duration of glazing process. Mask edges of glass at

adjoining glass edges and between glass edges and framing members.

- B. Temporarily secure a small diameter non-adhering foamed rod on back side of joint.
- C. Apply sealant to open side of joint in continuous operation; thoroughly fill the joint without displacing the foam rod. Tool the sealant surface smooth to concave profile.
- D. Remove masking tape.

3.5 INSTALLATION - INTERIOR DRY METHOD (TAPE AND TAPE)

- A. Cut glazing tape to length and set against permanent stops, projecting 1/16" above sight line.
- B. Place setting blocks at 1/4 points with edge block no more than 6" from corners.
- C. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
- D. Place glazing tape on free perimeter of glazing in same manner described above.
- E. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- F. Knife trim protruding tape.

3.6 CLEANING

- A. Remove glazing materials from finish surfaces.
- B. Remove labels after Work is complete.
- C. Clean glass and adjacent surfaces.

3.7 PROTECTION OF FINISH WORK

- A. Do not permit adjacent work to damage glass and glazing systems.

END 08800.

DIVISION 9 - FINISHES
Section 09249 – Adjustable Partition Closure

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Manufactured metal closure with insulation

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on components, material, and finish.

PART 2 PRODUCTS

2.1 ADJUSTABLE PARTITION CLOSURE

- A. Partition closures shall be adjustable aluminum with finish to match the aluminum window. One of the following approved manufacturers and products may be used:
 - a. For 2" to 4 1/2" space, Gordon, Inc, Bossier City, LA., "Mullion/Mate I"
(www.gordongrid.com)
 - b. For 4 1/2" to 6 1/2" space, Gordon, Inc, Bossier City, LA. " Mullion/Mate II"
(www.gordongrid.com)
 - c. Additional approved equal products shall be considered.
- B. Acoustical sound batt insulations shall be provided at closures and shall provide an STC rating of 38.

PART 3 EXECUTION

3.1 ADJUSTABLE PARTITION CLOSURE

- A. Verify that surface conditions are ready to receive work.
- B. Install Work in accordance with manufacturer's instructions.
- C. Coordinate installation of components with related and adjacent work; level and plumb.

3.2 CLEANING

- A. Remove temporary protection, clean exposed surfaces.

END 09249.

DIVISION 9 - FINISHES
Section 09250 - Gypsum Drywall Partitions and Ceilings

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Gypsum drywall partitions, gypsum sheathing, smoke-stop partitions, fire walls, and ceilings including steel studs, steel furring, suspension systems, gypsum board, trim and accessories.
- B. Refer to specification section 13090 – X-Ray Radiation Protection for lead lined gypsum board requirements.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on metal framing, gypsum board, and joint tape.

1.3 SUBMITTAL FOR INFORMATION

- A. Drywall system manufacturer’s brochure including manufacturer’s recommendations for joint, embedding and finishing compounds.

1.4 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.
- B. Contractor shall design and engineer suspension system components, when required to satisfy code required seismic bracing and support, in accordance with applicable building code.
- C. All work shall comply with the Recommended Specification for the Application and Finishing of Gypsum Board published by the Gypsum Association.
- D. Finishing of gypsum board shall conform to ASTM C840.

1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable building code for fire rated assemblies.
- B. Provide fire rated gypsum drywall partitions and ceilings as indicated on the Drawings.
- C. Provide fire rated gypsum drywall partitions and ceilings which are identical in materials and construction to the systems tested.
- D. Partitions shall be permanently marked with 2” high stenciling on both sides of wall construction above ceilings with the words “Fire (or Smoke) Barrier of ---- Hour Rating – Do Not Penetrate.

- a. Stenciling shall be repeated every 20'-0" with a minimum of one in each room, unless otherwise required by code.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. A temperature of not less than fifty-five (55) degrees Fahrenheit shall be maintained in areas where joint treatment and compound finishing is being performed for a period twenty-four (24) hours prior to commencing treatment until joint and finishing compounds have dried.

PART 2 PRODUCTS

2.1 FRAMING MATERIALS

- A. Interior Steel Studs: Non load bearing framing systems shall be light gauge cold-formed metal framing consisting of minimum 20 and 25 gauge, 1 1/2", 2 1/2", 3 5/8", and 6" galvanized G-60 steel studs and runners, 24 gauge galvanized steel metal angles, and 8 gauge galvanized power driven screws, tie wires, and fasteners. One of the following approved manufacturers and products may be used:
 - a. Clark Steel Framing Systems, (www.clarksteel.com)
 - b. Dale Industries, (www..com)
 - c. Dietrich Metal Framing, (www.dietrichindustries.com)
 - d. Additional approved equal manufacturers shall be considered.
- B. Interior Steel Furring; for masonry or concrete walls, or for conceal structural components or electrical panels and boxes shall be 1 5/8" "C" or 1 1/2" "Z" type, minimum 25 gauge, galvanized G-60 furring channels. One of the following approved manufacturers and products may be used:
 - a. Clark Steel Framing Systems, (www.clarksteel.com)
 - b. Dale Industries, "1 1/2" DWC" (www.daleinc.com)
 - c. Dietrich Metal Framing, (www.dietrichindustries.com)
 - d. Additional approved equal manufacturers shall be considered.
- C. Shaft Wall Studs; shall be light gauge cold-formed metal framing consisting of minimum 20 and 25 gauge, 2 1/2", and 4" C-H galvanized G-60 steel studs and runners and power driven screws and fasteners. One of the following approved manufacturers may be used:
 - a. Clark Steel Framing Systems, (www.clarksteel.com)
 - b. Dale Industries, (www.daleincor.com)

- c. Dietrich Metal Framing, (www.dietrichindustries.com)
 - d. Additional approved equal manufacturers shall be considered.
- D. Interior Steel Studs for Lead Lined Walls: Non load bearing framing systems shall be light gauge cold-formed metal framing consisting of minimum 20 gauge, 3 5/8" galvanized G-60 steel studs and runners, 24 gauge galvanized steel metal angles, and 8 gauge galvanized power driven screws, tie wires, and fasteners. One of the following approved manufacturers and products may be used:
- a. Clark Steel Framing Systems, (www.clarksteel.com)
 - b. Dale Industries, (www..com)
 - c. Dietrich Metal Framing, (www.dietrichindustries.com)
 - d. Additional approved equal manufacturers shall be considered.
- E. Gypsum Board Ceiling Suspension Components:
- a. Main Runners: 1 1/2" channels weighing not less than 0.475 pounds per lineal foot, factory painted, conforming to ASTM A109 or ASTM A303.
 - b. Cross Furring: 3/4" channels, spaced at 24" on center, weighing not less than .300 pounds per lineal foot, factory painted, conforming to ASTM A109 or ASTM A303.
 - c. Wire: 9 gauge for hangers and 16 gauge for tying; galvanized.
 - d. Suspension components; shall be modified as required to comply with seismic design.
 - e. One of the following approved manufacturers may be used:
 - i. Clark Steel Framing Systems, (www.clarksteel.com)
 - ii. Dale Industries, (www.daleincor.com)
 - iii. Dietrich Metal Framing, (www.dietrichindustries.com)
 - iv. Additional approved equal manufacturers shall be considered.

2.2 GYPSUM BOARD MATERIALS

- A. Interior Gypsum Board: shall be shall be 1", 5/8", 1/2", and 1/4" thick as indicated on the Drawings. Edges shall be tapered or eased.
 - a. Fire rated partitions; shall be 5/8" type "C" or type "X" fire rated gypsum board.
 - b. Fire rated shaft walls; shall be constructed of gypsum drywall thickness (typically 1") by the manufacturer, and of the thickness required by the U.L. tested assembly.
 - c. Moisture resistant gypsum board; shall be 5/8" and shall be provide in bathrooms, and other wet areas noted on the Drawings.

- d. Ceiling, headers, and soffit gypsum board; shall be 1/2" thick.
 - e. Interior Gypsum Board provided above finish ceilings at non-rated exterior walls shall be 1/4" non-rated gypsum board.
 - f. Refer to specification section 13090 – X-Ray Protection for lead lining requirements.
 - g. One of the following approved manufacturers may be used:
 - i. United States Gypsum Company (www.usg.com)
 - ii. Georgia Pacific (www.gp.com)
 - iii. National Gypsum Co, Gold Bond Building Products (www.gold-bond.com)
 - iv. Additional approved equal manufacturers shall be considered.
- B. Exterior Gypsum Board Sheathing; shall be exterior grade, water resistant core, square edge, 1/2" thick sheathing, conforming to ASTM C79. Provide fire rated sheathing where required to achieve rating, constructed of thickness required by U.L. tested assembly. Utilize self-drilling, self-tapping screws meeting ASTM C1002, or C954 requirements. Utilize manufacturer's recommended accessories such as glass mesh tape, joint compound, wafer head, rust resistant screws, sealants, caulk, and tape. One of the following approved manufacturers and products may be used:
- a. Georgia Pacific, "DensGlass Gold" (www.gp.com)
 - b. United States Gypsum, "Fiberrock Aqua-Tough Exterior Panels" (www.usg.com)
 - c. Additional approved equal products shall be considered.

2.3 ACCESSORIES

- A. Mineral Wool Insulation; shall be friction fit type, un-faced, 2" thick 2 1/2" pound density sound attenuation mineral wool. Shaft wall insulation shall be mineral wool sound attenuating insulation conforming to the requirements of the UL assembly listed. One of the following equal manufacturers and products may be used:
- a. Certain Teed, "Thermafiber" (www.certainteed.com)
 - b. Johns Manville, "Minwool 1200" (www.jm.com)
 - c. Additional approved equal products shall be considered
- B. Fiberglass Sound Batt Insulation: shall be friction type, un-faced thermal batt type fiberglass insulation, 3 1/2", R-11, complying with ASTM C665, Type III, Class A at all walls with a gypsum drywall finish. One of the following equal manufacturers and products may be used:
- a. Certain Teed Corp., "CentraPro AcoustaTherm" (www.certainteed.com)
 - b. Johns Manville Corp., "Easy Fit" (www.jm.com)

- c. Owens-Corning Fiberglass Corp., “Unfaced Thermal Batt Insulation” (www.owenscorning.com)
 - d. Additional approved equal products shall be considered
- C. Acoustical sealant; shall be as recommended by the manufacturer of the gypsum board.
- a. Sealant shall be highly elastic, water-based, non-hardening, non-drying, non-bleeding, or staining conforming to ASTM 919.
 - b. One of the following approved manufacturers and products may be used:
 - i. United States Gypsum Company, “Acoustical Sealant” (www.usg.com)
 - ii. Additional approved equal products shall be considered.
- D. Fasteners: ASTM C1002, Type S12, W, and GA-216.
- E. Metal Trim:
- a. Metal trim features for gypsum board shall be formed from 25 gauge minimum zinc-coated steel and shall conform to FS QQ-S-775, Type I, Class D or E.
 - b. Metal trim shall be angle shaped equal to USG 200-B. The exposed wing shall receive joint treatment.
 - c. Corner beads shall be angle shaped with wings not less than 1 1/8” wide perforated for nailing and joint treatment, or with combination metal and paper wings, bonded together, not less than 1 1/4” wide suitable for joint treatment.
 - d. Control joints shall be 1/4” in width, 7/16” deep equal to USG No. 093, suitable for joint treatment.
 - e. J- Bead trim shall be equal to USG 400 Series.
 - f. Reglet: Equal to Fry 1/2” x 1/2” aluminum channel reglet with powder coated finish to match the architects’ sample.
- F. Setting Type Joint Compound/Adhesive: Factory prepackaged, job mixed, chemical-hardening powder products; Use for moisture resistant gypsum board. One of the following approved manufacturers and products may be used:
- a. Georgia Pacific, “Speed Set” (www.gp.com)
 - b. National Gypsum Co, Gold Bond Building Products, “Sta-Smooth” (www.gold-bond.com)
 - c. United States Gypsum, “Durabond” (www.usg.com)

- d. Additional approved equal products shall be considered.
- G. Ready-Mixed Joint Compound: Ready-mix compound for filling/tape bedding and topping; use for standard gypsum board. One of the following approved manufacturers and products may be used:
- a. Georgia-Pacific, "Ready Mix All Purpose Compound" (www.gp.com)
 - b. National Gypsum Co, Gold Bond Building Products, "Ready Mix Joint Compound (all purpose)" (www.gold-bond.com)
 - c. United States Gypsum, "Ready Mixed Joint Compound" (www.usg.com)
 - d. Additional approved equal products shall be considered
- H. Miscellaneous Materials and Accessories:
- a. Reveals shall be extruded aluminum alloy 6063 TS, 5/8" deep by 1" high, manufactured by Fry Reglet #DRM-625-100 or equal by MM Systems Corporation. Finish shall be clear anodized.
 - b. Self-tapping, shouldered flathead screws; shall be not less than 1" long, specially designed for use with the power-driven tools shall be provided for fastening gypsum board and gypsum sheathing in place. Exterior wall sheathing screws shall be corrosion resistant, either cadmium plated or with a proprietary coating.
 - c. Sheathing tape for exterior wall sheathing; shall be designed and manufactured to seal joints against water and air infiltration and formulated with an adhesive that permanently bonds to the sheathing as recommended by the manufacturer.
 - d. Joint Tape: shall be paper reinforcing tape.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that site conditions are ready to receive work and opening dimensions are as indicated on Drawings.
- B. Alignment of framing members shall be checked and necessary adjustments made prior to proceeding with application of gypsum board.

3.2 COORDINATION

- A. Interior Partitions:
 - a. Unrated interior partitions forming the corridor and the tenant demising wall of the undeveloped areas (future tenant suite) shall have gypsum board omitted on the undeveloped area side.

- b. Smoke tight or full height gypsum board partitions shall extend the one layer of gypsum board on the developed side of the partition to the full height, from floor to structure above, smoke tight.
 - c. Acoustical Insulation shall be provided as detailed as detailed on the Drawings.
- B. Exterior Walls:
- a. Undeveloped areas (future tenant suite) shall have the gypsum board omitted on the undeveloped area side of the partition from the floor up to the suspended ceiling.
 - b. Gypsum board shall be installed above the ceiling, and form a complete building envelop.
 - c. Thermal insulation and vapor barrier shall be installed for the full height of the partition as detailed on the Drawings.

3.3 METAL STUD INSTALLATION

- A. Install studs in accordance with ASTM C754, GA201, GA216, GA600, and manufacturer's instructions.
- B. Metal Stud Spacing: 24" on center, with top and bottom tracks, unless noted otherwise on the Drawings.
- C. Metal Furring Spacing: 16" on center, with top and bottom tracks, unless noted otherwise on the Drawings.
- D. Lead Lined Gypsum Board Stud Framing: 16" on center, with top and bottom tracks, extending full height from floor to structure above.
- E. Refer to Drawings for indication of partitions extending stud framing through the ceiling to the structure above.
 - a. Maintain clearance under structural building members to avoid deflection transfer to studs.
 - b. Provide extended leg ceiling runners.
- F. Door Opening Framing: Install double studs at door frame jambs. Install stud tracks on each side of opening, at frame head height, and between studs and adjacent studs.
- G. Blocking: Nail wood blocking to studs, or screw steel channels to studs.
 - a. Wood blocking shall be provided in accordance with Section 06100 – Rough Carpentry.
 - b. Install blocking for support of plumbing fixtures, toilet partitions, wall cabinets, wood frame opening, toilet accessories, hardware, medical equipment, etc.
 - c. Provide extra nailers, and metal reinforcing plates for solid support of fixture attachments

where necessary.

- d. Minimum sixteen (16) gauge sheet metal straps or metal studs may be substituted for wood blocking.
- H. Non-full height partitions longer than 8'-0" between intersection partitions or structural columns shall be braced at 4'-0" o.c. to underside of structure above by diagonal stud braces or full height studs.
- I. Bracing and full height studs shall be installed after dead loads above the partitions have been imposed.
- J. Building expansion joints shall not be bridged with framing. Frame both sides of the joint with studs or furring.

3.4 GYPSUM BOARD CEILING FRAMING INSTALLATION

- A. Install in accordance with ASTM C754, GA201, GA216, and manufacturer's instructions.
- B. Coordinate location of hangers with other work.
- C. Install ceiling framing independent of walls, columns, and above ceiling work.
- D. Reinforce openings in ceiling suspension system which interrupt main carrying channels or furring channels, with lateral channel bracing. Extend bracing minimum 24" past each end of openings.
- E. Laterally brace entire suspension system.

3.5 ACOUSTIC ACCESSORIES INSTALLATION

- A. Place acoustic insulation in partitions tight within spaces, around cut openings, behind and around electrical and mechanical items within or behind partitions, and tight to items passing through partitions.
- B. Install acoustic sealant within partitions in accordance with manufacturer's instructions. Install two beads under metal track.
 - a. Calk all penetrations of partitions by conduit, pipe, duct work, and rough-in boxes.
- C. Install gypsum board in partitions receiving acoustical accessories with a 1/4" to 1/2" isolation joint at the floor and structure above, after installation of metal trim. Embed gypsum board on each side at the floor in acoustical sealant.

3.6 GYPSUM SHEATHING INSTALLATION

- A. Install in accordance with manufacturer recommendations.

- B. Erect exterior gypsum sheathing horizontally, at right angles to framing members, with “V” grooved edges down and tongue edge up, butted tight and ends occurring over firm bearing.
- C. Sheathing shall be installed in maximum lengths and widths available so that joints are minimized and edges align with underlying support system.
- D. Provide a 3/8” setback where non-load bearing Work abuts structural elements at the head and jambs.
- E. Building expansion joints shall not be bridged by sheathing.
- F. Sheathing shall be fastened at 8” on center, 3/8” minimum from edges unless otherwise recommended by the manufacturer.

3.7 GYPSUM BOARD INSTALLATION

- A. Install gypsum board in accordance with GA201, GA216, GA600, and manufacturer's instructions.
- B. Erect single layer standard gypsum board in most economical direction, with ends and edges occurring over firm bearing. Install vertically where possible to minimize or eliminate exposed end-butt joints.
- C. Erect single layer fire rated gypsum board vertically, with edges and ends occurring over firm bearing.
- D. Install gypsum board with face side out, with adjacent boards in moderate contact and not more than 1/16” open space between boards. Do not force into place.
- E. Imperfect, damaged or damp boards shall not be installed. Do not piece-in gypsum board above doors or around other openings.
- F. At internal and external corners, the cut edges of boards shall be concealed by overlapping uncut edges of abutting boards. Boards shall be staggered so that corners of any four boards do not meet at a common point except at vertical corners.
- G. All joints shall be located over supports. End-butt joints shall be located as far from center of walls and ceilings as possible, staggered not less than 2'-0” in alternate courses of board.
- H. Boards shall be positioned so that similar edge conditions abut. Tapered edges against tapered edges and mill-cut or field-cut ends against mill-cut or field cut ends.
- I. Vertical joints shall be staggered over different studs on opposite sides of partitions.
- J. Provide gypsum board returns for window head, jamb, and sill, at sliding and bi-fold door heads and jambs, and at other openings in partitions.
- K. Gypsum board ceilings shall be installed with long dimension of the board at right angles to the supporting members, except that boards may be installed with the long dimension parallel

to supporting members that are spaced at 16" on center when attachment members are provided at end joints.

- L. Provide aluminum reveals in gypsum board as indicated on the Drawings.
- N. Use screws when fastening gypsum board to metal furring or framing. Screws shall be driven with clutch-controlled power screwdrivers, spaced at 1'-0" on center at ceilings and at walls, and 8" on center at all edges, unless otherwise required by fire rated UL listed assembly requirements.
- O. Double Layer Applications: Use gypsum backing board for first layer, placed perpendicular to framing or furring members. Use fire rated gypsum backing board for fire rated partitions and ceilings.
 - a. Secure second layer to first in accordance with UL fire rated requirements.
 - b. Place second layer perpendicular to first layer, unless otherwise required by UL or code. Offset joints of second layer from joints of first layer.
- P. Treat cut edges and holes in moisture resistant gypsum board with sealant.
- Q. Place control joints consistent with lines of building spaces, and as indicated on the Drawings.
 - a. Install control joints in corridors at minimum 30'-0" o.c. spacing.
 - b. Coordinate control joints in corridors with suite entry door detail indicated on the Drawings.
- R. Place corner beads at external corners. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials.

3.8 METAL TRIM INSTALLATION

- A. External corners shall receive a corner bead fitting neatly over the corner and secured with the same type fasteners used for applying gypsum board. Fasteners shall be spaced approximately 6" on center, driven through the board into framing members.
- B. Wall control joints shall be provided where indicated on Drawings with legs attached to back-to-back studs with a 1/2" space between.
 - a. Space shall receive fire safing and acoustical sealant at each face directly behind the metal control joint at fire-rated partitions.
 - b. Space shall receive acoustical insulation and sealant at non-fire rated partitions receiving acoustical insulation.
- C. Ceiling control joints shall be provided where indicated on Drawings with legs attached to back-to-back suspension members with a 1/2" space between.

- D. J-Bead trim shall be installed where gypsum board abuts the bottom of plastic laminate writing ledges, wall caps, reception window counters and other similar conditions.

3.9 JOINT TREATMENT

- A. Joint treatment and finishing compound shall be applied by machine or hand tool.
- B. Drying time shall be a minimum of twenty-four (24) hours between coats with additional drying time provided in poorly ventilated areas.
- C. Embedding compound shall be applied to joints and fastener heads in a thin uniform layer. Finishing compound shall be applied to all joints and fastener heads feathered to not less than 12" wide.
- D. Compound shall be spread not less than 3" wide at joints, with reinforcing tape centered in the joint, and the tape embedded in the compound. A thin layer of compound shall then be spread over the tape.
- E. On walls to be finished, a second coat of embedding compound shall be applied to joints and fastener heads, spreading in a thin uniform coat not less than 6" wide at joints with feathered edges. When thoroughly dry, treatment shall be sanded to eliminate ridges and high points.
- F. When thoroughly dry, surfaces shall be sanded to obtain uniformly smooth surfaces, taking care to not scuff the paper surface of the gypsum board.
 - a. Joints shall not be visible through finish materials.
 - b. Feather coats on to adjoining surfaces so that camber is maximum 1/32".
- G. The base of partitions shall be sufficiently finished so that joints do not show through the rubber base.
- H. Corner Treatment:
 - a. Internal corners shall be finished as specified for joints, except that the reinforcing tape shall be folded lengthwise through the middle and fitted neatly into the corner.
 - b. External corners shall receive either field applied joint tape or manufactured paper faced corner bend as specified and shall be treated with joint compounds, feathering the compound out a minimum of 8" on each side of the corner.
- I. Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile.
- J. Fill and finish joints and corners of glass mesh mortar units.
- K. Finish in accordance with GA214 Level:

- a. Level 1: Above finished ceilings concealed from view, plenum areas, and concealed areas, unless a higher finish is required for fire rated assembly and sound rated assembly.
- b. Level 2: Where water resistant gypsum backing board forms the substrates for ceramic tile.
- c. Level 3: Walls to receive vinyl wall covering.
- d. Level 4: Walls and ceilings exposed to view.
- e. Level 5: Lobbies and Atriums walls and ceilings exposed to view.

3.10 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8" in 10 feet in any direction.

3.11 SCHEDULE

- A. Drywall partitions and column enclosures shall be provided as detailed and noted in the Partition Schedule on the Drawings.

END 09250.

DIVISION 9 - FINISHES
Section 09300 - Tile

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Ceramic and porcelain floor, base, and wall tile, grout, mortar, and aluminum transition trim.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide instructions for using grouts and adhesives.
- B. Grout color samples.
- C. Granite samples, two 12"x12", with non-slip coating and sealer for owners approval of color.

1.3 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.
- B. Extra Material: Identify Owner's storage room location, and store extra material in original cartons.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.
- B. Install tile in conformance with the Tile Council of America's "Handbook for Ceramic Tile Installation".
- C. Provide tile in conformance with Americans with Disability Act (ADA) 1990-28 CFR Part 36, recommended static coefficient of friction of 0.6.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Do not install adhesives in an unventilated environment.
- B. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials.

1.6 EXTRA MATERIAL

- A. A minimum of three (3) percent of each color ceramic tile, and three (3) percent or ten (10) pieces, whichever is greater, porcelain tile.

PART 2 PRODUCTS

2.1 CERAMIC TILE MATERIALS

- A. CT-1: Ceramic wall tile; shall be semi-gloss 4-1/4" x 4-1/4" x 7/32 thin-set wall tile with S4449 bullnose top. One of the following approved manufacturers and products may be used:
- a. Dal-Tile Corporation, "Matte, Almond X735 with S4449 bullnose top" (www.dal-tile.com)
 - b. Additional approved equal products shall be considered.
- B. CT-2: Ceramic floor tile; shall be unglazed 2" x 2" ceramic mosaics D156 thin-set ceramic tile. One of the following approved manufacturers and products may be used:
- a. Dal-Tile Corporation, "Keystones, Brownstone Range, DK156" (www.dal-tile.com)
 - b. Additional approved equal products shall be considered.
- C. CT-3: Ceramic base at ceramic tile floors; where wainscot is not present, shall be unglazed round top base. Corners shall be matching cove shape. Color shall match floor tile. One of the following approved manufacturers and products may be used:
- a. Dal-Tile Corporation, "Round Top Base, 2"x2" MB-5B consisting of one row bull nose top S-886, one row 2" x 2" and one row universal cove base C-833" (www.dal-tile.com)
 - b. Additional approved equal products shall be considered.
- D. CT-4: Ceramic base at ceramic tile floors; where wainscot is present, shall be semi-gloss, thinset. One of the following approved manufacturers and products may be used:
- a. Dal-Tile Corporation, "A3401 to match wall tile, with C-833 cove base to match floor tile" (www.dal-tile.com)
 - b. Additional approved equal products shall be considered.

2.3 STONE TILE

- A. GT-1, GT-2 & GT-3: Stone in elevators, public corridors, and lobbies and other common areas indicated on the Drawings; shall be granite flooring. Match Landmark's samples and install in the pattern show on the drawings.
- a. Granite shall be 1/2" thick, thin set granite tile flooring with joints installed in the sizes and pattern shown on the drawings and in the Finish Schedule.
(www.info@rowanstone.com)
 - i. Landmark National Representative:
Michael Rhodes

Sales Manager
Rowan Stone, Inc.
P.O. Box 100
1128 Athens Hwy.
Elberton, GA 30635
(706) 283-3905
Fax (706) 283-3912
Cell (615) 406-4248

- b. GT-1 Granite: complying with ASTM C615 Chrystal Gold Honed finish.
 - c. GT-2 Granite: complying with ASTM C615 Pine Green Polished finish.
 - d. GT-3 Granite: complying with ASTM C615 Shanxi Black Polished finish.
 - e. Additional approved equal products shall be considered.
- B. GT-4: 6" high x 1/2" thick granite base matching granite flooring. Install base to match floor tile patterns as shown on the drawings.
- a. Finish all exposed edges to match finish on face.

2.4 ACCESSORIES

- A. Adhesive:
- a. Organic Adhesive: ANSI A136.1, thinset bond type; use Type I in areas subject to prolonged moisture exposure at the 1st floor.
 - b. Epoxy Adhesive: ANSI A118.3, thinset bond type.
 - c. Tile Setting Adhesive: Elastomeric, waterproof, liquid applied at the 2nd, 3rd and 4th floor toilets.
- B. Transition strip: Zinc "L" shaped transition strips provided at all ceramic tile and porcelain tile floor transitions to carpet, to vestibule mat, and to vestibule rugs. Height shall match the height of the adjacent tile surface.
- a. Manhattan American Terrazzo Strip Company
 - b. Additional approved equal products shall be considered.
- C. Wall trim strip: Unless otherwise shown on the Drawings use clear satin anodized aluminum edge protection from outside tile to tile corner applications. Select trim strip according to tile thickness. One of the followings approved manufacturer's and products may be used:
- a. Schluter, "Rondec-AE" (www.schluter.com)
 - b. Additional approved equal products shall be considered

- D. Granite Coatings:
 - a. Non-slip coating will be equal to Slip Tech:
11 Lamesa Ave.
Spring Valley, CA.
619-698-7547
 - b. Sealer will be equal to Dry Treat (www.drytreat.com)

2.5 GROUT MATERIALS

- A. Grout; for all areas except at elevator floors and ceramic tile shower stalls. One of the following approved manufacturers and products may be used:
 - a. Bostic Company, “Hydroment H144”, misty gray at ceramic floor tile and base, white at ceramic wainscot tile and base, and a standard color to be selected by Landmark fro the porcelain tile floor and base. (www.bostik-us.com)
 - b. Additional approved equal products shall be considered.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Surface to be tiled shall fall within maximum variations as follows:
 - a. Floors: 1/8” in 10’-0”.
 - b. Walls: 1/8” in 8’-0”

3.2 PREPARATION

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances, and as compatible with tile mortar.
- D. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.3 INSTALLATION - GENERAL

- A. Install tile and grout in accordance with applicable requirements of ANSI A108.1 through A108.10, manufacturer's instructions, and TCA Handbook recommendations.
- B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
 - a. Toilet Room Ceramic Tile Floor and Base: Ceramic tile floor shall start with a full tile at the entry door wall with ceramic centered in the other direction. Base joints shall align with joints in floor tile if wainscot is not present.
 - b. Granite and other Ceramic Tile Floor and Base: Center in room or as indicated on the Drawings.
 - c. Ceramic Wainscot: Centered on walls to a height of 4'-3 3/4", unless otherwise indicated on the Drawings. Base joints shall align with wainscot wall joints.
- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor, base and wall joints.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.
 - a. Ceramic Tile Floor, Base, and Walls: Joints shall be aligned with even 1/16" width, with 3/32" maximum at room perimeter.
 - b. Granite Tile Floor and Base: Joints shall be aligned with even 3/16" width, with 1/4" maximum at room perimeter.
- E. Install zinc "L" shaped floor transition strip at all ceramic tile and porcelain tile floor transitions to carpet, to vestibule mat, and to vestibule rugs.
 - a. Height shall match the height of the adjacent tile surface.
 - b. Nail or screw floor attachment before thin set of tile is placed.
 - c. Install "L" shaped transition strip in accordance with manufacturers instructions and recommendations.
- F. Form internal angles square and external angles bullnosed.
- G. Install ceramic accessories rigidly in prepared openings.
- H. Sound tile after setting is complete. Replace hollow sounding units.
- I. Keep expansion, and control joints free of adhesive or grout.
- J. Allow tile to set for a minimum of 48 hours prior to grouting.
- K. Grout tile joints. Use standard grout unless otherwise indicated. Grout shall be mixed in a single batch for a given room or area so as to provide uniform color and texture.

- L. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

3.4 INSTALLATION - FLOORS - THIN-SET METHODS

- A. Over interior concrete substrates, install in accordance with TCA Handbook Method F113, dry-set or latex-portland cement bond coat F116, organic adhesive, with standard grout, unless otherwise indicated.

3.5 INSTALLATION - WALL TILE

- A. On cementitious backer unit walls install in accordance with TCA Handbook Method W244, thin-set.

3.6 CLEANING

- A. Clean tile and grout surfaces of all foreign material.
- B. Acid solutions shall be used only when permitted by and in accordance with the tile and grout manufacturer's printed instructions.

3.7 PROTECTION OF FINISHED WORK

- A. Do not permit traffic over finished floor surface for 4 days after installation.

END 09300.

DIVISION 9 - FINISHES
Section 09510 - Acoustical Ceilings

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Suspended acoustical tile ceilings including ceiling tile, grid, suspensions systems, and miscellaneous trim for a complete installation.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on metal grid system components, and acoustic units.

1.3 SUBMITTALS AT PROJECT CLOSEOUT

- A. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- B. Extra Material: Identify Owner's storage room location, and store extra material in original cartons.
- C. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with the following the CISCA, "Ceiling Systems Handbook"
- B. Contractor shall design and engineer ceiling suspension system components, when required to satisfy code required seismic bracing and support, in accordance with applicable building code.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Maintain uniform temperature of minimum 60 degrees F and maximum humidity of 40 percent prior to, during, and after acoustic unit installation.

1.7 EXTRA MATERIALS

- A. Provide a minimum of 100 square feet of ceiling tile shall be left at the jobsite for ceiling repair.

1.8 WARRANTY

- A. Provide minimum ten year manufacturer warranty against sag in normal humidity locations.

PART 2 PRODUCTS

2.1 SUSPENSION SYSTEM

- A. Suspension System: Ceiling suspension system; main runners, cross tees, variable placement tees and grid adapters and other trim shall be cold rolled electro-galvanized steel and steel cap with a standard soft white factory applied paint finish. Main runners shall conform to the intermediate duty classification of ASTM C635. One of the following approved manufacturers and products may be used:
- a. Chicago Metallic Corp., “No. 211” (www.chicago-metallic.com)
 - b. USG, “Donn DX intermediate duty series” (www.usg.com)
 - c. Additional approved equal products shall be considered.
- B. Perimeter wall angle in public corridors and lobbies: shall be a “W” shape shadow line product. One of the following approved manufacturers and products may be used:
- a. Chicago Metallic Corp., “No. 1461-01” (www.chicago-metallic.com)
 - b. USG, “Donn, MS 154” (www.usg.com)
 - c. Additional approved equal products shall be considered.
- C. Perimeter wall angle in all areas other than public corridors and lobbies: shall be “L” shape product. One of the following approved manufacturers and products may be used:
- a. Chicago Metallic Corp., “No. 1419-01” (www.chicago-metallic.com)
 - b. USG, “Donn, Wall Angle” (www.usg.com)
 - c. Additional approved equal products shall be considered.

2.2 ACOUSTICAL TILE CEILING

- A. Interior acoustical tile ceiling tiles: shall be white, reveal edge, 24” x 24” x 3/4” with an CAC minimum rating of 34. One of the following approved manufacturers and products may be used:
- a. USG, “F Fissured SL #132”. (www.usg.com)
 - b. Additional approved equal products shall be considered.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that layout of hangers will not interfere with other work.
- B. Sequence work to ensure acoustic ceilings are not installed until building is enclosed, dead loads have been applied, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- C. Install acoustic units after interior wet work is dry.

3.2 INSTALLATION - LAY-IN GRID SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C636, ASTM E580, and manufacturer's instructions.
- B. Install after major above ceiling work is complete. Coordinate the location of hangers with other work.
- C. Provide hanger clips during steel deck erection. Provide additional hangers and inserts as required.
- D. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- E. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- F. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- G. Support fixture loads by supplementary hangers located within 6" of each corner; or support components independently.
- H. Do not eccentrically load system, or produce rotation of runners.
- I. Install suspension system so component deflects more than $L/360$ of the span under loaded conditions, and as recommended by the acoustic tile manufacturer.
- J. Main runners shall be installed at 4'-0" on center and be supported by not less than No. 12 SWG Galvanized steel hanger wire spaced a maximum of 48" on center.
 - a. Hanger wires shall be wrapped tightly at least three full turns.
 - b. Additional hanger wires adjacent to light fixtures as required by ASTM C636 shall be provided.
 - c. Hanger wires shall be attached to trapezes where required to span large ducts, not to ductwork.

- K. Main runners shall be interconnected by cross tees, 4'-0" long at 2'-0" on center to form nominal 2'-0" x 4'-0" modules. 2'-0" long interconnecting members shall be installed at 2'-0" on center and form nominal 2' x 2" modules. Proper length cross tees shall also be installed adjacent to all recessed fluorescent light fixtures on each side not supported by a main runner.
- L. Install ceilings symmetrically about the center lines of the rooms unless otherwise indicated on the Drawings.
- M. Install accessories for Washable Ceilings and Exterior Ceilings as recommended by manufacturer.
- N. Perimeter Wall Angles:
 - a. Install edge molding at intersection of ceiling and vertical surfaces.
 - b. Use longest practical lengths.
 - c. Overlap and rivet corners.
 - d. Provide at junctions with other interruptions.
 - e. Install with screws into partition top track or with other fastening devices as recommended by the suspension system manufacturer, 1'-4" on center, and not more than 3" from ends.
- O. Form expansion joints as detailed. Form to accommodate plus or minus 1" movement. Maintain visual closure.
- P. Install washable ceiling grid gaskets in accordance with manufacturer's instructions, and as required by health department.

3.2 INSTALLATION - ACOUSTIC UNITS

- A. Install acoustic units in accordance with manufacturer's instructions.
- B. Fit acoustic units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Lay directional patterned units in basket weave pattern. Fit border trim neatly against abutting surfaces.
- D. Install acoustic units level, in uniform plane, and free from twist, warp, and dents.
- E. Cutting Acoustic Units:
 - a. Cut to fit irregular grid and perimeter edge trim.
 - b. Cut edges to field cut units to match manufactured cut edges.

- c. Double cut and field paint exposed edges of tegular units.
- F. Install hold-down clips to retain panels tight to grid system within 20'-0" of an exterior door and in washable ceiling tile locations.
- G. Install accessories required for Washable Ceilings and Exterior Ceilings.

3.3 ERECTION TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8" inch in 12'-0".
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END 09510.

DIVISION 9 - FINISHES
Section 09650 - Resilient Flooring

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Resilient flooring, rubber base, floor transitions, and adhesives.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- B. Seaming Plan: Provide plan indicating boarders, patterns, and material color and model.
- C. Samples: Submit two (2) manufacturer's color charts or samples, illustrating sheet vinyl floor color options, for selection by Landmark. Selection shall be from manufacturers standard options.

1.3 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- B. Extra Material: Identify Owner's storage room location, and store extra material in original cartons.

1.4 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Include special installation instructions.
 - a. Indicate special procedures at perimeter conditions which require special attention and preparation of floor surfaces.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F. and achieve temperature stability.
 - a. Install materials at a temperature of 70 degrees F.
 - b. Thereafter, maintain conditions between 55 degrees F and 90 degrees F.
- C. Maintain ambient temperature required by adhesive manufacturer for three days prior to and

one day after installation of material.

1.6 REGULATORY REQUIREMENTS

- A. Conform to applicable code for flame / smoke rating requirements in accordance with ASTM – 84. (ASTM E648, critical flux at 0.45 watts per cm squared or more, class 1, ASTM E662, smoke at 450 or less)

1.7 EXTRA MATERIALS

- A. Provide a minimum of one (1) carton of each standard color floor tile used.
- B. Provide a minimum of 10’-0” for each 500 square feet of each sheet vinyl floor color.
- C. Provide a minimum of one piece 12’-0” long of each standard color base.
- D. Provide one (1) 4’-0” long piece of floor transition moldings in each color used.

PART 2 PRODUCTS

2.1 MATERIALS

- A. VCT-1: Resilient floor tile; shall be 12” x 12” x 1/8” vinyl composite tile, one (1) color throughout a suite or clinical department, in one of Landmarks standard six (6) colors. One of the following approved manufacturers and products may be used:
 - a. Tarkett, “Expressions” (www.tarkett.com)
 - b. Additional approved equal products shall be considered.
- B. SV-1: Sheet vinyl wood look flooring (no integral base); shall be flexible commercial PVC sheet flooring in 2.0 mm thickness of laminated construction including print film layer of 0.70 mm and backing ply of 1.23 mm. The flooring shall incorporate a specially formulated polyurethane reinforcement, to significantly reduce maintenance costs. One color shall be used throughout a suite or clinical department, in one of Landmarks standard two (2) colors.
 - a. Seam method shall be recess scribe with heat weld.
 - b. Adhesive and rod for heat welding seam shall be as recommended by manufacturer.
 - c. One of the following approved manufacturers and products may be used:
 - i. Armstrong, “Timberline” (www.armstrong.com)
 - ii. Additional approved equal products shall be considered.
- C. SV-2 (TENANT FIT-OUT): Sheet vinyl floor and integral base; shall be commercial vinyl-backed with no reverse pieces.
 - a. Seam method shall be recess scribe with heat weld.

- b. Adhesive and rod for heat welding seam shall be as recommended by manufacturer.
 - c. Integral flash cove base by extending sheet flooring 4" up wall using adhesive, welding rod, and accessories as recommended by manufacturer.
 - i. Provide top edge trim caps of anodized aluminum for integral flash cove as approved by the Landmark.
 - ii. Provide a fillet support strip for integral cove base with a minimum radius of 1 in. of plastic.
 - d. Color of sheet vinyl floor, base and rod as selected by Landmark from manufacturers standard options.
 - e. One of the following approved manufacturers and products may be used:
 - i. Armstrong, "Medintech" (www.armstrong.com)
 - ii. Additional approved equal products shall be considered.
- D. RB-1: Rubber base; shall be coved 4" high base, 1/8" thick, coil stock base, one (1) color throughout a suite or clinical department, in one of Landmarks standard six (6) colors. One of the following approved manufacturers and products may be used:
- a. Johnsonite, "Nos. 49 Beige" (www.johnsonite.com)
 - b. Additional approved equal products shall be considered.
- E. RB-2 (TENANT FIT-OUT): Rubber base; shall be coved 4" high base, 1/8" thick, coil stock base, one (1) color throughout a suite or clinical department, in one of Landmarks standard six (6) colors. One of the following approved manufacturers and products may be used:
- a. Johnsonite, "Nos. 20 Charcoal" (www.johnsonite.com)
 - b. Additional approved equal products shall be considered.
- F. RB-3 (TENANT FIT-OUT): Rubber base; shall be coved 4" high base, 1/8" thick, coil stock base, one (1) color throughout a suite or clinical department, in one of Landmarks standard six (6) colors. One of the following approved manufacturers and products may be used:
- a. Johnsonite, "Nos. 168 Thunder" (www.johnsonite.com)
 - b. Additional approved equal products shall be considered.
- G. RB-4 (TENANT FIT-OUT): Rubber base; shall be coved 4" high base, 1/8" thick, coil stock base, one (1) color throughout a suite or clinical department, in one of Landmarks standard six (6) colors. One of the following approved manufacturers and products may be used:
- a. Johnsonite, "Nos. 47 Brown" (www.johnsonite.com)
 - b. Additional approved equal products shall be considered.

- E. FTM-1: Floor Transition Moldings; shall be provide where resilient floor, sheet vinyl flooring, carpet and/or sealed concrete butts each other. Colors to be selected by Landmark. One of the following approved manufacturers and products may be used:
 - a. Johnsonite, "Resilient Transition Mouldings" (www.johnsonite.com)
 - b. Additional approved equal products shall be considered.

2.2 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.
- C. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces to receive new materials area suitable for application of material.
 - a. Verify concrete floors are dry to a maximum moisture content of 7 %, and exhibit negative alkalinity, carbonization, and dusting.
 - b. Verify concrete floors are dry to a maximum moisture emission rate of 3 pounds per 1000 square feet for sheet vinyl applications, 5 pounds per 1000 square feet for vinyl composite tile,
- B. Verify floor and lower wall surfaces are free of substances that may impair adhesion of new adhesive and finish materials.
- C. Review project conditions against manufacturer's recommendations and consult with manufacture for proper methods and materials to suit specific or unusual conditions.

3.2 PREPARATION

- A. Remove sub-floor ridges and bumps. Fill minor low spots (1/8" in 10'-0"), cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- B. Floor substrates shall be feathered out with sub-floor filler so that adjacent ceramic and resilient finish floor surfaces are flush.
- C. Prohibit traffic until filler is cured.
- D. Clean substrate.
- E. Apply primer as required to prevent "bleed-thru" or interference with adhesion by substances

that cannot be removed.

3.3 INSTALLATION - TILE FLOORING

- A. All tile of the same color shall be of the same color lot in one room, suite or area of the building. Install in accordance with manufacturer's instructions.
- B. Mix tile from container to ensure shade variations are consistent when tile is placed.
- C. Spread only enough adhesive to permit installation of materials before initial set.
- D. Set flooring in place, press with heavy roller to attain full adhesion.
- E. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern. Lay tile centered within rooms.
- F. Install tile to straight pattern. Center the in room with pattern parallel to the short dimension of room. Allow minimum 1/2 full size tile width at room or area perimeter.
- G. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- H. Resilient tile is not required beneath cabinets.
- I. Where floor finishes are different on opposite sides of door, terminate flooring under centerline of door.
- J. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated
- K. Install flooring in recessed floor access covers. Maintain floor pattern.
- L. At movable partitions, install flooring under partitions without interrupting floor pattern.
- M. Install feature strips and floor markings where indicated. Fit joints tightly.

3.4 INSTALLATION – SHEET VINYL FLOOR AND INTEGRAL BASE

- A. Install in accordance with manufacturer's instructions.
- B. Extend flooring into toe spaces, door recesses, closets, and similar openings as indicated on the Drawings.
- C. If required, install flooring on pan-type floor access covers. Maintain continuity of color and pattern within pieces of flooring installed on these covers. Adhere flooring to the subfloor around covers and to covers.
- D. Scribe, cut and fit or flash cover to permanent fixtures, columns, walls, cabinet base, partitions, pipes, outlets and other similar vertical surfaces.

- E. Adhere flooring to subfloor without cracks, voids, raising or puckering at the seams. Roll with 100 pound roller in the field areas. Hand roll flooring at the perimeter and the seams to assure adhesion.
- F. Lay floor to provide the minimum number of seams. Avoid cross seams, filler pieces, and strips. Match edges for color shading and pattern at the seams.
- G. Prepare heat-welded seams with special routing tool supplied for this purpose and heat weld with vinyl welding rod in seams. Finish all seams flush and free from voids, recesses, and raised areas.
- H. Provide integral flash cove wall base including cove fillet support strip and tope edge cap trim. Heat weld seams as specified for flooring.

3.5 INSTALLATION – RUBBER BASE

- A. All base of the same color shall be of the same color lot in one suite or area of the building. Install in accordance with manufacturer's recommendations.
- B. Fit joints tightly and make vertical. Maintain minimum dimension of 24" between successive joints.
- C. Miter internal corners.
- D. External corners shall be job-formed with tool 'V' cut back of base strip to 1/2 of its thickness and folded. Insure base is adhering tightly to the wall at each side or the external corner. Joints in base shall occur at least 18" from an outside corner.
- D. Install base on solid backing. Bond tightly to wall and floor surfaces.
- E. Scribe and fit to door frames and other interruptions.
- F. Provide base at base cabinet toe, kick, and sides.

3.5 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean, seal, and wax resilient flooring products in accordance with manufacturer's instructions.

3.6 PROTECTION OF FINISHED WORK

- A. Prohibit traffic on resilient flooring for 48 hours after installation.

END 09650

DIVISION 9 - FINISHES
Section 09680 - Carpeting

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Carpet flooring, backing material, integral carpet base, and adhesives.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- B. Carpet seaming layout plan and quantity take-off.

1.3 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.

1.4 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- B. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
- C. Extra Material: Identify Owner's storage room location, and store extra material in original cartons.

1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable code for flame and smoke rating requirements in accordance with ASTM E84.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Store materials in area of installation for 48 hours prior to installation.
- B. Maintain minimum 70 degrees F ambient temperature 3 days prior to, during and 24 hours after installation.
- C. Ventilate installation area during installation and for 3 days after installation.

1.7 WARRANTY

- A. Carpet: Manufacturer's written limited ten (10) year warranty
- B. iLocMB Backed Carpet: Manufacturer's lifetime warranties on wear, delamination, edge reveal, zippering, and static propensity below 3.5kv.

1.8 EXTRA MATERIALS

- A. Provide a minimum of one (1) large carpet scrap of each color and type used.
- B. Provide one (1) 4'-0" long piece of floor transition molding in each color used.
- C. Provide three (3) pieces of pre-cut carpet for use in each elevator cab (three pieces per cab). Pieces shall not cut from single role of carpet with not seams, if possible. Bind edges with yarn which matches the carpet color as closely as possible.

PART 2 PRODUCTS

2.1 MATERIALS

- A. CPT-1 Thru CPT-6: Carpet in suite and / or clinic department, as indicated on the Drawings; shall be 28 ounce "Diatron" SD nylon, textured loop pattern, solution died. Backing material shall be polypropylene primary backing and woven polypropylene secondary backing for direct glue-down installation. One (1) color selected from Landmark's six (6) color schemes shall be used throughout one suite and / or clinic department.
 - a. Cambridge, "Royal Troon" (www.cambridgecarpet.com)
 - i. Landmark National Representative:
Brad Ryan
Account Manager
Cambridge Commercial Carpets
(608)444-7381
bradryan@cambridgecarpet.com
 - b. Additional approved equal products shall be considered.
- B. CPT-7 Thru CPT-12: Carpet in suite and / or clinic department, as indicated on the Drawings; shall be 28 ounce "Diatron" SD nylon, textured loop pattern, solution died. Backing material shall be polypropylene primary backing and woven polypropylene secondary backing for direct glue-down installation. One (1) color selected from Landmark's six (6) color schemes shall be used throughout one suite and / or clinic department.
 - a. Cambridge, "St. Andrews" (www.cambridgecarpet.com)
 - i. Landmark National Representative:
Brad Ryan
Account Manager
Cambridge Commercial Carpets

(608)444-7381
bradryan@cambridgecarpet.com

- b. Additional approved equal products shall be considered.
- C. CPT-13 Thru CPT-18: Carpet in Consultation / Private Offices; shall be 36 ounce cut pile, piece dyed. Backing material shall be polypropylene primary backing and woven polypropylene secondary backing for direct glue-down installation. One (1) color selected from Landmark's six (6) color schemes shall be used throughout one suite and / or clinic department.
 - a. Cambridge "Crossroads 36" (www.cambridgecarpet.com)
 - i. Landmark National Representative:
Brad Ryan
Account Manager
Cambridge Commercial Carpets
(608)444-7381
bradryan@cambridgecarpet.com
 - b. Additional approved equal products shall be considered.
- E. CPT-19: Carpet in public corridors, and lobbies and other common areas indicated on the drawings; shall be Solutia Ultron Nylon, Type 6.6, textured pattern loop. Backing composite foundation. One color shall be used throughout a floor level, as shown on the drawings:
 - a. Durkan, "Newbury"
 - b. Additional approved equal products shall be considered.
- E. Carpet base; shall be 4" high of the same material as the adjacent carpet. The exposed (upper) edge of the carpet base bound with yarn which matches the carpet color as closely as possible.

2.2 ACCESSORIES

- A. Sub-Floor Filler: Cementitious Type recommended by flooring material manufacturer.
- B. Floor Transition Moldings; shall be provided where resilient floor, sheet vinyl flooring, carpet and/or sealed concrete butts each other. Colors to be selected by Landmark. One of the following approved manufacturers and products may be used:
 - a. Johnsonite, "Resilient Transition Mouldings" (www.johnsonite.com)
 - b. Additional approved equal products shall be considered.
- C. Seam Adhesive: Recommended by manufacturer.
- D. Contact Adhesive: Compatible with carpet material, recommended by carpet manufacturer.

Adhesive shall comply with requirements for fire resistant installation and be as recommended by the manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that floor surfaces are smooth and flat within tolerances and are ready to receive work.
- B. Verify that concrete floors are ready for carpet installation by testing for moisture emission rate and alkalinity. Obtain instructions if test results are not within specified limits.
 - a. Moisture emission rate: Not greater than 3 lb per 1000 sq ft per 24 hours when tested using calcium chloride moisture test kit for 72 hours.
 - b. Alkalinity: pH range of 5-9.

3.2 PREPARATION

- A. Clean floor of dust, dirt, solvents, oil, grease, paint, plaster, and other substances detrimental to proper performance of adhesive and carpet. Allow floor to thoroughly dry.
- B. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.
- C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Maximum surface variation of 1/8" in 10'-0", non-cumulative.
- D. Prohibit traffic until filler is cured.
- E. After cure, vacuum clean substrate.

3.3 INSTALLATION

- A. Install carpet in accordance with manufacturer's instructions.
- B. Verify carpet match before cutting to ensure minimal variation between dye lots.
- C. Lay out carpet:
 - a. Locate seams in area of least traffic, out of areas of pivoting traffic, parallel to main traffic, and to minimize the number of seams.
 - b. Do not locate seams perpendicular through door openings, entries or exits.
 - c. Seams shall be centered beneath doors when in the closed position.
 - d. Align run of pile in same direction as anticipated traffic and in same direction on adjacent pieces.

- e. Make seams run with traffic flow.
 - f. Locate change of color or pattern between rooms under door centerline.
 - g. Provide monolithic color, pattern, and texture match within any one area.
- D. Install carpet tight and flat on subfloor, well fastened at edges, with a uniform appearance.
- E. Double cut carpet seams, with accurate pattern match. Make cuts straight, true, and unfrayed.
- F. Same color in adjacent areas shall be laid with pattern and pile-lay running in the same direction.
- G. Carpeting of any one color shall first be installed in corridors and areas contiguous to the corridor and shall be protected, and then installed in individual rooms with doors to safeguard against carpet dye lot variations.
- H. Carpet shall be laid with pile-lay and / or pattern running perpendicular to corridor walls except in "L" shaped corridors where pile-lay and / or pattern running parallel to corridor walls in shortest leg of the "L".
- I. Apply contact adhesive primer to floor uniformly at rate recommended by manufacturer. Apply contact adhesive to floor, after primer, at a rate recommended by manufacturer. After sufficient open time, press carpet into adhesive.
- J. Apply seam adhesive to the base of the edge glued down. Lay adjoining piece with seam straight, not overlapped or peaked, and free of gaps.
- K. Roll with appropriate roller for complete contact of adhesive to carpet backing.
- L. Extend carpet as base finish up vertical surfaces to form base. Terminate top of base bound with yarn which matches the carpet color as closely as possible.
- M. Complete installation of edge strips, concealing exposed edges. Bind cut edges where not concealed by edge strips.
- N. Carpet shall not be cut out for plumbing cleanouts.
- O. Carpet base shall be installed after carpet floor. Fit carpet base snugly to wall and provide full adherence.

3.4 INSTALLATION ON STAIRS

- A. Use one piece of carpet for each tread and the riser below. Apply seam adhesive to all cut edges.
- B. Install carpet with pile direction in the length of the stair.

- C. Adhere carpet tight to stair treads and risers.

3.5 INSTALLATION OF FLOOR TRANSITION MOLDING

- A. Coordinate the installation of floor transition molding with the resilient and ceramic tile floor installation.
- B. Anodized aluminum transition strips shall be installed at ceramic and porcelain tile floors, under section 09300 – Tile.
- C. Install resilient transition moldings at where carpet transitions to other floor finishes, and to concrete.
 - a. Install full length pieces at doors and other openings between rooms.
 - b. At door openings, install directly under door when closed.
 - c. Strips shall be butt tightly to vertical surfaces.
 - d. Where splices can not be avoided, ends shall be tight and flush.

3.6 CLEANING

- A. Remove excess adhesive without damage, from floor, base, and wall surfaces.
- B. Clean and vacuum carpet surfaces.

3.7 PROTECTION OF FINISHED WORK

- A. Heavy objects such as furniture shall not be placed on carpeted surfaces for a minimum of twenty four (24) hours or until adhesive is set.
- B. Protect finished work from damage.

END 09680.

DIVISION 9 - FINISHES
Section 09720 - Wall Coverings

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Vinyl wall covering and adhesives.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on covering and adhesive.

1.3 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.

1.4 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Maintenance Data: Submit data on cleaning, touch-up, and repair of covered surfaces.
- B. Extra Material: Identify Owner's storage room location and store extra material in original cartons.

1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable code for flame and smoke ratings of 25 and 50 when tested to UL 723 requirements.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the adhesive or vinyl covering product manufacturer.
- B. Maintain these conditions 24 hours before, during, and after installation of adhesive and covering.
- C. Provide lighting level of 80 ft candles measured mid-height at substrate surfaces when installing Work.

1.7 EXTRA MATERIALS

- A. A minimum of three (3) 8'-0" long pieces of each standard color vinyl wall covering used on the project.

1.7 DELIVERY, STORAGE, AND PROTECTION

- A. All materials shall be delivered to the job in original, new and unopened containers bearing the manufacturer's name and label showing name, Federal Specification number if applicable, manufacturer's stock number, manufacturer's name and application number
- B. Provide proper storage to prevent damage to and deterioration of materials.

1.8 PART 2 PRODUCTS

2.1 MATERIALS

- A. Vinyl wall covering; in public corridors, lobbies, and other common areas shall be one Class "A" fire rated, Type II, vinyl wall covering. One (1) color shall be used throughout the public areas. See drawings for color.:
 - a. Wolf Gordon, G4939008, Contour Stone CTR7-282
 - b. Additional approved equal products shall be considered.
- B. Vinyl wall covering; in suited or clinical departments shall be Class "A" fire rated, Type II, 21 ounce minimum vinyl wall covering. One (1) color shall be used throughout one suite, or clinical department, in one of Landmarks standard six (6) colors. One of the following approved manufacturers and products may be used:
 - a. RJF International Corp. "Koroseal Cipriani #7421" (www.rjfinternational.com)
 - i. Landmark National Representative:
Kim White
Corporate Contact
Sheri Thiesen
Decorative Surfaces
3415 Eastern Avenue SE
Grand Rapids, MI 49508
(414) 477-8226
kimw@decorativesurfacesonline.com
 - b. Additional approved equal products shall be considered
- C. Adhesive; shall be Gardner – Gibson, Inc. "Shur-Stik 785" or Evans, or type recommended by covering manufacturer to suit application to substrate.
- D. Substrate Filler: As recommended by adhesive and covering manufacturer; compatible with substrate.
- E. Substrate Primer and Sealer: As specified in Section 09900 – Painting.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate surfaces are prime painted and ready to receive work, and conform to requirements of the covering manufacturer.
- B. Measure moisture content of surfaces using an electronic moisture meter. Do not apply coverings unless moisture content of surface is below 12 percent for gypsum board.
- C. Verify flatness tolerance of surfaces does not vary more than 1/4" inch in 10'-0" nor vary at a rate greater than 1/16" in 1'-0".
- D. No felt-tip or ball point marks shall be made on walls scheduled to receive vinyl wall covering.

3.2 PREPARATION

- A. Fill cracks in substrate and smooth irregularities with filler; sand smooth.
- B. Wash impervious surfaces with tetra-sodium phosphate, rinse and neutralize; wipe dry.
- C. Surface Appurtenances: Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
- D. Surfaces: Correct defects and clean surfaces which affect work of this section. Remove existing coatings that exhibit loose surface defects.
- E. Marks: Seal with shellac those which may bleed through surface finishes.
- F. Apply primer sealer to substrate surfaces as specified in Section 09900 - Painting. Allow to dry. Lightly sand smooth.
- G. Vacuum clean surfaces free of loose particles.

3.3 INSTALLATION

- A. Apply adhesive and covering in accordance with manufacturer's instructions.
- B. Apply adhesive to wall surface immediately prior to application of covering. Let contact adhesive set tack free.
- C. Use covering in roll number sequence.
- D. Razor trim edges on flat work table. Do not razor cut on gypsum board surfaces.
- E. Apply covering smooth, without wrinkles, gaps or overlaps. Eliminate air pockets and ensure full bond to substrate surface. Butt edges tight.
- F. Horizontal seams are not acceptable, unless approved by Landmark in advance.
- G. Do not seam within 2" of internal corners or within 6" of external corners.

- H. Install covering before installation of bases, cabinet hardware, or items attached to or spaced slightly from wall surface.
 - a. Do not install covering more than 1/4" below top of resilient base. Allow base to adhere directly to gypsum board substrate.
 - b. Install covering 2" below countertops at cabinets.
- I. Cover spaces above and below windows, above doors in sequence from roll.
- J. Terminate wall covering at inside corners when wall finish changes color or changes from vinyl to paint, unless noted otherwise on the Drawings.
- K. Carry through door and window openings and openings cut out after application, with no piecing at door heads and window heads, jambs, and sills.
- L. Apply covering to wall cleanouts, and access doors prior to replacing.
 - a. Do not cover electrical, telephone, data, and other similar cover plates.
 - b. Do not cover electrical panel doors and frames.
- M. Covering required behind radiation and convector covers.
- N. Where covering tucks into reveals, or metal wallboard or plaster stops, apply covering with contact adhesive within 6" of covering termination. Ensure full contact bond.
- O. Remove excess adhesive while wet from seam before proceeding to next covering sheet. Wipe clean with dry cloth.

3.4 CLEANING

- A. Clean coverings of excess adhesive, dust, dirt, and other contaminants.
- B. Reinstall wall plates and accessories removed prior to work of this section.

END 09720.

DIVISION 9 - FINISHES
Section 09900 - Painting

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Painting of gypsum drywall, ferrous materials, and other miscellaneous materials which require paint.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on all finishing products.
- B. Paint out samples (6" x 8") in triplicate for each color used.
- C. Exterior cement plaster finish coat color selections in triplicate, unless plaster has integral color.
- D. Elastomeric finish color selection in triplicate.

1.3 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Instructions: Indicate special surface preparation procedures, and substrate conditions requiring special attention.

1.4 SUBMITTALS AT PROJECT CLOSEOUT

- A. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.
- B. Extra Material: Identify Owner's storage room location and store extra material in original cartons.

1.5 QUALITY ASSURANCE

- A. Primers, stains, sealers, and finish coats shall be by the same manufacturer, and shall be top of the line, consumer grade.
- B. Paint materials shall comply with Volatile Organic Compound regulations, current where the project is located.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the

humidity ranges required by the paint product manufacturer.

- C. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions. Do not apply paint when relative humidity exceeds 85%, unless otherwise permitted by manufacturer's printed instructions.
- D. Provide lighting level of 80 ft candles measured mid-height at substrate surface when installing Work.

1.7 EXTRA MATERIALS

- A. Extra Stock Material: A minimum of one (1) gallon of each standard paint color used on the interior of the project, and one (1) gallon of paint used on exterior metal shall be left stored at the job site for touch-up.

1.8 DELIVERY, STORAGE, AND PROTECTION

- A. Materials shall be delivered to the job in original, new and unopened containers with labels showing name, Federal Specification number if applicable, manufacturer's stock number, manufacturer's name, and application instructions.
- B. Provide proper storage to prevent damage to and deterioration of materials.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Paint Material and Manufacturers; Primers, stains, sealers, and finish coat material shall comply with Volatile Organic Compound regulations, current where the project is located. One of the following approved manufacturers may be used:
 - a. Pratt & Lambert (www.prattandlambert.com)
 - b. Benjamin Moore (www.benjaminmoore.com)
 - c. Pittsburgh, PPG Industries (www.ppg.com)
 - d. Additional approved equal manufacturers shall be considered.

2.2 ACCESSORIES

- A. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified; commercial quality.
- B. Patching Materials: Latex filler.

2.3 FINISHES

- A. PT-1 (TENANT FIT-OUT): Gypsum drywall partitions; not indicated to receive vinyl wall covering on the Drawings shall be primed with a white polyvinyl acrylic primer and, in addition, shall receive one coat of latex satin enamel. One of the following approved manufacturers and products may be used:
- a. Benjamin Moore, “1052 Sea Urchin” (www.benjaminmoore.com)
 - b. Pittsburgh, PPG Industries, “Approved Equal” (www.ppg.com)
 - c. Pratt & Lambert, “Approved Equal” (www.prattandlambert.com)
 - d. Additional approved equal products shall be considered
- B. PT-2 (TENANT FIT-OUT): Gypsum drywall partitions; not indicated to receive vinyl wall covering on the Drawings shall be primed with a white polyvinyl acrylic primer and, in addition, shall receive one coat of latex satin enamel. One of the following approved manufacturers and products may be used:
- a. Benjamin Moore, “952 Cayman Island” (www.benjaminmoore.com)
 - b. Pittsburgh, PPG Industries, “Approved Equal” (www.ppg.com)
 - c. Pratt & Lambert, “Approved Equal” (www.prattandlambert.com)
 - d. Additional approved equal products shall be considered
- C. PT-3 (TENANT FIT-OUT): Gypsum drywall partitions; not indicated to receive vinyl wall covering on the Drawings shall be primed with a white polyvinyl acrylic primer and, in addition, shall receive one coat of latex satin enamel. One of the following approved manufacturers and products may be used:
- a. Benjamin Moore, “1521 Nature’s Essentials” (www.benjaminmoore.com)
 - b. Pittsburgh, PPG Industries, “Approved Equal” (www.ppg.com)
 - c. Pratt & Lambert, “Approved Equal” (www.prattandlambert.com)
 - d. Additional approved equal products shall be considered
- D. PT-4: Gypsum drywall partitions; not indicated to receive vinyl wall covering on the Drawings shall be primed with a white polyvinyl acrylic primer and, in addition, shall receive one coat of latex satin enamel. Color shall be Landmark’s standard off-white, one color throughout. One of the following approved manufacturers and products may be used:
- a. Benjamin Moore, “855” (www.benjaminmoore.com)
 - b. Pittsburgh, PPG Industries, “2540 Altmont” (www.ppg.com)

- c. Pratt & Lambert, “2308 Mendocino” (www.prattandlambert.com)
- d. Additional approved equal products shall be considered
- E. PT-5: Interior exposed metal surfaces; including metal doors, hollow metal door frames, enclosed metal stairs, metal railings, ladders, and miscellaneous metal trim, shall, in addition to any factory prime coat, receive one coat of metal primer and one coat of satin enamel. See drawings for color.
 - a. One color throughout shall be used for enclosed metal stairs and railings.
 - b. A maximum of four colors throughout shall be used for hollow metal door frames. Color shall be selected to match rubber base colors as closely as possible.
- F. PT-6: Millwork, wood, and trim surfaces; scheduled to be painted, shall receive one coat of primer and two finish coats of satin enamel.
- G. PT-7: Concrete and concrete block exposed to the interior in finished areas such as stairs, and other public areas shall receive one coat filler-primer and one coat latex satin enamel.
- H. PT-8: Exterior exposed metal surface; including gas and electric meters, roof hatch, and miscellaneous metal trim, shall receive two field applied coats of exterior alkyd enamel. Color shall be selected by Landmark.
- I. PT-9 Gypsum board ceilings and soffits shall be primed with white polyvinyl primer and, in addition shall receive one coat of latex flat finish. See drawings for color. One of the following manufacturers **and products** may be used:
 - a. Benjamin Moore, “855” (www.benjaminmoore.com)
 - b. Pittsburgh, PPG Industries, “2540 Altmont” (www.ppg.com)
 - c. Pratt & Lambert, “2308 Mendocino” (www.prattandlambert.com)
 - d. Additional approved equal products shall be considered
- J. P-10: Exposed steel at the canopy area including the columns, beams, joists, deck and hangers shall be sandblasted and provided with epoxy paint primer in the fabrication process and delivered to the site with epoxy primer. All welds performed on site shall be ground smooth and filler shall be added between welds for a consistent appearance. All filed welds and exposed steel shall be inspected and all epoxy primed areas shall be touched up. Final finish of exposed steel shall consist of two coats of epoxy paint.
- K. PT-11: Textured Acrylic Coating: Duroplex “Antigua DSII. See drawings for color selection.
- L. PT-12: (same as above)
- M. WD-1 and all wood scheduled to receive a transparent finish shall receive 1 coat of conditioner/sealer and two coats of clear urethane varnish in a Sheen #40 to match the Architect’s sample.

- N. WD-2: Millwork, wood, and trim surfaces; scheduled to be stained, shall be shop finished to match the Architect's sample.
- O. Gypsum drywall partitions; indicated to receive vinyl wall covering on Drawings shall be primed with a white polyvinyl acrylic primer.
- P. Mechanical and equipment room; gypsum board walls shall be painted with one prime coat. Paint shall extend to floor.
- Q. Flush mounted electrical panels; not in equipment rooms or electric rooms shall receive two coats of paint to match adjacent finished surfaces.
- R. Access doors; installed in painted walls and ceilings shall receive two coats of paint to match the adjacent finish surface, unless room is scheduled to receive wall covering. Refer to Section 09720 – Wall Covering for additional information.
- S. Plywood telephone backboards; shall receive one coat of paint if installed in equipment rooms, and two coats of paint if installed in finished areas to match the adjacent finish surface.
- T. Exterior cement plaster without integral color shall receive one coat of Soneneborn Hydocide Heavy Textured Colorcoat or Thoro Systems Torocoat, color as selected by Landmark.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces, and substrate conditions are ready to receive Work as instructed by the product manufacturer. Report any condition that may potentially affect proper application.
- B. Test shop applied primer for compatibility with subsequent cover materials.
- C. All exposed steel and field welds shall be inspected. Rust shall be removed. Welds shall be ground smooth. Galvanized surfaces shall be repaired with field applied cold galvanization. Primed surfaces shall be repaired and epoxy primed to match factory applied primer.
- D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - a. Plaster and Gypsum Wallboard: 12 percent.
 - b. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
 - c. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
 - d. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.

3.2 PREPARATION

- A. Sequence application to the following:
 - a. Do not apply finish coats until paintable sealant is applied.
 - b. Back prime wood trim before installation of trim.
- B. Surface Appurtenances: Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
- C. Surfaces:
 - a. Correct defects and clean surfaces which affect work of this section.
 - b. Remove or repair existing coatings that exhibit surface defects.
 - c. Clean dirt, grease, chalk, and other contaminants, and insure surface is dry prior to receiving paint.
 - d. Fill or repair cracks, gouges, or other imperfections with putty or in other manner appropriate to the surface.
- D. Marks: Seal with shellac those which may bleed through surface finishes.
- E. Impervious Surfaces: Remove mildew by scrubbing with solution of tetra-sodium tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- F. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.
- G. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- H. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by power tool, wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.
- I. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. [Prime metal items including shop primed items.]
- J. Interior Wood Items Scheduled to Receive Paint Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats.
- K. Interior Wood Items Scheduled to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats.
- L. Exterior Wood Scheduled to Receive Paint Finish: Remove dust, grit, and foreign matter.

Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied.

M. Metal Doors Scheduled for Painting: Prime metal door top and bottom edge surfaces.

3.3 APPLICATION

- A. Apply products in accordance with manufacturer's instructions.
- B. All paint, varnish, and other materials shall be stirred before application to produce a mixture of uniform density and as required during the application of materials. Any film which may form on the surface shall not be stirred into the material.
- C. Paint all exposed ferrous materials not factory pre-finished with two coats of appropriate paint.
- D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- E. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
- F. Paint shall completely cover surfaces without drips, sags, holidays or excessive brush marks and shall present an even uniform finished final appearance.
- G. Sand wood and metal surfaces lightly between coats to achieve required finish.
- H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- I. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- J. Prime concealed surfaces of interior and exterior woodwork with primer paint.
- K. Prime concealed surfaces of interior wood surfaces scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with thinner.
- L. Re-coat primed and sealed walls and ceilings where there is evidence of suction spots or unsealed areas in the first coat to assure a finish coat with no burn-through or other defects due to insufficient sealing.

3.4 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Paint shop primed equipment. Paint shop finished items occurring at interior areas exposed to view.
- B. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

- C. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are shop finished.
- D. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces. Paint dampers exposed behind louvers, grilles, [and convector and baseboard cabinets] to match face panels.
- E. Paint exposed conduit and electrical equipment occurring in finished areas.
- F. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
- G. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.5 CLEANING

- A. Collect waste material which may constitute a fire hazard, place in closed metal containers, and remove daily from site.

END 09900.

DIVISION 10 – SPECIALTIES
Section 10150 –Compartments and Cubicles

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cubical curtain track and toilet partitions including fasteners and accessories.

1.2 SUBMITTALS FOR REVIEW

- A. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of supports, and door swings.
- B. Product Data: Provide data on panel construction, hardware, and accessories.
- C. Samples: Submit three samples of partition panel standard color selections.

1.3 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Steel Sheet: ASTM A653/A653M, with zinc coating.
- B. Stainless Steel Sheet: ASTM A167, Type 304.

2.2 CURTAIN TRACK

- A. Curtain Track: “I” beam design, 1” x 1 3/8” with 3/4” running surfaces, splice plates, and end caps with electrostatic white paint finish on aluminum parts. Ceiling mounted track shall be anchored through ceiling tile to blocking above ceiling or to suspension system. All curved curtain tracks shall be factory bent to a minimum 12” radius. Provide nylon rollers that accurately fit track. Provide one carrier for each 6” of fabric width. Fabric shall be provided by tenant, and is not in the contract. One of the following approved manufacturers and products may be used:
 - a. A.R. Nelson, “Arnco Model #1200” track complete with #11 glide carriers with hook and #1206 end stop (www.arnelson.com)
 - b. AIV Systems, “Clean-track #7900 with #7901 track carriers” (www.aivsystems.com)
 - c. Additional approved equal products shall be considered.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated on shop drawings and Drawings.
- B. Verify correct spacing of and between plumbing fixtures.
- C. Verify correct location of built-in framing, anchorage, and bracing.

3.2 INSTALLATION – CURTAIN TRACK

- A. Install track secure, rigid and true to ceiling or partition line in accordance with manufacturer's instructions.
- B. Install end caps and stop device.
- C. Secure track to ceiling system.

3.4 ERECTION TOLERANCES

- A. Maximum Variation From True Position: 1/4".
- B. Maximum Variation From Plumb: 1/4".

3.3 CLEANING AND ADJUSTING

- A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16".
- B. Adjust hinges to position doors in partial opening position when unlatched. Return out swinging doors to closed position.
- C. Adjust adjacent components for consistency of line or plane.
- D. Clean partitions and protect from damage.

END 10150.

DIVISION 10 - SPECIALTIES
Section 10200 - Metal Louvers

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal louvers, fasteners, and accessories.

1.2 SUBMITTALS FOR REVIEW

- A. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, tolerances; head, jamb and sill details; blade configuration, screens, blankout areas required, and frames.
- B. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.

1.3 SUBMITAL FOR PROJECT CLOSEOUT

- A. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.4 WARRANTY

- A. Provide twenty year manufacturer's warranty.
- B. Warranty: Include coverage for degradation of finish.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Louvers for building wall; shall be extruded aluminum, 4" deep, 0.050" minimum thickness, storm proof, drainable, and stationary blades, with a minimum net free area of 55%. Provide 1/2" aluminum finished bird screen mesh. Louver finish shall be manufacturer's standard Kynar 500 in a color selected by Landmark. One of the following approved manufacturers and products may be used:
 - a. Airolite, "K609HP", (www.airolite.com)
 - b. Construction Specialties, "GS407" (www.cs.com)
 - c. Ruskin, "ELF 375DX" (www.ruskin.com)
 - d. Additional approved equal products shall be considered.
- B. Louvers for mechanical screen wall; shall be extruded aluminum, 1 1/2" deep, 0.50"

minimum thickness, 48 degree pitch, continuous louver, vertically reinforced at 24" o.c. Louvers and reinforcing shall be manufacturer's standard baked enamel paint finish. Include accessories for a complete installation including metal cap, fasteners, support framing in addition to that shown on Drawings. One of the following approved manufacturers and products may be used:

- a. AiroLite, "AC 420", (www.airolite.com)
- b. Construction Specialties, "1320" (www.c-sgroup.com)
- c. Additional approved equal products shall be considered

2.2 ACCESSORIES

- A. Fasteners and Anchors: Galvanized steel type.
- B. Primer: Manufacturer's standard primer.
- C. Flashings: Sheet aluminum, type specified in Section 07600 Flashing and Sheet Metal.
- D. Sealants: Type specified in Section 07900 – Caulk and Sealant.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that prepared openings and flashings are ready to receive work and opening dimensions are as indicated on shop drawings.

3.2 COORDINATION

- A. Coordinate the Work with installation of mechanical ductwork

3.3 INSTALLATION

- A. Install louver assembly in accordance with manufacturer's instructions.
- B. Install louvers level and plumb.
- C. Align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.
- D. Secure louvers in opening framing with concealed fasteners.
- E. Install screen and frame to interior of louver.
- F. Install perimeter sealant and backing rod in accordance with Section 07900 – Caulk and Sealant.

3.3 CLEANING

A. Strip protective finish coverings.

B. Clean surfaces and components.

END 10200.

DIVISION 10 - SPECIALTIES
Section 10440 – Identifying Devices

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Building directories, interior room signage, exterior building lettering, exterior monument signage, and exterior traffic signage.

1.2 SUBMITTALS FOR REVIEW

- A. Shop Drawings: Indicate sign styles, lettering font, foreground and background colors, locations, overall dimensions of each sign.
- B. Interior signage color samples for selection by Landmark.

1.3 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Include installation template and attachment devices.

1.4 SUBMITTAL FOR PROJECT CLOSEOUT

- A. Keys: Directory keys delivered to Landmark.

1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable building code, and ANSI A117.1 for requirements for the physically handicapped.
- B. Conform to applicable building code for emergency vehicle access, for paint finish and marking on traffic signs.
- C. Conform to Americans with Disabilities Act (ADA).

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Do not install signs when ambient temperature is lower than recommended by manufacturer.
- B. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.1 INTERIOR BUILDING SIGNAGE

- A. Interior Signage: shall be framed, and surface mounted. Lettering shall be subsurface imprinted with back applied plaque color on clear semi-matte finish acrylic. One of the

followings approved equal manufacturers and products may be used:

- a. APCO, "Accord 15" (www.apcosigns.com)
 - b. ASI - Modulex, "Infinity" (www.asimodulex.com)
 - c. Seton, "Evolve Architectural Sign Systems" (www.seton.com)
 - d. Additional approved equal product shall be considered.
- B. ADA 1990-28 CFR Part 36 required tactile lettering and Braille shall be provided on all signs except directional, elevator emergency instruction and two-way communication signs and suite plaque inserts.
- a. Pictograms shall be provided where required by building code and shall include the International Symbol of Accessibility.
 - b. Pictograms shall be accompanied by the equivalent verbal description placed directly below the pictogram. The vertical space (background) allowed for a pictogram shall be a minimum of 6" in height. No Braille or text shall be placed within the 6" high vertical space allotted for the pictogram.
- C. Signage shall be mounted on the wall centered at 60" A.F.F. directly adjacent to the latch side of the door where applicable. Signage colors shall be selected by Landmark. Signs shall be provided where required to satisfy ADA and as follows:
- a. 9" x 6" minimum plaque for each public toilet room with International Handicapped Symbol of Accessibility.
 - b. 9" x 6" minimum plaque for each accessible building entry (if required by building code) with International Symbol of Accessibility.
 - b. 6" x 18" minimum directional plaque for each floor by the elevator.
 - c. Two (2) 6" x 6" minimum plaques for each egress stair door; identification of "Stair" on the exterior of the stair door, floor number on the interior of the stair door.
 - d. Two (2) plaques at each area of rescue assistance; 10" x 10" identification with international handicapped symbol and 10" x 10" two-way communication system emergency instructions.
 - e. 6" x 6" emergency instruction sign at each elevator location at each floor except the ground floor.
 - f. 10" x 10" minimum plaque for each suite up to 3,000 square feet; two (2) 10" x 10" minimum plaques for suites larger than 3,000 square feet; with interchangeable inserts to match the sign lettering and color.

2.3 EXTERIOR BUILDING SIGNAGE

- A. Exterior Building Lettering; shall be 10” Helvetica cast aluminum letters with baked enamel finish to match signage and letters on the adjacent hospital building on the same site. One of the following approved manufacturers and products may be used:
 - a. Wonderly Letters
 - b. Architectural Signing, Inc.
 - c. Additional approved equal products shall be considered

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.

3.2 INSTALLATION – INTERIOR BUILDING SIGNS

- A. Install in accordance with manufacturer's instructions.
- B. Install signs after doors, and surfaces are finished, in locations indicated on the Drawings.
 - a. If sign location is not provided on the Drawings, position sign 12” from strike side of door; on adjacent wall surface.
- C. Mount signage on the wall centered at 5'-0” above finish floor, directly adjacent latch side of the door where applicable.

3.3 INSTALLATION – EXTERIOR BUILDING SIGNS

- A. Install in accordance with manufacturer's instructions.

END 10400.

DIVISION 10 - SPECIALTIES
Section 10500 - Metal Lockers

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Locker units with hinged doors, base, top, and filler panels, hooks, latches, hardware, and all accessory items and attachment hardware for a complete and operating installation.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on locker types, sizes and accessories.
- B. Shop Drawings: Indicate locker plan layout, numbering plan.
- C. Color samples for selection by Landmark.

1.3 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate component installation assembly.

1.4 REGULATORY REQUIREMENTS

- A. Conform to Americans with Disabilities Act

1.5 PART 2 PRODUCTS

2.1 LOCKERS

- A. Lockers; shall be Lockers shall be 12" x 12" x 36" double tier set-up all welded (total height 72") recessed lockers mounted on carpenter built wood base (no legs).
- B. Hinges shall be 050" full loop 5 knuckle 2" high, 3 hinges for doors over 42".
- C. Latching Devices shall be 3 point for single tier and 2 point for double tier, manufacturer's "Quiet" specification with recessed handle.
- D. Provide hasp to receive padlock provided by others.
- E. Provide 3 single prong and 1 double prong cadmium plated hooks, and polished aluminum number plate for each locker.
- F. Door shall be solid, 16 gauge steel having 24 gauge interior pan with acoustical fill.
- G. Body shall be 24 gauge steel.

- H. Door frames shall be 16 gauge steel.
- I. Bottoms shall be 20 gauge steel.
- J. Finish shall be baked enamel finish in color selected from manufacturer's standard.
- K. Provide end panels, filler panels, and sloped metal tops to close off all openings.
- L. Fabrication: Finish edges smooth without burrs. Provide fillers for unused hardware openings on locker door.
- M. One of the following approved manufacturers and products may be used
 - a. Republic Storage Systems Company, "Quiet" (www.republicstorage.com)
 - b. Lyon, "All welded double tier" (www.lyonmetal.com)
 - c. Penco Products, "Guardian" (www.pencoproducts.com)
 - d. Additional approved equal products shall be considered

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that prepared bases are in correct position and configuration.
- B. Verify bases [and embedded anchors] are properly sized.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install lockers secure, plumb, square and in line.
- C. Secure lockers with anchor devices to suit substrate materials. Minimum Pullout Force: 100 lbs.
- D. Bolt adjoining locker units together to provide rigid installation.
- E. Install end panels, filler panels, sloped tops, and bases, as indicated on the Drawings.
- F. Install accessories.
- G. Replace components that do not operate smoothly.

3.3 ADJUSTING AND CLEANING

- A. Marred finishes shall be touched-up using only materials and finishes as recommended or furnished by locker manufacturer.
- B. Doors and latches shall be adjusted and oiled to operate easily without bind.
- C. Clean locker interiors and exterior surfaces.

END 10500.

DIVISION 10 - SPECIALTIES
Section 10520 - Fire Extinguishers, Cabinets, and Accessories

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fire extinguishers, fire extinguisher cabinets, and accessories.

1.2 SUBMITTALS FOR REVIEW

- A. Shop Drawings: Indicate cabinet physical dimensions, rough-in measurements for recessed cabinets, and wall bracket mounted measurements.
- B. Product Data: Provide extinguisher operational features, color and finish, and anchorage details.

1.3 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.

1.4 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Operation and Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

1.5 QUALITY ASSURANCE

- A. Conform to NFPA 10, and applicable building code.
- B. Provide extinguishers classified and labeled by Underwriters Laboratories Inc. for the purpose specified and indicated.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 PRODUCTS

2.1 MATERIALS AND PRODUCTS

- A. Fire Extinguisher; shall be Multi-purpose dry chemical fire extinguisher, with UL rating of 4A-60BC, 10lb. One of the following approved manufacturers and products may be used

- a. Larsen, “MP Series” (www.larsenmfg.com)
 - b. J.L. Industries, “Cosmic” (www.jlindustries.com)
 - c. Additional approved equal products shall be considered
- B. Extinguishers shall be inspected and tagged by the appropriate local authority.

2.2 FIRE EXTINGUISHER CABINETS

- A. Medical Office Building Fire Extinguishers Cabinet (Non-rated wall); shall be aluminum tub, mill finish cabinet with vertical white door with black type A letters. One of the following approved manufacturers and products may be used:
- a. J.L. Industries, “Semi-recessed Panorama 1027 P42” (www.jlindustries.com)
 - b. Larsen, “Semi-recessed AL-G-2409” (www.larsenmfg.com)
 - c. Additional approved equal products shall be considered
- B. Medical Office Building Fire Extinguishers Cabinet (Fire rated wall); shall be aluminum tub, mill finish cabinet with vertical white door with black type A letters. One of the following approved manufacturers and products may be used:
- a. J.L. Industries, “Semi-recessed Panorama 1027 P42 Fire-FX” (for fire rated wall locations) (www.jlindustries.com)
 - b. Larsen, “Semi-recessed AL-G-2409 with Flame Shield Option” (www.larsenmfg.com)
 - c. Additional approved equal products shall be considered

2.3 ACCESSORIES

- A. Fire Extinguisher Wall Bracket; shall be fire extinguisher manufacturers standard wall hung bracket. One of the following approved manufacturers and products may be used:
- a. Larsen, “MB 845”
 - b. J.L. Industries, “Mark Series III”
 - c. Additional approved equal products shall be considered

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify rough openings for cabinet are correctly sized and located.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install fire rate cabinets in fire rated partitions and non-fire rated cabinets in non-rated partitions.
- C. Install top of cabinet at 54" from finished floor, unless noted otherwise on the Drawings.
- D. Install cabinets and wall brackets plumb and level in wall openings, and as indicated on the Drawings.
- E. Secure rigidly in place.
- F. Place extinguishers in cabinets, or on wall brackets as indicated on the Drawings.

3.3 ADJUSTING AND CLEANING

- A. Marred cabinet finishes shall be touched-up using only materials and finishes as recommended or furnished by cabinet manufacturer.
- B. Doors and latches shall be adjusted and oiled to operate easily without bind.
- C. Clean cabinet interiors and exterior surfaces.

END 10520.

DIVISION 10 - SPECIALTIES
Section 10550 – Postal Specialties

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Mail boxes, keys, and other required accessories.

1.2 SUBMITTALS FOR REVIEW

- A. Shop Drawings: Indicate locations, construction and anchorage details, dimensions, rough-in openings sizes, quantity and arrangement of box sizes.
- B. Product Data: Provide data for components.
- C. Color samples for selection by Landmark

1.3 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.

1.4 SUBMITTAL FOR PROJECT CLOSEOUT

- A. Keys: Deliver mail box keys with identifying tags to Landmark by security shipment direct from manufacturer.

PART 2 PRODUCTS

2.1 MAIL BOXES

- A. Mail Boxes: shall be horizontal style, front loading, with double width compartments (5-1/8”h x 12-7/8”w). Each compartment shall be individually keyed and identified by suite number. Finish shall be powder coat anodized aluminum in color selected by Landmark. One of the following approved manufacturers and products may be used
 - a. Bommer Industries, Inc., “Model 6230, Door B” (www.bommer.com)
 - b. Auth-Florence American Device “Centurian 2600 F” (www.auth-florence.com)
 - c. Salsbury Industries, “3614FL” (www.mailboxes.com)
 - d. Additional approved equal products shall be considered
- B. Mail box configuration shall be as indicated on the Drawings. Model numbers listed above provide general information on the product, only.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that prepared openings are ready to receive work.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions and U.S. Postal Service regulations.
- B. Place anchor bolts and anchor devices in correct position.
- C. Install and secure boxes in position, neatly, and accurately stacked.
- D. Install doors and adjust to operate smoothly.
- E. Label rear of box same as front door label identification.

3.3 CLEANING

- A. Clean mail box exterior and interior surfaces.

END 10550.

DIVISION 10 - SPECIALTIES
Section 10810 - Toilet Accessories

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Toilet room accessories include coat hooks, grab bars, toilet paper holders, mirrors, towel dispensers, soap dispensers, specimen pass-thrus, shower seats, and shower curtain rod.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on accessories describing size, finish, details of function, attachment methods.

1.3 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate special procedures, and conditions requiring special attention.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable building code and ANSI A117.1 for requirements for the physically handicapped for provisions for the disabled.

PART 2 PRODUCTS

2.1 TOILET ROOM ACCESSORIES

- A. Toilet Room Accessories: All accessories shall be stainless steel, satin finish, installed at height to meet ADA requirements. One of the following approved manufacturers and products may be used:

	<u>Bobrick #</u> www.bobrick.com	<u>American Spec. #</u> www.americanspecialties.com
a. TA-1 Coat Hooks:	B-76727	7345
b. TA-2 Toilet Paper Holders (recessed): (Owner provided and installed)		
c. TA-3 Toilet Paper Holders (surface): (Owner provided and installed)		
d. TA-4 Mirrors (18" x 36"):	B-165-1836	0620, series
e. TA-5 Towel Paper Dispensers (surface):		

- (Owner provided and installed)
- f TA-6 Soap Dispensers (surface):
(Owner provided and installed)
- g TA-7 Specimen Pass-thru Cabinet: B-505 8154
Provide extension flange, if required
- B. Toilet Grab Bars: All grab bars shall be stainless steel, satin finish, installed at height to meet ADA requirements, and shall be 1 1/2" outside diameter, with 1 1/2" clearance between bar and wall grab bars. One of the following approved manufacturers and products may be used:

	<u>Bobrick #</u> www.bobrick.com	<u>American Spec. #</u> www.americanspecialties.com
a. TA-8 Side Wall Mounted – 42" long:	B-6806	3200 series
b. TA-9 Rear Wall Mounted – 36" long:	B-6806	3200 series
c. TA-10 Rear Wall Mounted – 24" long:	B-6806	3200 series
c. TA-11 Partition Mounted – 42" long:	B-6806	3200 series, Type 56

- C. Shower Accessories: All shower accessories shall be stainless steel, satin finish, installed at height to meet ADA requirements. One of the following approved manufacturers and products may be used:

	<u>Bobrick #</u> www.bobrick.com	<u>American Spec. #</u> www.americanspecialties.com
a. TA-12 Folding Shower Seats :	B-517 (right hand)	8205
b. TA-13 Grab Bar 30" x 60": Rear Wall Mounted – 48" long	B-6806	3200 series
c. TA-14 Grab Bar 30" x 60" Side / Control Wall Mounted – 24" long	B-6806	3200 series
d. TA-15 Grab Bar 36" x 36" shower	B-6861	3200 series, Type 74

- C. Utility Room Accessories: All utility room or janitor closets accessories shall be stainless steel, satin finish, installed at height to meet ADA requirements. One of the following approved manufacturers and products may be used:

	<u>Bobrick #</u> www.bobrick.com	<u>American Spec. #</u> www.americanspecialties.com
a. TA-16 Utility Shelf with Mop and Broom Holder :	B239x33	1308x34

2.2 ACCESSORIES

- A. Adhesive: Two component epoxy type, or contact type, waterproof.
- B. Fasteners, Screws, and Bolts: Hot dip galvanized, tamper-proof.
- C. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify exact location of accessories for installation.
- B. Verify that field measurements are as indicated on product data and the Drawings

3.2 PREPARATION

- A. Coordinate the work with the placement of internal wall reinforcement, and blocking to receive anchor attachments.
- B. Deliver inserts and rough-in frames to site for timely installation.
- C. Provide templates and rough-in measurements as required.

3.3 INSTALLATION

- A. Install accessories in accordance with manufacturers' instructions.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Carefully fit accessories abutting other components with hairline seams, and with maximum gaps of 1/32".
 - a. Where contractor is unable to achieve a hairline seam, provide sealant in joints in color to match adjacent finish surface.
- D. Mounting Heights and Locations: As required by accessibility regulations, and as indicated on the Drawings.

END 10810.

DIVISION 12 - FURNISHINGS
Section 12480 – Entrance Rugs

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Entrance vestibule walk-off floor rugs.

1.2 SUBMITTALS FOR REVIEW

- A. Shop Drawings: Indicate the dimensions and the special design features.
- B. Product Data: Provide data indicating mat characteristics, component dimensions, recessed frame and details.

1.3 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Operation and Maintenance Data: Submit data on cleaning instructions, and stain removal procedures.

PART 2 PRODUCTS

2.1 RUGS AND MATS

- A. EM-1: Floor Rugs; shall be solution dyed rubber reinforced polypropylene fiber, 20” x 20” (or equal) entrance system tiles. One of the following approved manufacturers and products may be used:
 - a. Anderson Company, “Waterhog Premier Tile” (www.andersenco.com)
 - b. Construction Specialties, “Powerpoint 50 oz. Tile” (www.c-sgroup.com)
 - c. Mats Incorporated, “Diagonal Tile.” (www.matsinc.com)
 - d. Additional approved equal products shall be considered

2.2 FABRICATION

- A. Construct recessed mat frames square, tight joints at corners, rigid. Coat surfaces with a protective coating where it is in contact with cementitious materials.
- B. Fabricate mats in single unit sizes.

2.3 ACCESSORIES

- A. Sub-floor filler: White premixed latex.
- B. Solvent free permanent adhesive, product recommended by tile rug manufacture

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that floor opening in the finish floor material for the mat or rug is ready to receive work.
- B. Verify floor tile edge includes an aluminum strip to form the transition between the mat or rug and the finish floor tile. Refer to floor tile specification for more information.

3.2 PREPARATION

- A. Verify size and depth of floor recess created by the finish floor material is before fabricating rug.
- B. Remove sub-floor ridges and bumps. Fill minor low spots (1/8" in 10'-0"), cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- C. Prohibit traffic until filler is cured.
- D. Vacuum clean floor recess.

3.3 INSTALLATION

- A. Install mat or rug frames to achieve flush plane with finished floor surface. Install sub-floor filler to the edges as required to feather up the edges as required to make the two surfaces flush.
- B. Apply solvent free permanent adhesive as recommended by tile rug manufacturer and solvent manufacturer.
- C. Install mats in floor recess flush with finish floor after cleaning of finish flooring.

END 12480.

DIVISION 12 - FURNISHINGS
Section 12490 – Window Treatment

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Aluminum mini-blinds including slats, rails, cords, hardware, and accessories.

1.2 SUBMITTALS FOR REVIEW

- A. Shop Drawings: Indicate opening sizes, tolerances required, method of attachment, clearances, and operation.
- B. Product Data: Provide data indicating physical and dimensional characteristics, and operating features.
- C. Color samples for selection by Landmark.

1.3 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.

1.4 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Extra Material: Identify Owner's storage room location and store extra material in original cartons.

1.5 EXTRA MATERIALS

- A. Provide ten additional slats.
- B. Provide two additional complete blind assemblies of each size.

PART 2 PRODUCTS

2.1 BLINDS AND BLIND COMPONENTS

- A. 1" aluminum slats and rails with baked enamel finish matching window frame color as closely as possible.
- B. Braided polyester dacron ladders and lift cords with rayon core and braided dacron polyester jacket. Lifting, tilting and locking hardware and molded plastic headrail end caps.
- C. One of the following approved manufacturers and products may be used:

- a. Hunter Douglas, "Celebrity" (www.hunterdouglas.com)
- b. Levolor, "Monaco DustGuard" (www.levolor.com)
- c. Springs Industries, "Bali LightBlock" (www.baliblinds.com)
- d. Kirsch, "Basic 8 Privacy 1" (www.kirsch.com)
- e. Additional approved equal products shall be considered.

2.2 FABRICATION

- A. Fabricate blinds to fit within openings with uniform edge clearance of 1/4". Install within window frames, and do not cover.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that openings are ready to receive the work.
- B. Ensure structural blocking and supports are correctly placed.

3.2 COORDINATION

- A. Coordinate the work with window installation and placement of concealed blocking to support blinds.

3.2 INSTALLATION

- A. Install blinds in accordance with manufacturer's instructions.
- B. Secure in place with concealed fasteners.
- C. Place intermediate head supports at spacing recommended by manufacturer.

3.3 INSTALLATION TOLERANCES

- A. Maximum Variation of Gap at Window Opening Perimeter: 1/4".
- B. Maximum Offset From Level: 1/4".

3.4 ADJUSTING

- A. Adjust blinds for smooth operation.

3.5 CLEANING

A. Clean blind surfaces just prior to occupancy.

END 12490.

DIVISION 13 - SPECIAL CONSTRUCTION
Section 13090 - Xray Radiation Protection

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Lead lined gypsum board, lead lined doors, lead lining hollow metal frames, and leaded glass.
- B. Film transfer cabinets.

1.2 SYSTEM DESCRIPTION

- A. Radiation Protection: Contain, without leakage, emitted radiation as indicated in radiation physicist report provided by tenant, measured at wall and floor surface with measuring device simulating the emitting equipment.

1.3 SUBMITTALS

- A. Shop Drawings: Indicate layout, details, dimensions, and interface with adjoining work.
- B. Product Data: Provide data on leaded glass, and transfer cabinets.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with NBS (NCRP Report) requirements and as required by regulatory agency having jurisdiction.

1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable health and occupation code for integrity of radiation protection and continuity of protected construction.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS - SHEET LEAD MATERIAL

- A. JF Petterson & Associates, Inc., 519 W. Front Street, Wheaton, IL
- B. Lead Industries Associates, Inc., 295 Madison St., New York, NY 10017
Phone: (212) 578-4750
- C. Lindgren RF Enclosures, Inc., 400 High Grove Blvd, Glendale Heights, IL 60139
Phone: (847) 307-7200
- D. Tecknit Shielding Systems, 838 Main Ave., Passaic, NJ 07055 Phone: (201) 718-6200
- E. Additional approved equal manufacturers shall be considered.

2.2 SHEET LEAD AND ASSOCIATED MATERIALS

- A. Sheet Lead: ASTM B749.
- B. Nails: Lead headed to twice thickness of sheet lead. Lead-headed nails shall be the size, type and design recommended by the system manufacturer.
- C. Tie Wire: Leaded steel, annealed.

2.3 FABRICATION

- A. Lead Lined Gypsum Board: Factory fabricate with permanent resilient adhesive monolithic sheet lead bonded to one surface of board, extend lead sheet 1" beyond one side and one end of board. Lead washers and patches shall be equal to the barrier thickness.
 - a. Gypsum Board shall be as provided in Section 09250 – Gypsum Drywall Partitions and Ceilings.
- B. Lead Lined Doors: Factory fabricate with monolithic sheet lead bonded to one face of solid wood door core, to form rigid door leaf. Bond plastic laminate veneer over lead sheet face. Fabricated door finished thickness of 1- 3/4". Trim lead and plastic laminate, flush with door leaf edges. Reinforce door to support weight of lead lined doors.
 - a. Doors shall be as provided in Section 08220 – Plastic Laminate Doors.
 - b. Conform to AWI type "LL" construction.
- C. Lead Lined Hollow Metal Frames: Factory fabricate with sheet lead formed to line frame, fit tight to internal frame profile, lap seams 2" minimum. Provide double thickness lead over hardware reinforcement plates to afford protection from protruding screw fasteners. Reinforce door frames to support weight of lead lined doors.
 - a. Hollow metal frames shall be as provided in Section 08100 – Hollow Metal Doors and Frames.
- D. Leaded Glass: ASTM C1036, ASTM C1048, clear lead-barium polished float glass, content equivalent to protection requirements of adjacent lead sheet protection (minimum 55 percent lead oxide). Both glass surfaces shall be mirror polished).
 - a. Glass shall be provided in Section 08800 – Glass and Glazing.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that existing surfaces and substrate construction are ready to receive work and opening dimensions are as indicated on the Drawings and shop drawings.
- B. Provide lead lining in accordance with the radiation physicist report provided by the Tenant.

- C. Shielding testing shall be measured at wall and floor surface with measuring device simulating the emitting equipment.

3.2 INSTALLATION

- A. Install components and accessories in accordance with manufacturer's instructions.
- B. Install lead lined gypsum board in accordance with Section 09250 – Gypsum Drywall Partitions and Ceilings.
- C. Install lead lined doors in accordance with Section 08220 – Plastic Laminate Doors
- D. Install lead lined glazed frames in accordance with Section 08100 – Hollow Metal Doors and Frames.
- E. Install leaded glass in accordance with Section 08800 – Glass and Glazing.

3.3 INSTALLATION – LEAD LINED GYPSUM BOARD

- A. Install lead sheets to wall substrate by mechanical attachments; lead headed fasteners spaced at 4” to framing members.
- B. Install lead laminated products with lead face against supports.
- C. Lap edges and ends of lead sheets 1”. Apply lead patches, same thickness as lead sheet, over penetrations, to achieve continuity of protection.
- D. Extend lead protection as indicated in physicist report.

3.4 FIELD QUALITY CONTROL

- A. Inspection and testing will be performed by a licensed radiologist technician, provided by the tenant, in coordination with regulatory agency requirements, to ascertain conformance of installation regarding radiation passage or leakage.
- B. Cooperate and offer assistance in such work. Execute instructions given.

END 13090.

DIVISION 14 - CONVEYING SYSTEMS
Section 14240 - Hydraulic Traction Elevators -Holed

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Holed hydraulic traction elevator, including cab, components, hoistway door, controls, and miscellaneous accessories for a complete and operational system.
- B. Contract shall submit an alternate price to provide a holes hydraulic traction elevator which matches the holed hydraulic traction elevator specified below.

1.2 SUBMITTALS FOR REVIEW

- A. Shop Drawings: Indicate the following information:
 - a. Motor and hydraulic pump, valves, controller, selector, governor and other component locations.
 - b. Car, machine beams, guide rails, buffers, and other components in hoistway.
 - c. Rail bracket spacing; maximum loads imposed on guide rails requiring load transfer to building structural framing.
 - d. Individual weight of principal components; load reaction at points of support.
 - e. Loads on hoisting beams.
 - f. Clearances and over travel of car.
 - g. Location of components in machine room.
 - h. Locations in hoistway and machine room of connections for [car light] [and] [telephone].
 - i. Location and sizes of access doors, doors, and frames.
 - j. Expected heat dissipation of elevator equipment in machine room.
 - k. Applicable seismic design data; certified by a Registered Professional Structural Engineer.
 - l. Electrical characteristics and connection requirements.
 - m. Show arrangement of equipment in machine room so moving elements and other equipment can be removed for repairs or replaced without disturbing other components. Arrange equipment for clear passage through access door.

- B. Product Data: Provide data on the following items:
 - a. Signal and operating fixtures, operating panels, indicators.
 - b. Cab design, dimensions, layout, and components.
 - c. Cab and hoistway door and frame details.
 - d. Electrical characteristics and connection requirements..
- C. Color samples for selection:
 - a. Plastic laminate wall panel selection
 - b. Paint color for cab shell
 - c. Paint color for shaft door and frame
 - d. Paint or finish color for call button and lantern

1.3 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Operation and Maintenance Data:
 - a. Include a parts catalog with complete list of equipment replacement parts; identify each entry with equipment description and identifying code.
 - b. Provide technical information for servicing operating equipment.
 - c. Include legible schematic of hydraulic piping and wiring diagrams of installed electrical equipment and changes made in the Work. List symbols corresponding to identity or markings on machine room and hoistway apparatus.
 - d. Provide one copy of master electric and hydraulic schematic and one copy of lubrication chart, each framed with clear [plastic] [glass]; mount on machine room wall.
- B. Warranty: Submit manufacturer and installer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
- C. Assignable proposal for one (1) year service and maintenance contract.

1.4 QUALITY ASSURANCE

- A. Installer: Company specializing in performing the work of this section and approved by elevator equipment manufacturer.
- B. Perform Work in accordance with the following requirements;
 - a. ANSI A17.1, "Safety Code for Elevators and Escalators".

- b. National Electrical Code (N.E.C.).
- c. NFPA 80 standards for labeling of entrances as required by code.
- d. Americans with Disabilities Act (ADA) 1990-28 CFR Part 36.
- e. Handicapped accessibility requirements adopted by the authority having jurisdiction.

1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable building code for manufacture and installation of elevator system.
- B. Conform to applicable building code and ANSI A117.1 for requirements for the physically handicapped for provisions for the disabled.
- C. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc., as suitable for the purpose specified and indicated.
- D. Firefighter's Service: Review requirements with regulatory agency having jurisdiction.
 - a. Provide "Firefighter's Operation" in accordance with ASME A17.1.
 - b. Designated Landing: First Floor, unless otherwise required by the governing authority having jurisdiction.

1.6 PROJECT CONDITIONS

- A. Schedule the work to permit early use of the elevator for construction purposes.
- B. If final finishes are in place, provide cars with temporary enclosures to protect finishes from damage. Repair or replace all damaged finishes.

1.7 WARRANTY

- A. Correct defective Work within a one year period after Date of Substantial Completion.
- B. Warranty: Include manufacturer's standard warranty coverage for elevator operating equipment and devices.

1.8 MAINTENANCE SERVICE

- A. A maintenance and service contract, for execution by the Owner, shall be provided covering the period of one year following Substantial Completion. The maintenance shall include testing, inspections, adjustments, lubrication, cleaning, supplies, and parts and labor to keep equipment in proper operation.
- B. Examine system components semi-monthly. Clean, adjust, and lubricate equipment.
- C. Include systematic examination, adjustment, and lubrication of elevator equipment; maintain hydraulic fluid levels. Repair or replace parts whenever required. Use parts produced by the

manufacturer of the original equipment. Replace wire ropes when necessary to maintain the required factor of safety.

- D. Perform work without removing cars during peak traffic periods.
- E. Provide emergency call back service at all hours for this maintenance period.
- F. Maintain locally, near the Place of the Work, an adequate stock of parts for replacement or emergency purposes. Have personnel available to ensure the fulfillment of this maintenance service, without unreasonable loss of time.
- G. Perform maintenance work using competent and qualified personnel under the supervision of the elevator manufacturer or original installer.
- H. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

1.9 DEMONSTRATION

- A. Landmark, Owner, and Hospital personnel shall be instructed in the proper use, operation, and daily maintenance.
- B. Review emergency provisions, including emergency access and procedures to be followed at the time of failure in operation and other building emergencies.
- C. Train Hospital's personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions.

PART 2 PRODUCTS

2.1 HYDRAULIC TRACTION ELEVATOR

- A. Elevator 3; shall be 4,000 pound minimum capacity, 100 fpm on two story buildings and 150 fpm on three or more story buildings, 6'-0" x 8'-9" exterior platform, 5'-8" x 7'-9 1/2" inside platform, 4'-0" x 7'-0" two speed slide by doors. One of the following approved manufacturers and products may be used (Model numbers are for cabs with one door. Provide comparable models when two door cabs are shown on Drawings):
 - a. Thyssen Krupp Elevator Company, "Continental 45" (www.thyssen-elevator.com)
 - b. Kone, "MX Series" (www.kone.com)
 - c. Otis, "LVM 4500" (www.otis.com)
 - d. Schindler Elevator Corporation, "300A" (www.schindler.com)
 - e. Additional approved equal products shall be considered
- B. Elevators 1 & 2; shall be 3,000 pound minimum capacity, 150 fpm on three or more story buildings, 7'-0" x 5'-7" exterior platform, 6'-8" x 4'-9 1/2" inside platform, 3'-6" x 7'-0" two

speed slide by doors. One of the following approved manufacturers and products may be used (Model numbers are for cabs with one door. Provide comparable models when two door cabs are shown on Drawings):

- a. Thyssen Krupp Elevator Company, “Seville 30” (www.thyssen-elevator.com)
- b. Kone, “ ?” (www.kone.com)
- c. Otis, “LVM 3000” (www.otis.com)
- d. Schindler Elevator Corporation, “ ?” (www.schindler.com)
- f. Additional approved equal products shall be considered

2.2 CAR FINISH

- A. Walls shall be made of 16-gauge sheet steel painted with black powder paint and shall have perforations for hardware to mount removable plastic laminate panels. Plastic laminate panels shall be mounted on wall and shall leave reveal space of approximately 1” of exposed painted metal walls. Plastic laminate shall be chosen from the manufacturer's standard selection by Landmark.
 - a. Provide freight buttons.
 - b. Laminate panels shall be vertically mounted and edged with black PVC.
- B. Ceiling shall be suspended with panels laminated with natural satin finish or stainless steel set with halogen down lights.
 - a. Lighting shall provide a minimum of five foot candles measured at the floor.
 - b. An exhaust fan shall be mounted on the car top.
- C. Floor Finish: ½” thinset granite on plywood sub-floor. Recess cab floor to receive floor finish.
- D. Car Door, Jambs, Head Finish: Satin finish stainless steel
- E. Hoistway Door, Jambs, Head Finish: Powder coat paint or baked enamel finish, color to be selected by Landmark from the manufacturer’s standard color chart.
- F. Front return; Satin finish stainless steel.
- G. Handrail; Brushed stainless steel 1-1/2” o.d., 1-1/2” clearance at each sidewall.
- H. Call buttons: Powder paint finish, color to be selected by Landmark from the manufacturer’s standard color chart to match hoistway door and frame finish.

2.3 ACCESSORIES

- A. Protective Pads: Provide one set of protective pads.
- B. Casings: Outer casing shall have waterproof seals at pit floor, and bottom and inner casings shall have welded waterproof high-pressure seal at the bottom.
- C. Operation and Controls: Microprocessor for each elevator or group of elevators; automatic two way leveling. If travel distance between two stops is less than 4'-0", wire relays may be provided.
- D. Signals:
 - a. Hall illuminated push buttons (minimum size 3/4"; centered at 42" above the floor).
 - b. Car illuminated push buttons (minimum size 3/4") with raised and braille characters and symbols mounted no higher than 54" above the floor for side approach and no higher than 48" above the floor for front approach. Illuminated push buttons including emergency controls shall be a minimum of 35" above the floor.
 - c. Illuminated (minimum number size 1/2") and audible signal (minimum 20 decibel) car position indicator mounted above the control panel or over the door.
 - d. Hall illuminated and audible (one gong up; two gongs down) signal and directional wall lanterns for each elevator (minimum visual element dimension of 2-1/2"; centered at 72" above the floor).
 - e. Electric eye on doors at 5" and 29" above the floor with keyed or toggle on-off switch.
 - f. Door edge protective devices on leading edge of doors that cause doors to stop and reopen upon contract.
 - g. Adjustable time door nudging feature with alarm buzzer.
- E. Braille plaques; shall be provided adjacent to each push button, including nominal 2" high raised character and braille floor designation at both jambs of each door (mounted at 60" to center line).
- F. Smoke detectors and key-operated switch; shall engage emergency recall to designated level, alternate level, and keyed switch level.
- G. Provide vibration absorption mounts for rotating or vibrating equipment and components.

2.4 EMERGENCY SERVICE

- A. Elevator service; shall be in full compliance with Section 211 of ANSI A17.1 in terms of emergency operation and signal devices.
- B. Battery pack emergency lighting; shall be provided in cab for instantaneous lighting in event of power loss to the elevator.

- C. Emergency communication; shall be push button self-dialing telephone system with message light, pre-recorded message and minimum 29" cord, mounted so that the highest operable part is no more than 48" above the floor. System shall satisfy ADA requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that hoistway, pit, and machine room are ready for work of this section.
- B. Verify hoistway shaft and openings are of correct size and within tolerance.
- C. Verify location and size of machine foundation and position of machine foundation bolts.
- D. Verify that electrical power is available and of the correct characteristics.

3.2 PREPARATION

- A. Arrange for temporary electrical power for installation work and testing of elevator components.
- B. Schedule work to permit early use of Elevator for construction purposes.
- C. Coordinate the installation of hoist beams and support of rails.

3.3 EXCAVATION AND BACKFILLING FOR CASING

- A. Excavate and backfilling for plunger casing and hydraulic lines between plunger and remote machine room in accordance with Section 02300 – Earthwork. Remove subsoil from site.
- B. Maintain shaft alignment of 1" from plumb. Fill over excavated shaft depth with lean concrete.
- C. Maintain shaft excavation free of water.
- D. Place plunger casing full depth of shaft. Align to 1/4" from plumb. Cut top of casing at hoistway pit slab elevation.

3.4 INSTALLATION

- A. Install in accordance with ASME A17.1.
- B. Install system components. Connect equipment to building utilities. Install piping between hoistway plunger and pump unit.
- C. Provide conduit, boxes, wiring, and accessories.
- D. Mount motor and pump unit on vibration and acoustic isolators, on bed plate and concrete pad. Place unit on structural supports and bearing plates. Securely fasten to building

- supports. Prevent lateral displacement.
- E. Accommodate equipment in space indicated.
 - F. Install guide rails using threaded bolts with metal shims and lock washers under nuts. Compensate for expansion and contraction movement of guide rails.
 - G. Accurately machine and align guide rails. Form smooth joints with machined splice plates.
 - H. Bolt or weld brackets directly to structural steel hoistway framing, or to inserts placed in concrete form work, or with self drilling expansion shell anchors that will perform to four times the rated pull-out load.
 - a. Refer to the Drawings for additional information.
 - I. Field Welds: Chip and clean away oxidation and residue, wire brush; spot prime with two coats.
 - J. Coordinate installation of hoistway wall construction.
 - K. Install hoistway door sills, frames, and headers in hoistway walls. Grout sills in place. Set entrances in vertical alignment with car openings and aligned with plumb hoistway lines.
 - L. Fill hoistway door frames solid with grout in accordance with Section 08100 – Hollow Metal Doors and Frames.
 - M. Adjust equipment for smooth and quiet operation.

3.5 ERECTION TOLERANCES

- A. Guide Rail Alignment: Plumb and parallel to each other in accordance with ASME A17.1 and ASME A17.2.
- B. Cab Movement on Aligned Guide Rails: Smooth movement, with no objectionable lateral or oscillating movement or vibration.
- C. Final installation shall provide a 1/2" leveling tolerance, up or down, regardless of the load and direction of travel.

3.6 TESTS BY CONTRACTOR

- A. Perform tests required by ASME A17.2.
- B. Provide two weeks written notice of date and time of tests.
- C. Supply instruments and execute specific tests.
- D. Perform the following tests in the presence of the Landmark
 - a. Test elevator system by transporting at least six persons up from main floor during a five

minute period.

- b. At an agreed time during the contract warranty period, and with the building normally occupied using normal building traffic, conduct tests to verify performance. Furnish event recording of all hall call registrations, time initiated, and response time throughout entire normal working day.
- c. Time elevator travel between typical floors. Measure time from moment doors start to close until car has stopped level at next floor and doors are opening.

3.7 TESTS BY REGULATORY AGENCIES

- A. Testing by regulatory agencies will be performed at their discretion; and shall be documented by the Contractor.
- B. Obtain required permits to perform tests. Perform tests required by regulatory agencies.
- C. Schedule tests with agencies and if possible, with Landmark present.
- D. Furnish test and approval certificates issued by jurisdictional authorities.

3.8 ADJUSTING AND CLEANING

- A. If elevator is used during construction of the project, it shall be protected from damage. All damaged parts or equipment shall be replaced prior to Substantial Completion and acceptance.
- B. Adjust for smooth acceleration and deceleration of car so not to cause passenger discomfort.
- C. Adjust automatic floor leveling feature at each floor to achieve 1/4" from flush.
- D. Remove protective coverings from finished surfaces.
- E. Clean surfaces and components ready for inspection.
- F. Do not permit construction traffic within cab after final cleaning.

END 14240.

DIVISION 15 - MECHANICAL
Section 15300- Basic Fire Protection Requirements

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fire protection system basic requirements

1.2 BASIC FIRE PROTECTION REQUIREMENTS

- A. Fire Protection – Medical Office Building: The fire protection system shall be a NFPA-13 and NFPA-14 complying system including a wet fire sprinkler system and a stand pipe.
 - a. The work shall incorporate a complete design / build approach including the engineering, development of working drawings for the engineered contract documents, permits, approvals, computer hydraulic design calculations, inspections and system performance testing in accordance with state and local governing authority requirements.
 - b. The fire protection system shall incorporate conveniences for maintenance and future remodeling.
 - c. The fire protection system shall comply with all state and local codes.
 - d. Service shall be fed with a 6” line from a city main. Refer to the Drawings for additional details.
 - e. System shall be zoned by floor.
 - f. Sprinkler heads in Lobbies and Atriums shall be concealed with white cover plates.
 - g. Sprinkler heads in all other finish areas shall be semi-recessed with white finish.
 - h. Brass upright sprinkler heads shall be provided in areas without finish ceilings.

END 15300

DIVISION 15 - MECHANICAL
Section 15320- Fire Protection

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Hydraulically designed automatic wet fire sprinkler system, including the design, approvals, piping, valves, fittings, hangers, sleeves, escutcheons, alarms, identification, and sprinkler heads.
- B. The work shall incorporate a complete design / build approach including the engineering, development of working drawings for the engineered contract documents, permits, approvals, computer hydraulic design calculations, inspections and system performance testing in accordance with state and local governing authority requirements.

1.2 SUBMITTALS FOR REVIEW

- A. Shop Drawings: Indicate pipe routes, head locations and types and all components of the design.
- B. Product Data: Provide data on; Pipe and fittings, Valves, Sprinkler heads, and Accessories

1.3 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Operation and Maintenance Data:
 - a. Include a parts catalog with complete list of equipment replacement parts and identify each entry with equipment description and identifying code.
 - b. Provide technical information for servicing operating equipment.
 - c. Include legible schematic of piping and wiring diagrams of installed electrical equipment. List symbols corresponding to identity or markings on machine room apparatus.
- B. Warranty: Submit manufacturer and installer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Installer: Company specializing in manufacturing fire protection systems with minimum three years documented experience.
- B. Perform Work in accordance with the following requirements:
 - a. Requirements of building and mechanical codes and local and state ordinances adopted by the authorities having jurisdiction.

- b. The latest published NEC, NEMA, ASME and UL standards.
 - c. Requirements of local utility companies and the fire department.
 - d. NFPA 13, 14, 20 and 24.
- C. The fire protection system shall incorporate conveniences for maintenance and future remodeling.

1.5 PERFORMANCE REQUIREMENTS

- A. Provide system in accordance with light hazard occupancy requirements.
- B. Follow the requirements of local utility companies and the fire department. Follow the recommendations of the latest published NEC, NEMA, ASME and UL standards as applicable. Follow NFPA 13, 14, 20 and 24, as applicable.
- C. Test pressure and flow characteristics of the water service prior to hydraulic design.
- D. Piping shall not be exposed except in stairs, future areas, mechanical rooms or rooms without ceilings.
- E. All valves controlling main water supplies shall be provided with tamper switches.
- F. Flow alarms shall be provided as required by code.
- G. Wiring to a control panel, if required by code, shall be by the electrical contractor.
- H. The sprinkler head density shall be as determined by the sprinkler contractor's calculations in accordance with the requirements for light hazard occupancy.
- I. The initial design shall include sprinkler piping sized to accommodate one (1) head per eighty five (85) square feet in suite areas.
- J. System shall be zoned by floor

1.6 REGULATORY REQUIREMENTS

- A. Conform to applicable building code for manufacture, product, and installation of system.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc., as suitable for the purpose specified and indicated.
- C. The fire protection system shall be a NFPA-13 and NFPA-14 complying system including a wet fire sprinkler system and a stand pipe.

1.6 WARRANTY

- A. Correct defective Work within a one year period after Date of Substantial Completion.

- B. Warranty: Include manufacturer's standard warranty coverage for operating equipment and device.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Pipe: Overhead piping shall be ASTM A53# , A135 or A795 black steel with clean-cut tapered threads or plain end grooved for couplings as required; standard weight Schedule 40 for threaded pipe, grooved, welded-pipe and thin wall, listed Schedule 10 for 2-1/2" or larger roll groove and welded pipe. Other types of fittings are not permitted.
- B. Threaded fittings: Cast iron Class 125, ANSI B16.4 or malleable iron Class 150, ANSI 16.3.
- C. Grooved coupling fittings: 175 psi cold working pressure, malleable iron fittings, ASTM A 47 with EPDM or Buna-N gaskets.

2.2 VALVES

- A. Shut-Off Valves; shall be gate, butterfly or ball valves, threaded brass or bronze as manufactured by ITT, Nibco, Grinnell or Jenkins.
- B. Gate Valves: OS & Y flanged type, 175 psi working pressure, Kennedy, IBBM or Jenkins.
- C. Check Valves: UL listed, non-slamming type swing check valves with bronze faced disc:
 - a. Check valves 2-1/2" or smaller: Threaded brass or bronze approved type, ITT, Grinnell or Jenkins.
 - b. Check valves 3" or larger: Flanged type, 175 psi working pressure, Kennedy, IBBM or Jenkins.
 - c. Test Valves: UL listed inspector test valve with gauges.
 - d. Drain Valves: All auxiliary drain valves 175 psi rated bronze with solid wedge discs and rising stems.
 - e. All test and drain valves (serving more than 5 gallons) shall be piped to discharge to the exterior. Auxiliary drains may discharge in adequate sized mechanical room floor drains.
- D. Control valves and water flow detectors; shall have UL Listed supervisory switches which are electrically compatible with the fire alarm system equipment. All control and drain valves shall be permanently tagged to show the corresponding sprinkler system zone. Water flow detectors shall have a mechanical or electrical retard.
- E. Fire Department Connection: Brass body 4" inlet with two (2) 2-1/2" connections, national hose thread cap and chains; clapper type independent check valves with ground seats; and nameplate "AUTO SPKR & STANDPIPE"; Potter Roemer 5022D. Verify sizes with the Local Fire Department.

- F. Identification: Each valve shall be tagged and numbered corresponding with a valve schedule.
- a. Tags shall be minimum twenty (20) gauge polished brass not less than 1-1/2" diameter with 1/4" stamped letters identifying service and 1/2" stamped letters identifying valve number.
 - b. Tags shall be secured with approved meter seal, brass "s" hooks or brass jack chain.
 - c. Valve charts shall be provided in duplicate. One mounted in an aluminum frame with plexiglass secured on a wall in the main mechanical room, and the other enclosed in a transparent plastic covering with two grommet reinforced holes at the top and an 8" length of nickel plated chain.
 - d. Charts shall include the following information:
 - i. Valve identification number
 - ii. Location
 - iii. Purpose
 - iv. Type
 - v. Service
 - vi. Pressure
 - vii. Class
 - viii. Manufacturer
 - ix. Figure number

2.3 SPRINKLER HEADS – MEDICAL OFFICE BUILDING

- A. Sprinkler heads shall have proper temperature ratings in accordance with NFPA 13.
- B. Sprinkler heads in Lobbies, Atriums and Drywall Soffits shall be quick response pendent, white painted sprinkler heads, concealed with white cover plate.
- C. Sprinkler heads in all other finish areas shall be quick response pendent, white painted sprinkler heads, with white escutcheons, semi-recessed with white finish.
- D. Brass upright sprinkler heads shall be provided in areas without a finished ceiling.

2.5 ACCESSORIES

- A. Backflow preventer: If required by code, provide FEBCO or Watts backflow preventor.
- B. Pipe sleeves; shall be schedule forty (40) steel pipe.
- C. Escutcheons; shall be chrome plated sectional type.
- D. Flow alarm switches; shall be UL and/or FM approved, paddle type indicator.
- E. Alarm bells; shall be 10" weatherproof, located outside the building where required by code.
- E. A metal sprinkler cabinet with four (4) additional sprinkler heads of each type and sprinkler wrench for emergency use shall be provided.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that area of Work is ready for work of this section.
- B. Verify that electrical power is available and of the correct characteristics.

3.2 INSTALLATION

- A. Install in accordance with manufacturer recommendations.
- B. Piping and fittings shall be anchored, clamped and rodded as required for proper support and to satisfy code required seismic requirements. Hangers shall be adjustable 1-1/2" minimum vertically and shall be installed within 12" of each horizontal elbow.
- C. Piping shall be installed as tightly against structural components as possible to allow for maximum finished ceiling heights.
- D. Sleeves shall be flush with wall and ceiling surfaces. Openings around sleeves shall be sealed with fiberglass and silicone caulking. Where pipes pass through fire rated construction, openings around piping shall be sealed with fire safing and fire resistant joint sealer satisfying the requirements of ASTM E 814.
- E. Escutcheons shall be installed on all piping passing through floors, walls and ceilings where piping is to remain exposed.
- F. Valves shall be located in accessible areas wherever possible. Key operated, concealed hinge access doors equal to Zurn Z-1460-4 shall be provided if valves are required to be installed in inaccessible areas.
- G. Cuts in ceiling material shall be totally concealed by escutcheons.
- H. Heads shall be fully installed in ceiling tile material, avoiding all conflict with fixtures and ceiling grid, as close to the center of ceiling tile as possible. Exact centering in tile is not required. Locate heads as close to center as possible in a room. Exact centering in a room is not required.
- I. Flow alarm switches shall be provided where required by the local authority having jurisdiction.

3.3 TESTS BY CONTRACTOR

- A. Pre-construction Testing: Pressure and flow characteristics of the water service shall be tested and verified prior to beginning hydraulic design.
- B. Post-construction Testing: Prior to concealing piping, completed sprinkler system shall be subjected to a hydrostatic pressure test at 200 lbs per square inch (psi) or 50 psi over system working pressure, whichever is greater, for a minimum two hour period in the presence of

Landmark and appropriate city, fire department and state officials.

- a. Provide all required flow tests in accordance with NFPA 13, NFPA 14 and NFPA 72.
- b. Provide all required fire pump test in accordance with NFPA 20 and NFPA 72.

3.4 TESTS BY REGULATORY AGENCIES

- A. Testing by regulatory agencies will be performed at their discretion; and shall be documented by the Contractor.
- B. Obtain required permits to perform tests. Perform tests required by regulatory agencies.
- C. Schedule tests with agencies and if possible, with Landmark present.
- D. Furnish test and approval certificates issued by jurisdictional authorities.

3.5 ADJUSTING AND CLEANING

- A. Clean all sprinkle heads and exposed fire protection system components.

END 15320.

DIVISION 15 - MECHANICAL
Section 15380- Stand Pipe System

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Hydraulically designed Class I manual wet stand pipe system combined with automatic sprinkler system.
- B. The work shall incorporate a complete design / build approach including the engineering, development of working drawings for the engineered contract documents, permits, approvals, computer hydraulic design calculations, inspections and system performance testing in accordance with state and local governing authority requirements.

1.2 SUBMITTALS FOR REVIEW

- A. Shop Drawings: Indicate pipe routes, head locations and types and all components of the design.
- B. Product Data: Provide data on; Stand pipe system and accessories

1.3 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Operation and Maintenance Data:
 - a. Include a parts catalog with complete list of equipment replacement parts and identify each entry with equipment description and identifying code.
 - b. Provide technical information for servicing operating equipment.
 - c. Include legible schematic of piping and wiring diagrams of installed electrical equipment. List symbols corresponding to identity or markings on machine room apparatus.
- B. Warranty: Submit manufacturer and installer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Installer: Company specializing in manufacturing fire protection systems with minimum three years documented experience.
- B. Perform Work in accordance with the following requirements:
 - a. Requirements of building and mechanical codes and local and state ordinances adopted by the authorities having jurisdiction.

- b. The latest published NEC, NEMA, ASME and UL standards.
 - c. Requirements of local utility companies and the fire department.
 - d. NFPA 13, 14, 20 and 24.
- C. The fire protection system shall incorporate conveniences for maintenance and future remodeling.

1.5 PERFORMANCE REQUIREMENTS

- A. Follow the requirements of local utility companies and the fire department. Follow the recommendations of the latest published NEC, NEMA, ASME and UL standards as applicable. Follow NFPA 13, 14, 20 and 24, as applicable.
- B. Test pressure and flow characteristics of the water service prior to hydraulic design.
- C. Piping shall not be exposed except in stairs, future areas, mechanical rooms or rooms without ceilings.
- D. All valves controlling main water supplies shall be provided with tamper switches.
- E. Flow alarms shall be provided as required by code.
- F. Wiring to a control panel, if required by code, shall be by the electrical contractor.
- G. The sprinkler head density shall be as determined by the sprinkler contractor's calculations in accordance with the requirements for light hazard occupancy.
- H. The initial design shall include sprinkler piping sized to accommodate one (1) head per eighty five (85) square feet in suite areas.
- I. System shall be zoned by floor

1.6 REGULATORY REQUIREMENTS

- A. Conform to applicable building code for manufacture, product, and installation of system.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc., as suitable for the purpose specified and indicated.
- C. The fire protection system shall be a NFPA-13 and NFPA-14 complying system including a wet fire sprinkler system, a pre-action fire sprinkler system, a fire pump, and a stand pipe.

1.6 WARRANTY

- A. Correct defective Work within a one year period after Date of Substantial Completion.
- B. Warranty: Include manufacturer's standard warranty coverage for operating equipment and device.

PART 2 PRODUCTS

2.1 MATERIALS

A. Pipe and Fittings:

- a. Overhead piping shall be standard weight ANSI/ASTM A53, A135, or A795 black steel with clean-cut tapered threads or plain end grooved for couplings as required. Standard weight Schedule 40 for threaded pipe and thin wall, listed Schedule 10 for 2-1/2" or larger roll groove pipe.
- b. Fittings for overhead piping shall be vicrotic coupling type for 175 psi cold working pressure and cast iron fittings, free from flaws, sand holds and burrs.

B. Valves:

- a. Fire Hose Connection:
 - i. Hose Valve; listed NFPA Class 1, 2 1/2" cast brass angle valve, 300 psi rated rough chrome plated finish. Outlet shall be approved by the Authorities Having Jurisdiction.
 - ii. Cap; shall be cast brass with pin lugs and chain, rough chrome plated finish.
- b. Shut-Off Valves:
 - i. Gate, butterfly or globe valves 2-1/2" and smaller: Threaded brass or bronze as manufactured by ITT, Grinnell, NIBCO or Jenkins.
 - ii. Valves 3" in size or larger: OS & Y flanged type, 175 psi working pressure, Kennedy, NIBCO or Jenkins.
- c. Check Valves:
 - i. Check valves 2 1/2" or smaller: Threaded brass or bronze approved type; ITT, Grinnell, NIBCO or Jenkins.
 - ii. Check valves 3" or larger: Flanged type, 175 psi working pressure, Kennedy, NIBCO or Jenkins.
- d. Control valves and water flow detectors: shall have UL Listed supervisory switches which are electrically compatible with the fire alarm system equipment. All control and drain valves shall be permanently tagged to show the corresponding sprinkler system zone. Water flow detectors shall have a mechanical or electrical retard.
- e. Identification: Each valve shall be tagged and numbered corresponding with a valve schedule. Tags shall be minimum twenty (20) gauge polished brass not less than 1-1/2" diameter with 1/4" stamped letters identifying service and 1/2" stamped letters identifying valve number. Tags shall be secured with approved meter seal, brass "s" hooks or brass jack chain. Valve charts shall be provided in duplicate, one (1) mounted in an aluminum frame with plexiglass secured on a wall in the main mechanical room, and the other enclosed in a transparent plastic covering with two (2) grommet reinforced holes at the top and an 8" length of nickel plated bead chain attached. Charts shall include the following information:

- i. Valve identification number
 - ii. Location
 - iii. Purpose
 - iv. Type
 - v. Service
 - vi. Pressure
 - vii. Class
 - viii. Manufacturer
 - ix. Figure number
- C. Pipe sleeves shall be Schedule 40 steel pipe.
 - D. Escutcheons shall be chrome plated sectional type.
 - E. Flow alarm switches shall be UL and/or FM approved, paddle type indicator.
 - F. Alarm bells shall be 10" weatherproof, located inside and/or outside the building where required by code.
 - G. Fire department siamese connection and fire department test header connection shall be 2-1/2" x 2-1/2" x 4" polished brass construction, individual clappers, plugs and chains, labeled "Fire Standpipe" or "Fire Department Connection" to meet local fire department requirements. Connections shall be as manufactured by Croker-Standard, Elkhart, Allenco or Potter Roemer. Inlet and hose thread requirements shall be verified with the fire department.
 - H. A pressure gauge shall be provided at the top of each wet standpipe.
 - I. Backflow preventer, if required by code, shall be FEBCO or Watts as required by code.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that area of Work is ready for work of this section.
- B. Verify that electrical power is available and of the correct characteristics.

3.2 INSTALLATION

- A. Install in accordance with manufacturer recommendations.
- B. Piping and fittings shall be anchored, clamped and rodded as required for proper support and to satisfy code required seismic requirements. Hangers shall be adjustable 1-1/2" minimum vertically and shall be installed within 12" of each horizontal elbow.
- C. Sleeves shall be flush with wall and ceiling surfaces. Openings around sleeves shall be sealed with fiberglass and silicone caulking. Where pipes pass through fire rated construction, opening around piping shall be sealed with fire safing and fire resistant joint sealer satisfying the requirements of ASTM E 184.

- D. Escutcheons shall be installed on all piping passing through floors, walls and ceilings where piping is to remain exposed.
- E. Valves shall be located in accessible areas wherever possible. Key operated, concealed hinge access doors equal to Zurn Z-1460-4 shall be provided if valves are required to be installed in inaccessible areas.
- F. Flow alarm switches shall be provided on each wet standpipe where required by the local authority having jurisdiction and NFPA 14.

3.3 TESTS BY CONTRACTOR

- A. Completed standpipe system shall be subjected to a hydrostatic pressure test at 200 psi or 50 psi over system working pressure, whichever is greater, for a minimum two (2) hour period in the presence of Landmark and appropriate city, fire department and state officials.

3.4 TESTS BY REGULATORY AGENCIES

- A. Testing by regulatory agencies will be performed at their discretion; and shall be documented by the Contractor.
- B. Obtain required permits to perform tests. Perform tests required by regulatory agencies.
- C. Schedule tests with agencies and if possible, with Landmark present.
- D. Furnish test and approval certificates issued by jurisdictional authorities.

3.5 ADJUSTING AND CLEANING

- A. Clean all exposed fire protection system components.

END 15380.

DIVISION 15 - MECHANICAL
Section 15400- Basic Plumbing Requirements

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Plumbing systems basic requirements

1.2 BASIC PLUMBING REQUIREMENTS

- A. Plumbing: All plumbing lines, valves, pumps, tanks, equipment, accessories, and other miscellaneous items shall be provided for a complete and working plumbing system. The plumbing system shall incorporate conveniences for maintenance and future remodeling by valving small groups of fixtures and locating soil and vent stacks at interior columns.
 - a. The Plumbing system shall comply with all state and local building and mechanical codes and local ordinances used by the authority having jurisdiction.
 - b. Reduced response time for hot water shall be provided at point of use by means of hot water circulating system.

1.3 EQUIPMENT ARRANGEMENTS, ROUGHING AND INSTALLATION

- A. Due to the small scale of the Drawings, it is not possible to indicate all offsets, fittings, changes in elevations, interferences, etc. Make necessary changes in the work, equipment locations, etc. as part of the contract to accommodate work to obstacles and interferences encountered. Before installing, verify exact location and elevation at work site.
- B. Coordinate work with other trades and determine route or location of each duct, pipe, conduit, etc., before fabrication and installation.
- C. Provide material with flame spread rating of 25 or less and a smoke development rating of 50 or less, in accordance with NFPA 255. All equipment and material for which there is a listing service shall bear the UL label.
- D. Conceal all work above ceilings, in walls, below slabs and elsewhere throughout building. If concealment is impossible, notify Landmark before starting work, and install only after review.
- E. Chases; assume responsibility for correct and final location and size of openings and chases. Provide firestopping for openings in fire and smoke rated walls, roof and floor assemblies.
- F. Supports; provide required supports, beams, angles, hangers, rods, bases, braces, and other items to properly support the work.

END 15400.

DIVISION 15 - MECHANICAL
Section 15420- Plumbing System

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Sanitary sewer piping, storm sewer piping, domestic water supply piping, fittings, valves, specialties, and pumps

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on the following items:
 - a. Valves.
 - b. Water heaters.
 - c. Recirculating pump.
 - d. Sump pump.
 - e. Tank.
 - f. Backflow preventer.
 - g. Hot water heater circuit setters.

1.3 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Operation and Maintenance Data:
 - a. Include a parts catalog with complete list of equipment replacement parts and identify each entry with equipment description and identifying code.
 - b. Provide technical information for servicing operating equipment.
 - c. Include legible schematic of piping and wiring diagrams of installed electrical equipment and changes made in the Work.
 - d. Include information for circulating or domestic booster pumps, sump pumps and sewage ejectors
 - e. Include information for hot water heaters.
- B. Warranty: Submit manufacturer and installer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

- C. Water Test Results: Submit test results that indicate new domestic water systems produce water that is potable.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with the following requirements;
 - a. Local utility company.
 - b. ASME B 31.9 “Building Services Piping” for materials, products and installation. Safety valves and pressure vessels shall bear the appropriate ASME label.
 - c. Code required seismic anchorage and support.

1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable building and plumbing code and local ordinances for manufacture, product, and installation of system.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc., as suitable for the purpose specified and indicated.

1.6 WARRANTY

- A. Correct defective Work within a one year period after Date of Substantial Completion.
- B. Warranty: Include manufacturer’s standard warranty coverage for operating equipment and devices.
 - a. Manufacturer’s three (3) year warranty for circulating or domestic booster pumps, sump pumps and sewage ejectors
 - b. Manufacturer’s three (3) year warranty for water heaters.

1.7 DEMONSTRATION

- A. Landmark, Owner, and Hospital personnel shall be instructed in the proper use, operation, and daily maintenance.
- B. Review emergency provisions, including emergency access and procedures to be followed at the time of failure in operation and other building emergencies.
- C. Train Hospital’s personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions.

PART 2 PRODUCTS

2.1 PIPING AND FITTINGS

- A. Water Supply Piping; shall be one of the following, unless otherwise required by code:
 - a. Ductile Iron Pipe: ANSI A21.51 or AWWA C 151 with ANSI A21.4 cement lining.
 - b. Copper Tubing: ASTM B 88, Copper with wrought fittings, below ground type K soft temper with 95/5 lead free solder, above ground type L hard temper with 95/5 lead free solder.
- B. Water Supply Pipe Fittings; shall be one of the following, unless otherwise required by code:
 - a. Ductile Iron Gasketed Fittings: ANSI B 16.42, Class 150, with AWWA C111 or ANSI A 21.11 rubber gaskets.
 - b. Wrought Copper: ANSI B 16.22, joined with ASTM B 32, no lead solder.
 - c. Unions: ANSI B16.39, malleable iron, Class 150.
- C. Drainage and Vent Piping; shall be one of the following, unless otherwise required by code:
 - a. Cast Iron Soil Pipe: ASTM A74, service weight hub and spigot pipe and fittings.
 - b. Hubless Cast Iron Soil Pipe: CISPI 301 service weight.
 - c. PVC Pipe: ASTM D 2665 or D2949.
 - d. Copper: ASTM B 42, B 88 and B 306 Type DWV.
- D. Drainage and Vent Pipe Fittings:
 - a. Cast Iron Pipe Above Grade: Hubless fittings with neoprene CISPI 310 gaskets and stainless steel bands.
 - b. Cast Iron Pipe Below Grade: Hub and spigot fittings with neoprene compression type gaskets conforming to ASTM C564.
 - c. PVC Pipe: NSF approved solvent solder joints compatible with the material being used. Primer shall conform to ASTM F 656. Solvent cement shall conform to ASTM D 2564. Heavy bodied solvent shall be used on piping 8" and larger.
 - d. Copper: Wrought copper or brass fittings; mechanically cleaned 50-50 solder joints with paste flux.

- E. Pipe identification: All piping shall be color coded using legend markers and directional arrows after piping has been covered, if insulated, and after painting. Pipe markers shall be in accordance with ANSI standard A 13.1-1981 with arrows as manufactured by Seton Name Plate Corp., Craftsmark, Panduit or WH Brady.

2.2 VALVES

- A. Water Supply Pipe Valves: The manufacturer's name and valve number shall be cast into the body of the valve. Each valve shall be tagged and numbered corresponding with a valve schedule which shall provide the location, purpose, type, service, pressure, class, manufacturer, and figure number. One of the following approved manufacturer's may be used:
 - a. Bell & Gossett (B&G)
 - b. Hammond
 - c. ITT Grinnell
 - d. Milwaukee
 - e. NIBCO
 - f. Watts
- B. Ball Valves: For piping 2-1/2" and smaller rated for 600 psi WOG, bronze body, two-piece full-port, replaceable Teflon seats and seals, with vinyl coated steel handle to protect installation; equal to NIBCO 580-70 for piping larger than 1" and 585-70 for piping 1" and smaller.
- C. Butterfly Valves: For piping 3" and larger, MSS SP-67, 200 psi, ductile iron body, nickel plated ductile iron disc, stainless steel stem, and EDPM O-ring stem seals; equal to NIBCO #LD-2010.
- D. Gate Valves: Rising stem, union bonnet, brass body, for 2" and under. For piping 2 1/2" and larger, iron body, bronze trim, equal to NIBCO #F-617-0.
- E. Check Valves: 2-1/2" and smaller, Class 125, bronze body, in-line non-slamming lift type, Teflon seal, resilient disc., equal to NIBCO #S-480; 3" and larger, 125 lb. WOG wafer type, renewable bronze disc and seat, equal to NIBCO #W-910.
- F. Balancing Valves: 3/4" and smaller shall be calibrated bronze plug valve with tapping orifice: B&G CB-3/4 or CB-1/2, or equal Watts or Armstrong.
- G. Trap Seal Primer Valves: ASSE 1018, water-supply-fed type, 125 psig, bronze body with atmospheric-vented drain chamber.
 - a. Inlet and Outlet Connections: NPS 1/2 (DN 15) threaded, union, or solder joint.
 - b. Gravity Drain Outlet Connection: NPS 1/2 (DN 15) threaded or solder joint.

- c. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.
 - d. One of the following equal manufacturers may be used:
 - i. Josam Co.
 - ii. MIFAB Manufacturing, Inc.
 - iii. Precision Plumbing Products, Inc.
 - iv. Smith, Jay R. Mfg. Co.
 - v. Tyler Pipe; Wade Div.
 - vi. Watts Industries, Inc.
 - vii. Zurn Industries, Inc.
 - e. Types:
 - i. Single drain: Watts A200 or equal by other specified manufacturers.
 - ii. Multiple drain: Watts T20 with D20 distributor or equal by other specified manufacturers.
- H. Valve Identification: Each valve shall be tagged and numbered corresponding with a valve schedule.
- a. Tags shall be minimum twenty (20) gauge polished brass not less than 1-1/2" diameter with 1/4" stamped letters identifying service and 1/2" stamped letters identifying valve number.
 - b. Tags shall be secured with approved meter seal, brass "s" hooks or brass jack chain.
 - c. Valve charts shall be provided in duplicate, one (1) mounted in an aluminum frame with plexiglass secured on a wall in the main mechanical room, and the other enclosed in a transparent plastic covering with two (2) grommet reinforced holes at the top and an 8" length of nickel plated bead chain attached.
 - d. Charts shall include the following information:
 - i. Valve identification number
 - ii. Location
 - iii. Purpose
 - iv. Type
 - v. Service
 - vi. Pressure
 - vii. Class
 - viii. Manufacturer
 - ix. Figure number

2.3 WATER HEATERS AND TANKS

- A. Heaters shall be gas as shown on Drawings.

- B. Automatic Circulating Water Heaters: shall be constructed for 160 psi working pressure. Water heaters shall be provided with relief valve, automatic gas shutoff, pilot safety shutoff, insulated jacket, gas pressure regulators as required, and adjustable thermostat. Provide capacity and performance of heaters as scheduled on the Drawings
- a. Heater exchanger shall have a gasketless design.
 - b. Heaters shall be ASME constructed.
 - c. Heaters shall meet the requirements of ASHRAE 90.1 for energy conservation.
 - d. Provide mechanical draft inducer for sidewall vent installation in accordance with the manufacturer's recommendations.
 - e. Heaters shall be provided with concentric vent side wall termination kits complete with rain caps.
 - f. Water heater temperature shall be set at one hundred twenty (120) degrees Fahrenheit, unless noted otherwise on the Drawings.
 - g. One of the following equal manufacturers may be used:
 - i. Lochinvar
 - ii. Laars
 - iii. Reco
 - iv. Additional approved equal manufacturers will be considered
- D. Hot water storage tank shall be provided with relief valve, magnesium anode rod, glass lining on internal wetted surfaces, fiberglass insulated jacket, and drain valve. Provide capacity of water tank as scheduled on the Drawings.
- a. One of the following equal manufacturers may be used:
 - i. Amtrol
 - ii. Lockinvar
 - iii. Wessels Company
 - iv. Additional approved equal manufacturers will be considered
- E. Automatic Circulating Water Heaters: shall be provided where recovery rate is greater than 550 GPH. Heater system shall be provided as shown on Drawings. A minimum of two (2) heaters and one (1) storage tank shall be provided. One of the following equal manufacturers may be used:
- a. Lochinvar
 - b. Laars
 - c. Reco

- F. Hydro-Pneumatic Tanks: Tank shall be pre-charged steel thermal expansion tank with butyl diaphragm or rubber bladder, welded carbon steel construction, threaded water connection, 0.302"-32 air charging valve (standard tier valve fitting), tank mounting (sizes over 5 gal.), and epoxy finish. All wetted surfaces shall be isolated from the steel vessel.
- a. One of the following approved manufacturers may be used:
 - i. Amtrol
 - ii. Tapco
 - iii. Wessels Co.
 - b. Tank pre-charge shall be field re-set as noted on Drawings.
 - c. Tank shall meet ASME Boiler and Pressure Vessels Code and shall be stamped for 125 psig working pressure.
- G. Central Mixing Valve:
- a. Size and capacity shall be provided as scheduled on the Drawings
 - b. Temperature range; 80 degrees F. to 115 degrees F.
 - c. Mixing valve shall be thermostatic type and shall meet ASSE 1017 performance requirements down to 2-gpm. Mixing valve shall have temperature adjustment, dial thermometer, and inlet strainers. Complete assembly shall be rated for not less than 160 psi working pressure. Valve construction shall be exposed rough brass.
- H. Expansion Tanks: Thermal expansion tanks shall be pre-charged with butyl diaphragm, welded carbon steel construction, threaded water connection, 0.302"-32 air charging valve (standard tire valve fitting), tank mounting (sizes over 5 gal.), and epoxy finish. All wetted surfaces shall be isolated from the steel vessel. Tank pre-charge shall be field re-set or as noted on Drawings.
- a. One of the following approved equal manufacturers may be used:
 - i. Amtrol
 - ii. Bell & Gossett
 - iii. Taco
 - iv. Watts

2.4 RECIRCULATING PUMP

- A. Recirculating Pumps: shall be horizontal type with bronze body, steel shaft with integral thrust collar, sleeve bearings, mechanical seal, and non-overloading motor. Provide capacity and performance of pump as scheduled on the Drawings. One of the following equal manufacturers may be used:
- a. Bell & Gossett,
 - b. Taco,

- c. Thrush
 - d. Grundfoss.
- B. Recirculating Pump Aquastat; shall be strap mounted upstream of the circulating pump. Pump shall turn on when the aquastat temperature falls below the set temperature and then off when the upper limit has been met. One of the following equal manufacturers and products may be used:
- a. Honeywell, "Model No. L6006C"
 - b. Additional approved equal products shall be considered.
- C. Provide 7-day timer to control operation of recirculation pump. Settings shall correspond to building occupancy.

2.6 SUMP PUMPS

- A. Sump Pump: shall be submersible type with automatic starting and stop devices, cast iron casing, stainless steel shaft, mechanical seal, open non-clogging impeller, permanently lubricated bearings, 115 VAC / 60Hz / 1PH motor with built-in overload, ball float, electrode or mercury float control, high water float control with audible alarm.
- B. Pumps shall be able to handle liquids with solids not greater than 1/4" and temperatures intermittently not greater than 140° F.
- C. Pumps shall be equipped with an induction motor with minimum open-type Class A stator winding rated at 105° C.
- a. Housing shall be dielectric-oil filled.
 - b. Housing construction shall be ASTM A 48, Class 30 cast iron protected by phosphate treatment and alkyd enamel coating.
 - c. Top and bottom bearing shall be sleeve-type or ball bearing.
 - d. Motor overload, on 1/2 horsepower and less, shall be by heat sensor attached to motor winding.
- D. Power cord shall be SJOW/SJOW-A (SJTW/DJTW-A for 0.4 horsepower pumps or less). Connection to motor shall be mechanically sealed.
- E. Pumps shall be either two vane enclosed type with sealing cup between volute and impeller or shall be recessed vortex-type.
- F. Pump shall be equipped with a single mechanical shaft seal of lapped carbon and ceramic faces. Springs and other metal parts shall be 300 series stainless steel.

- G. All exposed fasteners shall be of 300 series stainless steel.
- H. Sump basins shall be fiberglass, cast iron or concrete.
 - a. Fiberglass construction shall be glass fiber reinforced polyester resin layed up and sprayed to a wall thickness not less than 1/4".
 - b. A collar shall project not less than 3" at the bottom of all basins, except for 18" diameter basins.
 - g. Flanged riser section may be used to satisfy depth requirements.
 - h. Sump cover shall be of construction similar to basin or rib-reinforced polypropylene.
 - i. Steel covers shall be constructed of skid resistant tread plate and coated with bake-on epoxy.
 - j. Fasteners for covers shall be 300 series stainless steel with heads of screws embedded in flange of basin.
- H. Furnish automatic control with NEMA 6 float switches, mercury-tube or mechanical, inside polypropylene housing. Wiring shall be minimum 18 gauge with SJOW/A jacketed cable, sufficient length to reach control or junction box without splices, and height adjustment design that requires minimal tools. Float (s) shall be secured to pump or to removable support.
- I. Alternator on duplex systems shall be furnished with automatic control.
- J. Junction box where used inside basin: NEMA 6 standard, structural plastic construction, tethered cover, box and conduit sized for number of wires and connections.
- K. Pumps shall be furnished with high water alarm panel with alarm silencing switch and auxiliary contact for remote alarm.
- L. Sump cover shall be secured to basin and vented.
- M. One of the following equal manufacturers may be used:
 - a. Hydromatic
 - b. Weil
 - c. Gould Pumps, Inc., Seneca Falls, NY
 - d. Grundfos Pumps Corporation, Clovis, CA
 - e. F.E..Meyers Company, Ashland, OH
 - f. Zoeller Pump Co., Lousiville, KY

- g. Aurora Hydromatic
- h. Additional approved equal products shall be considered.

2.7 SEWAGE EJECTOR PUMPS

- A. Sewage Ejector: shall be submersible screenless type with automatic starting and stop devices, fiberglass basin with bolted solid steel cover with hinged access opening. All pumps with mercury float switch controllers, control panel, alternators for duplex pumps, and high water float control with audible alarm.
- B. Pumps shall be equipped with an induction motor with minimum open-type Class A stator winding rated at 105° C.
 - a. Housing shall be dielectric-oil filled.
 - b. Housing construction shall be ASTM A 48, Class 30 cast iron protected by phosphate treatment and alkyd enamel coating.
 - c. Top and bottom bearing shall be sleeve-type or ball bearing.
 - d. Motor overload, on 1/2 horsepower and less, shall be by heat sensor attached to motor winding.
- C. Power cord shall be SJOW/SJOW-A (SJTW/DJTW-A for 0.4 horsepower pumps or less). Connection to motor shall be mechanically sealed.
- D. Pumps shall be either two vane enclosed type with sealing cup between volute and impeller or shall be recessed vortex-type.
- E. Pump shall be equipped with a single mechanical shaft seal of lapped carbon and ceramic faces. Springs and other metal parts shall be 300 series stainless steel.
- F. All exposed fasteners shall be of 300 series stainless steel.
- G. Sump basins shall be fiberglass, cast iron or concrete.
 - a. Fiberglass construction shall be glass fiber reinforced polyester resin layed up and sprayed to a wall thickness not less than 1/4".
 - b. A collar shall project not less than 3" at the bottom of all basins, except for 18" diameter basins.
 - c. Flanged riser section may be used to satisfy depth requirements.
 - d. Sump cover shall be of construction similar to basin or rib-reinforced polypropylene.
 - e. Steel covers shall be constructed of skid resistant tread plate and coated with bake-on epoxy.

- f. Fasteners for covers shall be 300 series stainless steel with heads of screws embedded in flange of basin.

- H. Furnish automatic control with NEMA 6 float switches, mercury-tube or mechanical, inside polypropylene housing. Wiring shall be minimum 18 gauge with SJOW/A jacketed cable, sufficient length to reach control or junction box without splices, and height adjustment design that requires minimal tools. Float (s) shall be secured to pump or to removable support.

- I. Alternator on duplex systems shall be furnished with automatic control.

- J. Junction box where used inside basin: NEMA 6 standard, structural plastic construction, tethered cover, box and conduit sized for number of wires and connections.

- H. Pumps shall be furnished with high water alarm panel with alarm silencing switch and auxiliary contact for remote alarm.

- I. Sump cover shall be secured to basin and vented.

- J. One of the following equal manufacturers may be used:
 - a. Hydromatic
 - b. Weil
 - c. Gould Pumps, Inc., Seneca Falls, NY
 - d. Grundfos Pumps Corporation, Clovis, CA
 - e. F.E..Meyers Company, Ashland, OH
 - f. Zoeller Pump Co., Louisville, KY
 - g. Additional approved equal products shall be considered.

2.9 BACKFLOW PREVENTERS

- B. Reduced Pressure Principle Backflow Preventer (ASSE 1013): as required by code, furnish approved reduced pressure principle backflow preventer, complete with control valves, test cocks, air gap at vent port, and local waste pipe to drain.
 - a. Preventer size shall be pipeline size or as indicated on drawings.
 - b. For 2 1/2" or larger: Watts 957 OSY, Hersey Products, Inc. FRP-II or equal by other listed manufacturers.
 - b. For 2" or less: Watts 919 QT-S, or equal by other listed manufacturers.
 - c. Furnish with strainer at inlet and provide drain valve at strainer plug.

- d. Provide Water Hammer Arrestor downstream of backflow preventer if preventer connects to quick opening valves such as quarter-turn valves and solenoids.
 - e. One of the following approved manufacturers may be used:
 - i. Ames Company, Woodland, CA
 - ii. Febco, CMB Industries, Fresno, CA
 - iii. Hersey Products Inc., Dedham, MA
 - iv. Watts Water Products Division, North Andover, MA
 - v. Wilkins Division, Paso Robles, CA
- D. Air gaps shall comply with ANSI A112.1.2.
- E. Pipe Applied Atmospheric Type Vacuum Breaker (ASSE 1001): furnish approved device as required by code.
- F. Hose Connection Vacuum Breaker (ASS# 1011): furnish approved device as required by code. This is not required where a drain valve is only intended to drain pipes, tanks or equipment.
- F. Backflow Preventer with Intermediate Atmospheric Vent (ASSE 1012) complete with indirect waste pipe to drain and air gap; Hersey Products, Inc. BCP.
- G. Pressure Vacuum Breaker (ASSE 1020): furnish approved device as required by code. Mount height of device as required by code.
- H. Backflow Preventer for Carbonated Beverage Machine (ASSE 1022): where required by code, furnish approved backflow preventer, complete with indirect waster pipe to drain and air gap.
 - a. Provide Watts 3/8 inch SD-3 or review equivalent.
- J. Black Siphonage Vacuum Breaker (ASSE 1056): as required by code, furnish approved back siphonage vacuum breaker complete with quarter-turn control valves, and test cock.
 - a. Preventer size shall be pipeline size or as indicated on drawings.
 - b. Mount height of device as required by code.
 - c. Furnish with satin chrome finish.
 - d. Furnish Watts 008QT-SC, or reviewed equivalent.

2.10 SPECIALTIES

- A. Air Vent: Brass body with stainless non-ferrous internal working parts, float type. Vent opening varies with volume of air.
 - a. One of the following approved manufacturers may be used:

- i. Amtrol
- ii. Bell & Gossett
- iii. Taco
- iv. Watts

B. Vacuum Relief Valve; Brass body with stainless steel non-ferrous internal working parts. One of the following approved manufacturers may be used:

- a. Amtrol
- b. Bell & Gossett
- c. Taco
- d. Watts

C. Pressure Gauges and Thermometers: Comply with ASME B 31.1, ANSI B40.1, and ISA. Readings shall be suitable for pressures and temperatures encountered.

D. Clean outs shall be as follows:

	Josam	J.R. Smith	Zurn	Wade
Exposed Concrete Floors	56000-2	4028	1400-BP	6010
Tile Floors	56000-12	4148	1400-X	6010-T
Carpet Floors	56000-14	4028-Y	1400-CM	6010-72
Walls				
All surfaces	58710-22	4422	1441	8450-R
Exterior Z-1474 housing	58860-5	4250	Z-1400 with	

E. Strainers: “Y” type with stainless steel screen.

F. Water Hammer Arrestors; if required by code, provide water hammer arrestors in accordance with the hydraulic design of the piping system and manufacturers’ recommendations.

- a. Suppressors shall be J.R. Smith “Hydrotrol” or equal.
- b. Water Hammer Arresters shall be located in branch lines between the last two (2) fixtures.
- c. Water Hammer Arresters shall be equal to J.R. Smith 5000 series. Water Hammer Arresters shall be provided for each supply water branch, sized according to the following schedule:

Fixture Units	J.R. Smith No.
1-11	5005
12-32	5010
33-60	5020
61-113	5030

- d. Water Hammer Attester shall comply with ANSI A 112.26.1 or ASSE 1010.
- e. One of the following approved manufacturers may be used:
 - i. J.R. Smith
 - ii. Watts
 - iii. Zurn
- G. Wall Hydrant, Freeze Resistant, Automatic Draining Type (ASSE 1019): furnish approved device as required by code.
- H. Hose Bibbs: Bronze body, renewable composition disc, 3/4" NPT inlet, 3/4" hose outlet.
- I. Supports and Anchors; shall be saddle type hangers for hanging insulated pipe, heavy wrought iron bolted type clamps or collars at each floor to support vertical piping, steel pipe hangers for steel and plastic pipe, and copper plated steel for copper pipe.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that area of Work is ready for work of this section.
- B. Verify that electrical power is available and of the correct characteristics.

3.2 INSTALLATION

- A. Install in accordance with manufacturer recommendations.
- B. Excavation for plumbing shall be properly backfilled and compacted in accordance with Section 02300. All underground lines shall be laid straight in a trench with a minimum 6" clearance on each side of piping.
- C. Plumbing fixtures shown on Drawings and as listed within the Fixture Schedule shall be furnished and installed. Fixtures and trim shall be properly anchored.
- D. Waste, vent and water piping where noted on Drawings for equipment furnished by others shall be included. Final connections to such equipment is not included. Lines shall be capped for future hookup.

- E. Piping shall not be exposed except in Future Suited Area, Mechanical Rooms, at connections to fixtures or equipment and piping above roof.
- F. Shut-offs shall be provided at hot and cold water supplies to each fixture, to each suite or department and to each floor at each riser.
- G. Chrome plated sectional type escutcheons shall be provided at all locations where pipes protrude inside of cabinets or through walls in finished areas, mechanical rooms and janitor closets.
- H. All rough-ins shall be labeled.

3.3 INSTALLATION - PIPING

- A. Piping shall be installed as tightly against structural components as possible to allow for maximum finished ceiling heights.
- B. Minor location modifications shall be made to piping to coordinate and avoid conflicts with other pipes, ducts, conduits and structural members.
- C. Pipe sleeves shall be provided for all pipes passing through concrete or masonry construction. Sleeves shall be steel for pipes 6" and smaller, and sheet metal for larger sizes. Pipe penetrations through exterior walls shall have mechanical sleeve seals.
- E. Piping shall be sealed at penetrations in walls and floors. Where pipes pass through fire rated construction, openings around piping shall be sealed with fire safing and fire resistant joint sealer meeting the requirements of ASTM E 814.
- F. Flanges or unions shall be installed at all final connections to equipment.
- G. Dielectric fittings shall be installed wherever dissimilar metals are joined. Dielectric unions shall not be used.
- H. Factory fabricated horizontal pipe hangers and supports complying with MSS SP-58 and seismic requirements shall be provided. Hangers and supports shall be applied to suit piping system complying with MSS-SP-69 and shall be adjustable 1-1/2" minimum vertically and be installed with 12" of each horizontal elbow. Factory fabricated saddles and shields under pipe hangers and supports shall be provided for all insulated piping. Isolator bushings shall be provided on pipe at hangers, bridging or in contact with structural members. The spacing of pipe supports shall not exceed the following:

Pipe Size	Hanger Spacing Feet	Rod Size Inch
1	7	3/8
1-1/2	9	3/8
2	10	3/8
3	12	1/2

4	14	5/8
5	16	5/8
6	17	3/4
8	19	7/8
10	22	7/8
12	23	7/8

- I. Vertical pipes shall be supported with riser clamps at each floor and at tees and elbow at the base of risers.
- J. Horizontal cast iron piping shall be supported every 5'.
- K. Piping and other materials shall be supported from building structure with beam clamps wherever possible, and not from pipe, ductwork, conduit, ceiling systems or other non-structural members.
- L. Thermometers shall be located at outlet of water heaters and inlet to hot water circulating pumps.
- M. Shut-offs, unions and piping arrangement as required to individually replace water heaters without interrupting service shall be provided.
- N. Rooftop air conditioning unit condensate piping installed above the roof shall be Schedule 40 ASTM D 1784 PVC with socket welded joints joined with PVC solvent cement complying with ASTM D 2564.
- O. Water Distribution Piping:
 - a. Hose connection vacuum breakers shall be installed on all fixtures having threaded hose bibb connections.
 - b. Drain valves shall be installed on each plumbing equipment item, at the bottom of all risers, and all low points of the system.
 - c. All piping at exterior walls and in soffits shall be installed on the interior side of the building insulation.
 - d. Water piping shall not be installed in elevator equipment rooms or above electric/telephone rooms.
 - e. Balancing valves shall be provided at recirculating pumps, at the top of each riser and where shown on Drawings, to balance the hot water recirculation system. Valves shall be field adjusted to the quantities indicated on Drawings.
 - f. The system shall be sanitized per applicable codes and in accordance with AWWA C651.
- P. Drain and Vent Piping Below Floor:
 - a. Sewers shall be laid on 4" of bedding sand or pea gravel to support pipe evenly and avoid hubs supporting piping.

- b. Building drains shall be installed at a minimum slope of 1/4" per foot for pipe 2" and smaller, and 1/8" per foot for pipes 3" and larger.
- c. Cleanouts shall be installed so as not to conflict with resilient and ceramic tile base and shall not be installed beneath or behind cabinets. Cleanout covers shall be finished to match adjacent wall surfaces. Cleanouts in exposed concrete or carpeted floors shall be installed flush with concrete.
- d. Cleanouts shall be installed at the base of all soil and waste stacks, at all changes in direction, and in straight runs at intervals in accordance with local code.

Q. Distribution pipe cleaning and flushing:

- a. Water distribution piping shall be cleaned for a sufficient length of time so that interiors shall be free of foreign matter. Cleaning shall occur after completion of pressure tests and before permanently connecting equipment. After cleaning operation, all systems shall be drained.
- b. Disinfection shall comply with local requirements and AWWA C 651. Water distribution piping shall be flushed by filling with a solution containing 50 ppm of chlorine and let stand for twenty-four (24) hours or a solution containing 200 ppm of chlorine and let stand for three (3) hours. Flush with clear water until no chlorine remains and test for bacteria.
- c. Faucet aerators and faucet cartridges shall not be installed until after cleaning and flushing of the piping system.

3.4 INSTALLATION – BACKFLOW PREVENTERS

- A. Provide indirect waste pipe or local waste pipe or local waster pipe where required. Provide drains, air gaps, air breaks and traps as required. Provide visible access to all air gaps and air breaks.
- B. Secure installation permits and pay fees as required.

3.6 TESTS BY CONTRACTOR

- A. Perform tests required by state and local authorities,
 - a. Correct defects and re-test as required
- B. Tests Backflow Preventer:
 - a. An initial Performance Test shall be provided by reduced pressure principle backflow preventers and pressure vacuum breaker assemblies.

- b. The Performance Test shall be performed at the time of installation and immediately after repairs or alterations.
 - c. Performance Test shall conform to ASSE standards by qualified individuals.
 - d. Performance Test results shall be furnished to Landmark in writing and shall be furnished to the State if required.
- C. Test interior domestic water piping hydrostatically at 125 psi for two hours. The pipe shall be tight and shall show no loss of pressure.
- D. Test interior sanitary and storm piping by maintaining a 10'-0" head of water above the highest point of section being tested for six hours. There shall be no loss of water.

3.3 TESTS BY REGULATORY AGENCIES

- A. Testing by regulatory agencies will be performed at their discretion; and shall be documented by the Contractor.
- B. Obtain required permits to perform tests. Perform tests required by regulatory agencies.
- C. Schedule tests with agencies and if possible, with Landmark present.
- D. Furnish test and approval certificates issued by jurisdictional authorities.

3.4 ADJUSTING AND CLEANING

- A. If system is used during construction of the project, it shall be protected from damage.
 - a. All damaged parts or equipment shall be replaced prior to Substantial Completion and acceptance.
 - b. System shall be maintained, and left in like new operation prior to Substantial Completion and acceptance.
- B. Cleaning and disinfection of water lines shall be in accordance with the requirements of the State of the Project, the Health Department, the Utility Company and the authority having jurisdiction.
 - a. Prior to disinfecting, flush piping to remove any sediment and debris.
 - b. Clean and disinfect water distribution piping system of existing potable water systems that have been altered, extended or repaired.
- C. After disinfection procedures, submit water sample in sterile bottles to an approved Laboratory. Samples shall be proven equal to the water quality served by the public from the existing water supply system an acceptable to the authority having jurisdiction. Flush and disinfect all sections of pipe that fail the laboratory tests. Submit test results indicating water is potable.

END 15420

DIVISION 15 - MECHANICAL
Section 15430- Plumbing System Insulation

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Plumbing system insulation, pipe insulation, jackets, coverings, sealers, mastic, adhesives and accessories.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on insulation materials.

1.3 REGULATORY REQUIREMENTS

- A. Conform to applicable building code for manufacture, product, and installation of system.
- B. Provide insulation material with flame spread rating per NFPA 90.1 and UL 181,
- C. Composite pipe insulation including jackets, coverings, sealers and mastics shall have a flame-spread index of twenty-five (25) or less and a fuel contributed and smoke-developed index of fifty (50) or less as tested by ASTM E 84 (NFPA 225).

PART 2 PRODUCTS

2.1 MATERIALS

- A. Fiberglass Piping Insulation: ASTM C 547, Class I.
- B. Flexible Unicellular Piping Insulation: ASTM C 534, Type I or Type II.
- C. Rigid and Semi-rigid Fiberglass Insulation; shall be minimum nominal density of 3 pcf with a white kraft reinforced foil vapor barrier all service jackets
- D. Jackets for Piping Insulation: ASTM C 921, Type I for piping with temperatures below ambient, Type II for piping with temperatures above ambient. Type I may be used for all piping.
- E. Insulation for pipe fittings shall be encased with one-piece premolded PVC fitting covers.
- F. Calcium Silicate Insulation; shall be rigid hydrous calcium silicate, ASTM C 533, Type I, minimum dry density of 12.5 pcf.
- D. Elastomeric Insulation; shall be flexible closed cell, minimum nominal density of 5.5 psf.
- E. Fireproofing Insulation; shall be mineral fiber with nominal density of 8 pcf, flame spread index of 0, and smoke development index of 0.

2.2 RIGID PIPE INSULATION

- A. Rigid pipe insulation with vapor barrier type fire retardant jacket, and equipment insulation of double density fiberglass with integral fire retardant continuous vapor barrier jacket. One of the following equal manufacturers may be used:
 - a. Armstrong
 - b. Gustin-Bacon
 - c. Johns-Manville
 - d. Owens Corning

2.3 PIPE INSULATION LOCATIONS

- A. Hot Water Piping: Provide rigid fiberglass with integral all service jacket insulation for hot water supply and return piping including valves, and fittings.
- B. Chilled Water Piping: Provide rigid fiberglass insulation with integral vapor barrier jacket on supply and return piping running including valves, and fittings for pipe runs inside the building. Provide elastomeric applied insulation to form a vapor barrier, white 30 mil protective PVC jacketing and heavy duty PVC fittings for chilled water supply and return piping including valves, and fittings for pipe runs outside the building.
- C. Refrigerant Suction and Hot Gas Lines: Provide lines outside with elastomeric insulation applied to form a vapor barrier. All lines run outdoors will be painted with two coats of weather and ultra violet resistant paint. Provide lines running in ceiling plenums with rigid fiberglass with integral vapor barrier jacket.
- D. Hot water storage tank shall be factory insulated with painted steel jacket.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that area of Work is ready for work of this section.
- B. Verify that electrical power is available and of the correct characteristics.

3.2 INSTALLATION

- A. Install in accordance with manufacturer recommendations.
- B. Cold Piping Application Requirements:
 - a. Cold domestic water piping - first fifty (50) feet of incoming service piping if installed in a return air ceiling plenum; all horizontal piping if installed in ducted return air spaces above ceilings.

- b. Above-ground horizontal storm water piping and all cold condensate drain piping.
 - c. Roof drain bodies and sump pans.
 - d. Insulation shall be 1/2" thick.
- C. Hot Piping Application Requirements:
- a. All potable hot water and hot water recirculating piping except drops to fixtures within partitions.
 - b. Insulation shall be 1/2" thick for pipe sizes up to and including 1" and 1" thick for pipe sizes greater than 1" but less than 5".
- D. Integrity of vapor-barrier jackets shall be maintained and protected to prevent puncture.
- E. Valves, fittings and similar items in each piping system shall be covered with equivalent thickness and composition of insulation as applied to adjoining pipe run. Factory molded, pre-cut or job fabricated units shall be installed.
- F. Pipe insulation shall butt against pipe hanger insulation inserts. For hot piping, 3" wide vapor barrier tape or band shall be applied over the butt joints. For cold piping, a wet coat of vapor barrier lap cement shall be applied on butt joints and joints sealed with 3" wide vapor barrier tape or band.

END 15430.

DIVISION 15 - MECHANICAL
Section 15440- Plumbing Fixtures and Trim

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. All plumbing fixtures, trim, and accessories for sinks, lavatories, mop basins, water closets, urinals, floor drains, roof drains, electric water coolers, hose bibs, and special trim.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on plumbing fixtures.
- B. Color samples for selection by Landmark.

1.3 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Operation and Maintenance Data:
 - a. Include a parts catalog with complete list of equipment replacement parts and identify each entry with equipment description and identifying code.
 - b. Maintenance instructions for electric water coolers.
- B. Warranty: Submit manufacturer and installer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable building code for manufacture, product, and installation of system.
- B. Accessible fixtures shall comply with Americans with Disabilities Act (ADA) 1990-28 CFR Part 36 requirements.

1.5 WARRANTY

- A. Correct defective Work within a one year period after Date of Substantial Completion.
- B. Warranty: Include plumbing fixture manufacturer's standard warranty coverage for plumbing fixtures and devices.
- C. Warranty: Include electric water cooler manufacturer's five (5) year refrigeration system warranty.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. All exposed piping and accessories shall be chrome plated.
- B. Traps shall comply with all applicable codes.
- C. Threaded traps shall have cleanout plugs.
- D. Plumbing fixtures shall have chrome plated, 17 gauge brass tube traps and tailpieces.
- E. All fixtures shall be provided with shutoff valves or stops
- F. All fixtures shall be provided with water risers. Exposed risers shall be rigid.
- G. The rims of stainless steel sinks shall be completely sealed against plastic laminate countertops with silicone sealant.
- H. ADA complying insulation shall be provided on fixture traps and water supplies. One of the following equal manufacturers and products may be used:
 - a. Truebro, "Lavshield Lavguard Enclosure" white color.
 - b. Additional approved equal products shall be considered.
- I. Some of the fixtures indicated in the following Plumbing Fixture Schedule will not be used on this project, but are included for reference in the case that they are added by a tenant suite build-out.

2.2 PLUMBING FIXTURE SCHEDULE

Fixture S-1; Sink for exam rooms in 18" deep base cabinet, shall be 15" x 15" x 6" deep single bowl stainless steel sink, 2 holes for fittings, wrist handle gooseneck faucet with aerator.

	Elkay # (www.elkayusa.com)	Just # (www.justmfg.com)	Chicago Faucet # (www.chicagofaucet.com)	Zurn # (www.zurn.com)
a Fixture:	BCR-15	SL-1515-B-GR		
b Faucet:	LK411ABH4		895-317XKCP	Z812A4
c Drain	LK36	J-15-CC		

Fixture S-2; Sink for staff lounge shall be 21" x 33" x 7" deep double bowl stainless steel sink, 3 holes for fittings, single lever handle faucet 10" swing spout and aerator. One of the following equal manufacturers and products may be used:

	Elkay # (www.elkayusa.com)	Just # (www.justmfg.com)	Chicago Faucet # (www.chicagofaucet.com)	Zurn # (www.zurn.com)
a Fixture:	CR-3321	CDL-2133-B-GR		
b Faucet:	LK4380FCR		2300-CP	Z82300

c Drain (2) LK35L (2) J-35

Fixture S-3; Sink for nurse stations and laboratories, in 24" deep base cabinet, shall be 21" x 25" x 7 deep single bowl stainless steel sink, 2 holes for fittings, wrist handle gooseneck faucet with aerator. One of the following equal manufacturers and products may be used:

	Elkay # www.elkayusa.com	Just # www.justmfg.com	Chicago Faucet # www.chicagofaucet.com	Zurn # www.zurn.com
a Fixture:	CR-2521	CSL-2125-B-GR		
b Faucet:	LK411ABH4		895-317XKCP	Z812A4
c Drain:	LK35	JV35		

Fixture S-4; Sink for special procedure rooms, in 24" deep base cabinet, where deep sink is required, shall be 22" x 25" x 12" deep single bowl stainless steel sink, 2 holes for fittings, wrist handle gooseneck faucet with aerator. One of the following equal manufacturers and products may be used:

	Elkay # www.elkayusa.com	Just # www.justmfg.com	Chicago Faucet # www.chicagofaucet.com	Zurn # www.zurn.com
a Fixture:	DLR-2522	SLXD-2225-A-GR		
b Faucet:	LK411ABH4		895-317XKCP	Z812A4
c Drain:	LK35	JV35		

Fixture L-1; Lavatory for public handicap toilet rooms, shall be 20" x 18" wall hung single bowl vitreous china sink, single lever handle faucet with aerator and open grid drain. Mount at 34" to top of front face, and provide Brocal trap wrap on waste and hot water supply pipes. One of the following equal manufacturers and products may be used:

	American Standard # www.us.amstd.com	Eljer # www.eljer.com	Chicago Faucet # www.chicagofaucet.com	Zurn # www.zurn.com
a Fixture:	0355.012	051-2101		
b Faucet:		3571062	2200-4CP	Z81000
c Drain:		803-0530		

Fixture L-2; Lavatory for exam rooms, labs, and other rooms notes, shall be 20" x 18" wall hung single bowl vitreous china sink, single lever handle faucet with gooseneck spout and open grid drain. Mount at 34" to top of front face. One of the following equal manufacturers and products may be used:

	American Standard # www.us.amstd.com	Eljer # www.eljer.com	Chicago Faucet # www.chicagofaucet.com	Zurn # www.zurn.com
a. Fixture:	0355.012	051-2101		Equal
b. Faucet:			2302-CP	
c. Drain:		803-0530		Equal

Fixture L-3; Lavatory for private toilet rooms, shall be the same as L-2, except with a pop-up drain. One of the following equal manufacturers and products may be used:

	American Standard # www.us.amstd.com	Eljer # www.eljer.com	Chicago Faucet # www.chicagofaucet.com	Zurn # www.zurn.com
a. Fixture:	0355.012	051-2101		

b. Faucet:	3571002	2201-4CP	Z81000
c. Drain:	Pop-up	Pop-up	Pop-up

Fixture FRS-1; Flush Rim Sink for soiled utility rooms, shall be provided with a vacuum breaker when required by code and foot peddle siphon jet flush control. Provide flush valve alternate with a Sloan Royal 117-HYV-0 flush valve in lieu of siphon jet. One of the following equal manufacturers and products may be used:

	American Standard # www.us.amstd.com	Eljer # www.eljer.com	Chicago Faucet # www.chicagofaucet.com	Kohler # www.kohler.com
a. Fixture:	9504.010	241-0270		K-6676
b. Faucet:	8345.110	4491200	814-VBCP	K-7309-5A
c. S.S. Rim Guards:	7832-017 (3)	805-0210 (2) 805-0215		K-8935 (3)

Fixture MB-1; Mop Basin for janitor closets and mechanical rooms, shall be molded stone 24" x 24" mop basin with stainless steel or cast brass drain. One of the following equal manufacturers and products may be used:

	FIAT # www.fiatproducts.com	Roberts Hamilton # www.rh.com	Zurn # www.zurn.com
a. Fixtures:	MSB-2424	64	Z1996-24
b. Hose Holder:	832-AA	65-700	HH
c. Mop Hanger:	889-CC	65-600	MH
d. Bumper Guard:	E-77-AA	63-401	BV

	American Standard # www.us.amstd.com	Eljer # www.eljer.com	Chicago Faucet # www.chicagofaucet.com	Speakman # www.speakmanncomany.com
e. Faucet:	8344.112	4491200	540-LD897SWXFCSC	5811-RCP

Fixture WC-1; Water Closet for toilet rooms, shall be minimum 16 1/2" (19" high with seat to meet handicap requirements), 1.5 or 1.6 gallon floor mounted water closet with elongated bowl and power assist flush. Mount flush handle on wide side or sink side of room. Seat shall be manufacturers standard to match water closet, with open front less cover solid plastic, 2" tall to meet ADA requirements. One of the following equal manufacturers and products may be used:

	American Standard # www.us.amstd.com	Eljer # www.eljer.com	Kohler # www.kohler.com
a. Fixture:	2377.100	091-7045(7055)	K-3544

Fixture WC-2; Water Closet for toilet rooms, shall be 14" (16" high with seat), 1.5 or 1.6 gallon floor mounted water closet with elongated bowl and power assist flush. Mount flush handle on wide side or sink side of room. Seat shall be manufacturers standard to match water closet, with open front less cover solid plastic. One of the following equal manufacturers and products may be used:

	American Standard # www.us.amstd.com	Eljer # www.eljer.com	Kohler # www.kohler.com
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a. Fixture: 2333.100 091-7025 K-3458

Fixture U-1; Urinal for men's public toilet rooms, shall be wall mounted urinal, tank, and flush valve. One of the following equal manufacturers and products may be used:

	American Standard # www.us.amstd.com	Eljer # www.eljer.com	Kohler # www.kohler.com
a. Fixture:	6501.010	161-1030	K-4972T
	Sloan # www.sloanvalve.com	Delany # www.coynedelany.com	Zurn # www.zurn.com
b. Flush Valve:	186-1	F451-1	Z6003-WS1

Fixture EDF-1; Electric Water Cooler for public corridors, shall be wall mounted dual height electric stainless steel drinking fountains. Provide 115 volt receptacle, and a five year refrigeration warranty. One of the following equal manufacturers and products may be used:

	Elkay # www.elkayusa.com	Oasis # www.oasiscoolers.com	Acorn Aqua # www.acornaqua.com
a. Fixture:	EZTL8C	P8AMSL	A112108F

Fixture EDF-2; Electric Water Cooler for private use when EDF-1 is provided in public corridor, shall be wall mounted single height electric stainless steel drinking fountains. Provide 115 volt receptacle, and a five year refrigeration warranty. One of the following equal manufacturers and products may be used:

	Elkay # www.elkayusa.com	Oasis # www.oasiscoolers.com	Acorn Aqua # www.acornaqua.com
a. Fixture:	EZ8	P8AM	A111108F

Fixture SH-1; Shower for tenant suite, shall be ADA compliant 36" x 36" inside dimension, one piece, white fiberglass module, plywood backed and ready for grab bar and seat installation, stainless steel curtain rod, hand-held shower with vacuum breaker, and control valve, and collapsible removable water retainer at sill. Plumbing contractor shall set hot water limit safety stop to 100 degrees F. maximum. One of the following equal manufacturers and products may be used:

	Best Bath # www.fsidaho.com	Lasco Bathware # www.lascobath.com	FiberFab # www.fiberfab.com
a. Fixture:	LSS3838A5T	1363 BFSC	38BF
b. Faucet or Supply:	Included	Included	Provide Equal

Fixture SH-2; Shower for tenant suite, shall be ADA compliant 60" x 30" inside dimension, one piece, white fiberglass module, plywood backed and ready for grab bar and seat installation, stainless steel curtain rod, hand-held shower with vacuum breaker, and control valve, and collapsible removable water retainer at sill. Plumbing contractor shall set hot water limit safety stop to 100 degrees F. maximum. One of the following equal manufacturers and products may be used:

	Best Bath # www.fsidaho.com	Lasco Bathware # www.lascobath.com	FiberFab # www.fiberfab.com
a. Fixture:	LSS6333A75B	1603 BFSC	63BF
b. Faucet or Supply:	Included	Included	Provide Equal

Fixture FD-1; Floor Drain for toilet rooms, and other rooms with finish flooring, shall be chrome plated with strainer. One of the following equal manufacturers and products may be used:

	Zurn # www.zurn.com	Wade # www.wadedrains.com	Josam # www.josam.com	J.R. Smith # www.jrsmith.com
a. Fixture:	Z-415-C	W-1100-STD	30000-A	2005-A-NB

Fixture FD-2; Floor Drain for mechanical rooms, areaways, and other rooms with exposed concrete. One of the following equal manufacturers and products may be used:

	Zurn # www.zurn.com	Wade # www.wadedrains.com	Josam # www.josam.com	J.R. Smith # www.jrsmith.com
a. Fixture:	Z-550	1310	32100	2110

Fixture FD-3; Floor Drain for darkrooms, and other special applications, shall be floor drain with funnel. One of the following equal manufacturers and products may be used:

	Zurn # www.zurn.com	Wade # www.wadedrains.com	Josam # www.josam.com	J.R. Smith # www.jrsmith.com
a. Fixture:	Z-415-C w/ Z-328	W-1100-STD w/ EF4	30000-A w/ F4	2005-A-NB w/ 3580

Fixture FD-4; Floor Drain for equipment drains with half-grate, shall be provided with trap primer connection. One of the following equal manufacturers and products may be used:

	Zurn # www.zurn.com	Wade # www.wadedrains.com	Josam # www.josam.com	J.R. Smith # www.jrsmith.com
a. Fixture:	ZN-1910 w/ P-2-25	9110-6-15-27	49000-3-33-55	3101-12

Fixture RD-1; Roof Drain for roofs, shall be standard roof drain with adjustable extension, no-hub outlet, under-deck clamp, sump receiver, and vandal proof dome. One of the following equal manufacturers and products may be used:

	Zurn # www.zurn.com	Wade # www.wadedrains.com	Josam # www.josam.com	J.R. Smith # www.jrsmith.com
a. Fixture:	Z-100-EA- NH-C-R-VP	3010-NH- 52-5	21500-2-3- 10-30	1015-Y-C- R-U

Fixture HB-1: Hose Bibbs shall be for exterior wall, loose key, freeze proof, bronze body, renewable composition disc, 3/4" NPT inlet, 3/4" hose outlet with vacuum breaker. One of the following equal manufacturers and products may be used:

	Woodford # www.woodford.com	MIFAB # www.mifab.com
a. Fixture:	65	HY 10

Fixture HB-2: Hose Bibbs shall be for roofs at hatch or stair, loose key, freeze proof, bronze body, renewable composition disc, 3/4" NPT inlet, 3/4" hose outlet with vacuum breaker. One of the following equal manufacturers and products may be used:

	Woodford # www.woodford.com	MIFAB # www.mifab.com
a. Fixture:	24	MHY 90

Fixture PT-1; Plaster Trap for dental labs and cast rooms, for use with sink S-3, shall be installed in waste line. One of the following equal manufacturers and products may be used:

	Zurn # www.zurn.com	Rockford #
a. Fixture:	A-1180	G-1412-M

Fixture PT-2; Plaster Trap for dental labs and cast rooms, for use with sink S-4, shall be installed in waste line. One of the following equal manufacturers and products may be used:

	Zurn # www.zurn.com	Rockford #
a. Fixture:	Z1181	G-1815-M

Fixture BT-2; Barium Trap for special barium use areas, shall be installed in waste line. One of the following equal manufacturers and products may be used:

	Zurn # www.zurn.com	Rockford #
a. Fixture:	Z-1180	G1412-M

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that area of Work is ready for work of this section.
- B. Verify that electrical power is available and of the correct characteristics.

3.2 INSTALLATION

- A. Install plumbing fixtures in accordance with manufacturer recommendations.

3.3 ADJUSTING AND CLEANING

- A. If system is used during construction of the project, it shall be protected from damage.

- a. All damaged parts or equipment shall be replaced prior to Substantial Completion and acceptance.
 - b. System shall be maintained, and left in like new operation prior to Substantial Completion and acceptance.
- B. Clean fixtures and adjust operating parts.

END 15440.

DIVISION 15 - MECHANICAL
Section 15500- Basic Mechanical Requirements

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Mechanical systems basic requirements

1.2 BASIC MECHANICAL REQUIREMENTS

- A. Mechanical / HVAC Introduction: All HVAC equipment, ductwork, valves, controls, and other items shall be installed for a complete and working HVAC system.
- B. The HVAC system shall incorporate conveniences for maintenance and future remodeling.
- C. Quality Assurance and Regulatory Requirements:
 - a. The Mechanical system shall comply with all state and local building and mechanical codes and local ordinances used by the authority having jurisdiction.
 - b. The HVAC system design shall be based on the principals and data in the current American Society of Heating and Air Conditioning Engineers (ASHRAE) Handbook and Standards.
 - c. Comply with the latest published SMACNA, NFPA, NEMA and NEC Standards.
 - d. Comply with UL or other tested assemblies to maintain the code required fire ratings of the building, and as indicated in the Drawings.
 - e. Comply with code required seismic anchorage and support systems.

1.3 MECHANICAL SYSTEM CONCEPT – NON ASC PORTIONS OF BUILDING

- A. The HVAC system shall consist of variable volume packaged rooftop units with electric direct expansion (DX) cooling engineered for rooftop installation, serving a series of air terminal boxes and a plenum return air system.
- B. A gas furnace shall be provided in each rooftop unit for unoccupied night heating, and morning warm-up if the annual degree days exceed 2500 or the winter design temperature is less than forty (40) degrees Fahrenheit.
- C. Economizers shall be provided if the annual degree days exceed 2000.
- D. Perimeter zones shall be served by fan powered VAV terminal units. Interior zones shall be served by shut-off VAV terminals. Zones shall be provided for rooms with heating and cooling requirements sufficiently similar to enable design conditions to be maintained (an average of 3 zones per 1000 square feet of finished area).

- E. Perimeter and interior zone heating shall be accomplished by electric heating coils located in the terminal units.
- F. Duct Liner Locations:
 - a. All return air ducts including return air transfer ducts.
 - b. All rectangular supply air ductwork downstream of VAV boxes.
 - c. All supply and return ductwork within duct shafts.
 - d. All supply ductwork for a minimum of 15'-0" downstream from the outlet of the supply fan on all rooftop units.
- G. Flexible Duct Wrap Locations:
 - a. All supply air ductwork upstream of VAV boxes. At contractor's option, duct liner may be used in lieu of flexible duct wrap if ductwork is rectangular.
 - b. All round supply air ductwork downstream of VAV boxes.
 - c. Exhaust air ductwork within 15'-0" upstream of inlet of exhaust fan.
 - d. All outside air relief ducts.
 - e. All ductwork in unconditioned spaces.
- H. Rigid Duct Wrap Locations:
 - a. Insulate outside air ducts that are exposed in mechanical rooms with 2" rigid board insulation. Insulate all exposed supply ducts that are exposed in mechanical rooms with 2 1/2" rigid board insulation. Cover all insulation with white all service jacket.
- I. A microprocessor-based building management control panel shall index the rooftop units from "occupied" to "unoccupied" (night setback) cycle, the perimeter electric heating and rooftop air conditioning shall be locked out. The building shall be maintained at a reduced night temperature by means of intermittent operation of the gas fired furnace section in the rooftop unit. Prior to morning occupancy, the building will be warmed to occupied space temperatures by operating the air handling system in the morning warm-up mode.
- J. Zones shall be controlled by wall mounted DDC space temperature sensors.
- K. A central exhaust system using rooftop power roof ventilators shall be provided for all toilet rooms, janitor closets and electrical closets with transformers.

1.4 NOT USED

1.5 MECHANICAL SYSTEM DESIGN CONDITIONS

- A. The HVAC system for medical and general office areas shall be capable of maintaining room temperatures to 75 degree F. in the summer and 72 degree F. in the winter, based on the outdoor air conditions listed in ASHRAE Fundamentals Handbook to the contract project location.
- B. When climatic conditions are at or within design conditions, performance of the installed system shall not exceed a variation of the plus or minimum two (2) degrees F. from the inside design conditions listed above in rooms containing a sensor.
 - a. Design conditions shall be as tabulated in Table #1 of the most current copy of the ASHRAE Climatic Conditions for the United States and Canada.
 - b. The minimum summer outdoor air design temperature will be that listed as the 0.4% cooling dry-bulb data condition.
 - c. The maximum winter outdoor design temperature will be that listed as the 99.6% heating dry-bulb data condition.
- C. Performance of the installed system shall not exceed a variation of ten (10) percent of design air volume.

PART 2 PRODUCTS

2.1 NOT USED

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify site is ready for ductwork and piping installation.
- B. Elevations and locations of all points of connection as indicated on drawings are approximate and the Contractor shall establish elevations and locations of services in the field.
- C. Any anticipated offsets to avoid obstructions that are not shown on the drawings shall be noted.
- D. The Contractor shall check all measurements of equipment and shall be responsible for connections of his Work with the Work of other contractors (if any) in the building.
- E. Slight modifications (three-inch or less, in any direction) in the size of ductwork, dampers, diffusers, and other air distribution material shall be permitted but may not be of less cross sectional area than as shown on the plans. Modifications greater than three-inches in any direction shall require review with Engineer.
- F. Confirm location and space availability for access panels, service valves and drain valves.
- G. Confirm location and space availability of chases, joist spaces and beam clearances.
- H. Confirm electrical voltages, phase and other characteristics.

3.2 INSTALLATION

- A. Contractor shall cooperate with the other contractors so that construction may proceed without hindrance. Confer with other contractors regarding any Work that may affect this Work and arrange schedule so that components shall be installed in a natural sequence. Contractor shall be responsible for grading, fitting, joining or adjusting of his Work to all adjacent Work of other contractors.
- B. Sequence, coordinate and integrate installations of mechanical equipment and material for efficient flow of the Work.
- C. Coordinate positioning of large equipment prior to enclosing building or equipment room.
- D. Install Work to conform with reviewed shop drawings to greatest extent possible. Position finish components, such as air outlets and temperature controls, to achieve symmetry in ceiling and wall layouts.
- E. Ducts and piping shown on plan views shall be installed above finished ceilings of rooms shown unless otherwise specified. In mechanical spaces and similar unfinished areas, install ducts and pipes as high as possible unless otherwise specified.
- F. Piping installed at specified pitch shall generally take precedence of ductwork and other piping.
- G. Operation of doors, windows, lighting, Owner's equipment or fixtures shall not be hindered by position of ductwork or piping.
- H. Piping, tubing, and ductwork shall not be permitted above or through elevator equipment rooms, electrical rooms, telephone rooms or computer rooms without the approval of Landmark.
- I. In rated egress enclosures, such as stairways and exit passageways, only piping, tubing, and ductwork related to such spaces shall be permitted within these spaces.

3.3 ACCESS

- A. Installation shall allow access to all portions of equipment requiring routine service including:
 - a. Service, cleaning, inspection and lubrication as recommended by manufacturer
 - b. Replacement of renewable components as recommended by manufacturer
 - c. Visibility of all vents
 - d. All Dampers
 - e. Drain Valves
 - f. Name plate data
 - g. Automatic Dampers
 - h. Valves
 - i. Smoke Detectors
 - j. Sensors

- k. Gauges
- l. Motors and Motor Controllers
- m. Pumps

3.4 PROTECTION

- A. Protect final installation from damage during construction period.
- B. All open sections of ducts exposed to construction dust and all grilles and diffusers shall be covered with cheesecloth.
- C. Open ends of all piping shall be kept closed during construction.

3.5 LUBRICATING

- A. Before any equipment is energized, it shall be lubricated according to manufacturer's instructions.
- B. Lubrication points that are concealed or are hard to reach shall have extended fittings to a point of easy access and shall be clearly marked.

END 15500

DIVISION 15 - MECHANICAL
Section 15620- Natural Gas System

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Gas service for HVAC equipment, water heating equipment, and emergency generator.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on natural gas system.

1.3 QUALITY ASSURANCE

- A. Installer: Company specializing in performing the work of this section and approved by equipment manufacturer.
 - a. Underground gas piping shall be installed by an approved utility contractor in accordance with the gas company requirements.
- B. Seismic Zone Criteria: The entire gas piping installation and testing shall comply with requirements of NFPA 54, seismic code requirements and codes and local ordinances used by the authority having jurisdiction.
 - a. The entire gas piping installation and testing shall comply with requirements of NFPA 54, seismic code requirements and codes and local ordinances used by the authority having jurisdiction.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable building code for manufacture, product, and installation of system.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Gas cocks 2" and smaller; shall be threaded Jenkins, NIBCO, Powell or Stockham, 150 psi with bronze body, straight pattern and square head. 2-1/2" and larger shall be flanged MSS SP-78, 175 psi, plug type with semi-steel body.
- B. Gas Piping; shall be ASTM A 53, Schedule 40, Type S, Grade B, seamless black steel.
- C. Fittings; shall be malleable iron threaded, ANSI B 16.3, Class 150 or seamless steel welded fittings, ASTM A 53, ANSI B 16.9 and B 16.11.
- D. Gas pressure regulators; as required for rooftop heating ventilating and air conditioning units, shall be single stage, steel jacketed, corrosion resistant and atmospheric vented to the outside; 2" and smaller shall be threaded, 2-1/2" and larger shall be flanged.
- E. Underground gas piping provided outside of the building shall be in accordance with specification Section 02500 Site Plumbing.

- F. Exterior above grade gas piping shall be welded. Prepare pipe to receive primer and paint per specification Section 09900 Painting.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer recommendations.
- B. Pitch horizontal piping down 1" in 60 feet in the direction of flow. Install a 4" minimum depth dirt leg at the bottom of each vertical run and at each appliance. When installing mains and branches, cap gas tight each tee or pipe end which will not be immediately extended. All branch connections to the main shall be from the top or side of the main.
- C. Do not install gas pipe below a building or its foundation or in a ventilation air plenum.
- D. If an above ground vent terminates in an area subject to snow accumulation, terminate the line at least five feet above grade.
- E. Install a shut off valve at each appliance. Provide a valve connection at the main for equipment and appliances furnished by others.
- F. Provide hangers and supports in accordance with building code and gas utility company requirements.
- G. Piping through a roof shall be run through an approved roof penetration with flashing and counter flashing.
- H. Each gas pressure reducing valve vent and relief valve vent shall be run separately to a point outside of the building, terminated with a screened vent cap, and located according to gas utility regulations.
- I. Clean all welded piping before all regulators and control valves. Test by placing target cloth over piping and blow with compressed air. Clean piping until target cloth is clean and free of debris.
- J. Underground gas piping installed outside of the building shall be in accordance with Specification Section 02500 Site Plumbing.

END 15620

DIVISION 15 - MECHANICAL
Section 15660- Electric Resistance Heating

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Electric wall cabinet unit heaters.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on the electric wall cabinet unit heaters.

1.3 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Operation and Maintenance Data:
 - a. Include a parts catalog with complete list of equipment replacement parts and identify each entry with equipment description and identifying code.
 - b. Provide technical information for servicing operating equipment.
 - c. Include legible schematic of piping and wiring diagrams of installed electrical equipment and changes made in the Work.
- A. Warranty: Submit manufacturer and installer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Installer: Company specializing in performing the work of this section and approved by equipment manufacturer.

1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable building code for manufacture, product, and installation of system.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc., as suitable for the purpose specified and indicated.

1.6 WARRANTY

- A. Correct defective Work within a one year period after Date of Substantial Completion.
- B. Warranty: Include manufacturer's standard warranty coverage for operating equipment and devices.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Electric Wall Cabinet Unit Heaters; shall be semi-recessed when possible, or surface mounted to satisfy structural conditions, integral controls and disconnect, integral thermostat, electric wall heater. One of the following equal manufacturers and products may be used:
 - a. Qmark, "AWH Series 4000"
 - b. Trane,
 - c. Markel,

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that area of Work is ready for work of this section.
- B. Verify that electrical power is available and of the correct characteristics.

3.2 INSTALLATION

- A. Install in accordance with manufacturer recommendations.
- B. Wiring to electric baseboards and wall heaters shall be concealed.
- C. Wall heaters shall be mounted at 12" clear above the floor.
- D. Wall mounted baseboard shall be mounted 10-1/2" clear above floor and secured at 2'-0" o.c.
- E. Wall mounted baseboard shall be mounted on SO-2 stand-offs (spacers).

END 15660

DIVISION 15 - MECHANICAL
Section 15720- VAV Rooftop Units

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Variable air volume packaged rooftop units, and roof curbs.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on the VAV Rooftop Unit: Provide data on the rooftop unit, complete with accessories.
- B. Provide wiring and piping diagrams indicating all piping and control interconnections.

1.3 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Operation and Maintenance Data:
 - a. Include a parts catalog with complete list of equipment replacement parts and identify each entry with equipment description and identifying code.
 - b. Provide technical information for servicing operating equipment.
 - c. Include legible schematic of piping and wiring diagrams of installed electrical equipment and changes made in the Work. List symbols corresponding to identity or markings on machine room apparatus.
 - d. Provide one copy of master electric and hydraulic schematic and one copy of lubrication chart, each framed with clear glass; mount on machine room wall.
- A. Warranty: Submit manufacturer and installer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Installer: Company specializing in performing the work of this section and approved by equipment manufacturer.
- B. Quality Assurance: Cooling capacity shall be rated in accordance with ARI standard 360. Heating section shall be U.L. approved for outdoor installation downstream of cooling coil.
- C. Units shall be designed, manufactured and tested in accordance with U.L. requirements and shall bear the U.L. label.

1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable building code for manufacture, product, and installation of system.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc., as suitable for the purpose specified and indicated.

1.6 WARRANTY

- A. Correct defective Work within a one year period after Date of Substantial Completion.
- B. Warranty: Include manufacturer's standard warranty coverage for operating equipment and devices.

1.7 MAINTENANCE SERVICE

- A. A HVAC maintenance and service contract in accordance with Form No. 6 attached shall be provided covering the period of one (1) year following Substantial Completion for execution by Owner.
- B. The maintenance shall include testing, inspections, adjustments, lubrication, cleaning, supplies, and parts and labor to keep equipment in proper operation.
- C. Perform maintenance work using competent and qualified personnel under the supervision of the manufacturer or original installer.
- D. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

1.8 DEMONSTRATION

- A. Landmark, Owner, and Hospital personnel shall be instructed in the proper use, operation, and daily maintenance.
- B. Review emergency provisions, including emergency access and procedures to be followed at the time of failure in operation and other building emergencies.
- C. Train normal procedures to be followed in checking for sources of operational failures or malfunctions.

PART 2 PRODUCTS

2.1 VAV ROOFTOP UNITS

- A. VAV Rooftop units shall be model SFHG manufactured by the Trane Company.
 - a. Landmark National Representative
John Kelley
The Trane Company
11400 West Theodore Trecker Way
West Allis, WI 53214
(414) 266-5200
jekeely@trane.com

- B. Each unit shall include all manufacturer's standard construction and features and in addition, shall include the following factory installed options and accessories:
- a. Forward curved DIDW centrifugal supply fans with inlet guide vanes controlled by static pressure optimization control.
 - b. Supply air sensor and microprocessor based discharge air control with Froststat.
 - c. Two sets of Farr 30-30 filters.
 - d. Extended motor grease lines.
 - e. Trane Communication Interface (TCI).
 - f. Factory mounted non-fused disconnect switch.
 - g. Ultra low-leakage outdoor air dampers.
 - h. Comparative enthalpy economizer cycle if the annual degree days exceed 2000.
 - i. Modulating one hundred (100) percent DIDW centrifugal exhaust fans controlled by STATITRAC building pressurization control.
 - j. Gas fired heating section if winter design criteria are exceeded.
 - k. Access doors.
 - l. Zone sensor for unoccupied space temperature control with concealed adjustment.
 - m. Factory installed 115v convenience outlet.

2.2 UNIT BASE

- A. Base shall be welded supporting the entire length and width of the unit. Units shipped in one piece shall have at a minimum six points of lift. These lift points shall be designed to accept standard rigging devices. The unit base design shall allow unit to rest on top of roof curb when field installed. Entire length and width under base shall be sealed in the field with curb gasketing for weather tight seal.
- B. Roof Curbs; shall be spring vibration isolation roof curb for each roof top unit. Springs shall have a minimum of 3" static deflection. Curbs shall be constructed with sheet metal sides, insulated weather seals, and shall be suitable for use as a return air plenum. Curb height shall be 36" minimum. One of the following equal manufacturers and products may be used: Mason Industries, "Model RSC". Additional approved equal products shall be considered.

2.3 CASING

- A. Casing construction descriptions shall be consistent for all other modular sections. All panels shall be double wall construction. Interior and exterior panels shall be constructed of galvanized steel. Panel insulation system shall provide a minimum R-value of 12. Insulation shall conform to NFPA 90 requirements.
- B. Panels shall be fully removable to allow for a proper way to thoroughly clean panels and to access internal parts. Access doors shall be constructed with a double-wall of solid G90 galvanized steel interior panel. Gasketing around the full perimeter of the access door shall be used to prevent air and water leakage. Preferred door handle shall not penetrate door casing with single-handle latch.
- C. External surface of unit casing shall be prepared and factory coated with a minimum 1.5-mil enamel finish or equal. Unit casing exterior with factory coating shall be able to withstand a salt spray test in accordance with ASTM B117 for a minimum of 672 consecutive hours. Unit casing will be provided with manufacturer's standard color.
- D. Provide inlet hood with high performance sine wave moisture eliminator to prevent water carryover into unit casing from outside air. Hoods shall be sized for 100% economizer cycle.
- E. For exhaust air requirements, manufacturer shall provide exhaust with ½" square galvanized wire bird screen.
- F. Provide insulated drain pans constructed of G90-U galvanized steel exterior panels and 304 stainless steel interior liner. Encase insulation between exterior and interior walls. Drain pans shall be sloped in two planes; cross-break interior pans and pitch toward drain connections to ensure complete condensate drainage. Units with cooling coils shall have drain pans under complete cooling coil section.

2.4 FAN SECTIONS

- A. Provide as shown on plans, supply and return fan sections with double width, double inlet centrifugal fan designed and suitable for class of service indicated in the unit schedule. Fan shaft to be properly sized and protectively coated with lubricating oil. Fan shafts shall be solid and properly designed so that fan shaft does not pass through first critical speed as unit comes up to rated RPM. Fans shall be statically and dynamically tested as an assembly at the required RPM to meet design specifications. Key fan wheels to fan shaft to prevent slipping.
- B. Provide self-aligning, grease lubricated pillow-block ball bearings selected for L-50 200,000 hour average life per ANSI/AFBMA 9. Extend both grease lubrication fittings to drive side of unit with plastic tubes and zerk fittings rigidly attached to drive side-bearing support.
- C. Mount fans on isolation bases. Internally mount motors on same isolation bases and internally isolate fans and motors with 2-inch spring seismic isolators. Install flexible canvas ducts between fan and casings to ensure complete isolation. Flexible canvas ducts shall comply with NFPA 90A.

- D. Fan sections shall have full height, double wall, hinged doors both sides for inspection and maintenance of internal components.
- E. Factory-install all motors on slide base to permit adjustment of belt tension.
- F. Fan Motors shall be heavy duty, premium efficiency open drip-proof.

2.5 COILS SECTION

- A. Coils shall be manufactured by the same company as the supplier of the air-handling unit. Install coils such that headers and return bends are enclosed by unit casings.
- B. The wet section of the unit, defined as the entering airside of the dehumidification coil to the leaving edge of the drain pan, shall be insulated. The insulation shall meet UL 181 requirements. The air stream surface of the insulation shall be constructed or coated such that it is not biodegradable, repels water and it can be cleaned to prevent microbial growth. The manufacturer's maintenance instructions shall describe the proper cleaning procedure for the unit.
- C. Construct coils of plate fins and seamless tubes. Fins shall have collars drawn, belled and firmly bonded to tubes by means of mechanical expansion of tubes.
- D. Construct coil casings of galvanized steel with formed end supports and top and bottom channels. If two or more coils are stacked in unit, install intermediate drain channels between coils to drain condensate to main drain pans without flooding lower coils or passing condensate through airstream.
- E. Refrigerant Cooling Coils
 - a. Label suction and liquid connections on outside of units.
 - b. Proof test coils to 450-psig air under water and leak test coils to 300 psig air pressure under water. Dry insides of coils after testing and seal all connections.
 - c. Construct suction headers of copper tubing. Suction connections shall penetrate unit casings to allow for sweat connections to refrigerant lines.
 - d. Coils shall have equalizing type vertical distributors sized in conjunction with capacities of coils.

2.6 GAS HEATING SECTION

- A. Gas-fired heating shall be completely assembled and have a wired gas fired heating system integral within unit. Unit shall be UL or CSA approved specifically for outdoor applications downstream from refrigerant cooling coils. All gas piping shall be threaded connection with a pipe cap provided. Gas supply connection shall be provided through the side of unit. Unit shall be fire tested prior to shipment.

- B. Heat Exchanger shall be tubular two-pass design with 16-gauge stainless steel primary and 18-gauge stainless steel secondary heat exchanger surfaces. Free-floating design shall eliminate expansion and contraction stresses and noises. Gasketed cleanout plate shall be provided for cleaning of tubes/turbulators. Heat exchanger shall be factory pressure and leak tested.
- C. Burner shall be industrial type burner with an air-proving switch to prevent burner operation if burner is open for maintenance or inspection. Ceramic cone shall be provided to shape the flame to prevent impingement on sides of heat exchanger drum. Burner assembly shall house ignition and monitoring electrode.
- D. Combustion Blower shall be centrifugal type fan to provide air required for combustion. Fan motor shall have built-in thermal overload protection.
- E. Gas Safety Controls shall include electronic flame safety controls to require proving of combustion air prior to ignition sequence which shall include a 60 second pre-purge cycle.
- F. Full Modulation Gas Heater shall be made from grades of stainless steel suitable for condensing situations. The heater shall have a turn down ratio of at least 4 to 1. Pilot ignition shall be provided. Continuous electronic flame supervision shall be provided.

2.7 FILTERS

- A. Provide factory-fabricated filter section of the same construction and finish as unit casings. Filter sections shall have filter guides and full height, double-wall, hinged doors for filter removal. Filter sections shall flange to other unit components. Provide filter block-offs as required to prevent air bypass around filters.
- B. Provide 2 inch angled filter sections with 30% pleated filters. Filters shall be removable from both sides of filter sections.
- C. Provide high efficiency filter sections with 12" cartridge filters and 2 inch 30% pleated pre-filters. High efficiency filters shall be 95% efficient and rated in accordance with ASHRAE 52 and UL class 1 or class 2. Filters shall be removable from both sides of filter sections.

2.8 DAMPERS

- A. Provide internally mounted ultra low leak outside air, return air, and exhaust air dampers as scheduled on drawings. Dampers shall be Ruskin CD60 double skin airfoil design or equivalent. Construct damper blades and damper frames of galvanized steel. Provide with metal compressible jamb seals and extruded vinyl blade edge seals. Blades shall rotate on stainless steel sleeve bearings. Damper blade lengths shall not exceed 60 inches. Leakage rate shall not exceed 5 CFM/square foot at one-inch water gage and 9 CFM/square foot at 4 inches water gage. All Leakage testing and pressure ratings will be based on AMCA Publication 500.

2.9 ACCESS SECTIONS

- A. Access for inspection and cleaning of the unit drain pan, coils and fan section shall be provided. The unit shall be installed for proper access. Procedures for proper access, inspection and cleaning of the unit shall be included in the maintenance manual. Access sections shall have double wall, hinged doors on both sides of sections.

2.10 FACTORY-MOUNTED MOTOR STARTER AND LINE BREAK SWITCH

- A. Provide IEC or NEMA Type Combination Starter/Line Break Switch for each fan motor. Starter/Line Break Switch shall be Allen Bradley or equal. Each shall be properly sized, mounted, wired and commissioned by the AHU manufacturer. Package shall include line break switch, control transformer, Hands-Off-Auto (H-O-A) switch, N.O. auxiliary contacts, overloads (factory-set for the specific motor) and adjustable trip switch. Units with factory-mounted controls shall also include power wiring from the starter control transformer to the control system transformers, and start-stop wiring from the direct digital controller start-stop relay to the starter H-O-A switch. Wiring methods shall comply with the National Electric Code and NFPA 70.
- B. Enclosure: Starters/Line Break Switch shall have full metal enclosures. Starter/Line Break Switch shall be factory mounted on the drive side of the air handling unit fan section. Ensure four feet of clearance to access panel.
- C. Factory Commissioning: Trained factory personnel shall ensure proper operation of the starter by a thorough factory test. Units should be energized through factory test. Testing to include Hypot test of unit wiring to insure that no shorts exist in starter, starter wiring, or motor. Starter should be energized and fan run at specified rpm in both the "Hand" and "Auto" position to insure starter is operational. For NEMA type starters, RK1 type "2" fuses and overload heaters must be selected individually for the voltage, horsepower, and full load amps of the actual motor being supplied. For IEC type starters, overload and adjustable trip switch to be factory set to motor nameplate amperage requirements.
- D. Provide a factory installed 115v convenience outlet.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that area of Work is ready for work of this section.
- B. Verify that electrical power is available and of the correct characteristics.

3.2 INSTALLATION

- A. Install in accordance with manufacturer recommendations.
- B. Rooftop units shall be installed plumb and level.

- C. Sealant as specified in Division 7 shall be provided at all roof curb joint seams and rivet holes in weather seal.
- D. Springs shall be adjusted as detailed in manufacturer's instructions, removing shipping blocks from rebound stops.
- E. Sealant shall be provided around spring cover plates.
- F. After roof penetrations within the curb space have been installed, sealant shall be provided around all penetrations, making sure that no noise transmission paths exist around duct or electric conduit roof penetrations.

3.3 ADJUSTING AND CLEANING

- A. If system is used during construction of the project, it shall be protected from damage.
 - a. All damaged parts or equipment shall be replaced prior to Substantial Completion and acceptance.
 - b. All filters shall be replaced.
 - c. System shall be maintained, and left in like new operation prior to Substantial Completion and acceptance.
- B. Start-up: Trane shall inspect, start, test, check and commission the VAV rooftop unit in accordance with Trane's published instructions.

END 15720

DIVISION 15 - MECHANICAL
Section 15740- Air Terminal Units

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Variable volume fan powered terminals, variable air volume terminals, and variable air volume terminals with electric heat.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on all air terminal units and accessories:

1.3 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Operation and Maintenance Data:
 - a. Include a parts catalog with complete list of equipment replacement parts and identify each entry with equipment description and identifying code.
 - b. Provide technical information for servicing operating equipment.
 - c. Include legible schematic of wiring diagrams of installed electrical equipment and changes made in the Work.
- B. Warranty: Submit manufacturer and installer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Installer: Company specializing in performing the work of this section and approved by elevator equipment manufacturer.
- B. Air terminals shall be installed to maintain required clearances for service.
- C. Units shall comply with requirements of NFPA 90A.

1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable building code for manufacture, product, and installation of system.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc., as suitable for the purpose specified and indicated.

1.6 WARRANTY

- A. Correct defective Work within a one year period after Date of Substantial Completion.
- B. Warranty: Include manufacturer's standard warranty coverage for operating equipment and devices.

1.7 MAINTENANCE SERVICE

- A. A maintenance and service contract, for execution by the Owner, shall be provided covering the period of one (1) year following Substantial Completion. The maintenance shall include testing, inspections, adjustments, lubrication, cleaning, supplies, and parts and labor to keep equipment in proper operation.
- B. Perform maintenance work using competent and qualified personnel under the supervision of the manufacturer or original installer.
- C. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

1.8 DEMONSTRATION

- A. Landmark, Owner, and Hospital personnel shall be instructed in the proper use, operation, and daily maintenance.
- B. Review emergency provisions, including emergency access and procedures to be followed at the time of failure in operation and other building emergencies.
- C. Train normal procedures to be followed in checking for sources of operational failures or malfunctions.

PART 2 PRODUCTS

2.1 TERMINAL UNITS

A. Manufacturers:

a. The Trane Corporation

- i. Landmark National Representative
John Kelley
The Trane Company
11400 West Theodore Trecker Way
West Allis, WI 53214
(414) 266-5200
jekeely@trane.com

b. Titus

B. Tenant Suite Variable Volume Fan Powered Terminals shall be Trane, "Model VPEF", or Titus, "Model TFS" pressure independent fan powered variable air volume terminals. Provided with Trane air valves, factory installed electronic actuators, adjustable minimum and maximum CFM limits, DDC controller, space temperature sensor, and integral transformer for low voltage control.

- a. U.L. listed direct electric resistance open type heaters shall be factory installed with required safety cutout airflow switch, factory mounted disconnect switch, and with silent mercury contactors for each stage.

- b. Units shall have a direct drive integral centrifugal fan with backdraft damper and a three-speed split capacitor fractional horsepower motor with factory furnished and mounted manual starters.
 - c. Units shall have factory installed 1/2" internal matt faced insulation except terminals downstream of 90% or higher efficiency filters which shall receive foil faced insulation.
- C. Tenant Suite Variable Air Volume Terminals shall be Trane, "Model VCCF" pressure independent variable air volume terminals shall be provided with Trane air valves, factory installed electronic actuator, adjustable minimum and maximum CFM limits, DDC controller and space temperature sensor.
- a. Units shall be provided with factory installed balancing dampers at each discharge tap except where duct configuration requires a Trane type "Z" arrangement.
 - b. Units shall have factory installed 1/2" internal matt faced insulation except terminals downstream of 90% or higher efficiency filters which shall receive foil faced insulation.
- D. Variable Air Volume Terminals with Electric Heat shall be Trane, "Model VCEF", or Titus, "Model DESV", pressure independent variable air volume terminals shall be provided with air valves, factory installed electronic actuator, adjustable minimum and maximum CFM limits, DDC controller, space temperature sensor and integral transformer for low voltage control.
- a. U.L. listed direct electric resistance open type heaters shall be factory installed with required safety cutout airflow switch, factory mounted disconnect switch, and with silent mercury contactors for each stage.
 - b. Units shall have factory installed 1/2" internal matt faced insulation except terminals downstream of 90% or higher efficiency filters which shall receive foil faced insulation.

2.2 ACCESSORIES

- A. Space temperature sensors; shall be Trane or Titus zone sensors with external dial temperature setting adjustment and two (2) hour override button.
 - a. Space temperature sensors installed in public areas shall have concealed adjustment.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that area of Work is ready for work of this section.
- B. Verify that electrical power is available and of the correct characteristics.

3.2 INSTALLATION

- A. Install in accordance with manufacturer recommendations.

3.3 ADJUSTING AND CLEANING

- A. If system is used during construction of the project, it shall be protected from damage.
 - a. All damaged parts or equipment shall be replaced prior to Substantial Completion and acceptance.
 - b. All filters shall be replaced.
 - c. System shall be maintained, and left in like new operation prior to Substantial Completion and acceptance.
- B. Start-up: Manufacturer shall inspect, start, test, check and commission the air terminal units in accordance with Trane's published instructions.

END 15740

DIVISION 15 - MECHANICAL
Section 15780- Fans

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Power roof ventilators and exhaust fans

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on the exhaust fans:

1.3 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Operation and Maintenance Data:
 - a. Include a parts catalog with complete list of equipment replacement parts and identify each entry with equipment description and identifying code.
 - b. Provide technical information for servicing operating equipment.
 - c. Include legible schematic of wiring diagrams of installed electrical equipment and changes made in the Work.
- A. Warranty: Submit manufacturer and installer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Installer: Company specializing in performing the work of this section and approved by elevator equipment manufacturer.

1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable building code for manufacture, product, and installation of system.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc., as suitable for the purpose specified and indicated.

1.6 WARRANTY

- A. Correct defective Work within a one year period after Date of Substantial Completion.
- B. Warranty: Include manufacturer's standard warranty coverage for operating equipment and devices.

1.7 MAINTENANCE SERVICE

- A. A maintenance and service contract, for execution by the Owner, shall be provided covering the period of one (1) year following Substantial Completion. The maintenance shall include testing, inspections, adjustments, lubrication, cleaning, supplies, and parts and labor to keep equipment in proper operation.
- B. Perform maintenance work using competent and qualified personnel under the supervision of the manufacturer or original installer.

- C. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

1.8 DEMONSTRATION

- A. Landmark, Owner, and Hospital personnel shall be instructed in the proper use, operation, and daily maintenance.
- B. Review emergency provisions, including emergency access and procedures to be followed at the time of failure in operation and other building emergencies.
- C. Train normal procedures to be followed in checking for sources of operational failures or malfunctions.

PART 2 PRODUCTS

2.1 POWER ROOF VENTILATORS

- A. Power Roof Ventilators; shall be AMCA rated with centrifugal aluminum fan wheel, backwardly inclined, with NEMA approved open ball bearing, permanent split capacitor motor isolated from air stream in a separate compartment. Provided complete with the following:
 - a. Adjustable belt drive or direct drive depending on fan size.
 - b. Weatherproof disconnect switch.
 - c. Backdraft damper with seals and jambs and blades.
 - d. Spun aluminum weatherproof housing with aluminum birdscreen.
 - e. "U" spring compression rubber vibration isolators.
 - f. 12" high prefabricated curb complete with fiberglass insulation and sponge rubber mounting pad.
 - g. Soldered condensation pans shall be provided below roof ventilators.
 - h. One of the following equal manufacturers and products may be used:
 - i. Greenheck, "Model GB"
 - ii. Acme, "Model PV"
 - iii. Cook, "Model ACEB"
 - iv. Additional approved equal products shall be considered.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that area of Work is ready for work of this section.
- B. Verify that electrical power is available and of the correct characteristics.

3.2INSTALLATION

- A. Install in accordance with manufacturer recommendations.

END 15780.

DIVISION 15 - MECHANICAL
Section 15820- Ductwork

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Ductwork, lining, flexible ductwork, and accessories.

1.2 SUBMITTALS FOR REVIEW

- A. Shop Drawings: Indicate the following information:
- B. Product Data: Provide data on the following items:

1.3 QUALITY ASSURANCE

- A. Perform Work in accordance with the following requirements;
 - a. SMACNA's "HVAC Duct Construction Standards, Metal and Flexible."
 - b. NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems" and NFPA 90B "Standard for the Installation of Warm Air Heating and Air Conditioning Systems."
 - c. Code required seismic anchorage and support.
 - d. Ductwork, tapes and sealant shall have a flame spread rating no greater than 25 and a smoke developed rating no greater than 50 when tested in accordance with ASTM E 84, UL 723 or NFPA 255.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable building code for manufacture, product, and installation of system.
- B. Seismic Zone Criteria: Products specified below shall be modified to an alternate seismic design product of similar style, from the same manufacturer, to meet the applicable code.
- C. Fire Rated Assemblies: Ductwork, tapes and sealant shall have a flame spread rating no greater than 25 and a smoke developed rating no greater than 50 when tested in accordance with ASTM E 84, U.L. 723 or NFPA 255.

PART 2 PRODUCTS

2.1 DUCTWORK

- A. Rectangular Ductwork: Except as otherwise specified, ductwork shall be fabricated from galvanized sheet steel complying with ASTM A 527, in gauges and reinforcement complying with SMACNA "HVAC Duct Construction Standards. Weights of sheet shall be as follows:
 - a. Up to 12" 26 gauge

- b. 12" to 30" 24 gauge
 - c. 31" to 48" 22 gauge
 - d. 49" to 60" 20 gauge
 - e. 60" and over 18 gauge
- B. Round Ductwork; shall be spiral duct as manufactured by United Sheet Metal or Semco Manufacturing. Spiral duct shall be constructed of galvanized steel in the following minimum gauges:
- a. 3" to 8" 26 gauge
 - b. 9" to 22" 24 gauge
 - c. 24" to 36" 22 gauge
- C. Flexible Ductwork: Duct to supply diffusers, and return air grilles shall be pressure rated for 6" and negative 1/2" water column. The maximum length of Flexduct shall be 4'-0" for return air grilles, inlets of VAV terminal units, and 10'-0" for supply diffusers.
- a. Flexduct shall be labeled U.L.-181 Class I air duct material with insulation meeting NFPA-90A.
 - b. Flexduct liner shall be fastened to fittings with Panduit PLT8H or galvanized steel worm gear strap.
 - c. Field fabricated Flexmaster flexible aluminum ductwork satisfying above criteria (U.L. labeling, insulation value, and pressure rating) may be used.
 - d. One of the following approved manufacturers and products may be used:
 - i. Genflex, "G-30C high pressure; IL low pressure"
 - ii. Wiremold, "WK high pressure; WGC low pressure"
 - iii. Clevaflex, "KQ high pressure; DB low pressure"
 - iv. Additional approved equal products shall be considered.

2.2 DUCTWORK PRESSURE CLASSIFICATION

- A. Supply ductwork upstream of VAV terminal units shall be constructed for a minimum of 3" working pressure.
- B. Supply ductwork downstream of VAV terminal units shall be constructed for 1/2" working pressure.
- C. Return and exhaust ducts shall be constructed for 1" working pressure.

2.3 FITTINGS, SEAMS, AND ACCESSORIES

- A. Large Duct Seams: Rectangular ductwork with a side dimension of 42" or greater shall be joined using the Ductmate system. These ducts shall be flanged, gasketed and sealed, with bolted construction.
- B. Round Ductwork Fittings; shall be factory prefabricated, 20 gauge.
- C. Round Ductwork Seams: All round ductwork shall be joined and sealed with the United Duct Sealer and plastic backed tape as recommended by the manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that area of Work is ready for work of this section.
- B. Verify dimensions at the site, making field measurements and drawings necessary for fabrication and erection. Check plans showing work of other trades and consult with Landmark in the event of any interference.
- C. Make allowances for beams, pipes or other obstructions in building construction and for work of other contractors. Transform, divide or offset ducts as required, in accordance with SMACNA HVAC Duct Construction Standards, Figure 2-7, except do not reduce duct to less than six inches in any dimension and do not exceed an 8:1 aspect ratio. Where it is necessary to take pipes or similar obstructions through ducts, construct easement as indicated in SMACNA HVAC Duct Construction Standards, Figure 2-8, Fig. E. In all cases, seal to prevent air leakage.

3.2 INSTALLATION

- A. Install in accordance with manufacturer recommendations.
- B. Ductwork shall be assembled and installed to achieve air-tight (5 percent leakage) systems. Ducts shall be rigidly supported with suitable ties, braces, hangers and anchors of type which will hold ducts true-to-shape and prevent buckling and satisfy seismic support requirements.
- C. Ductwork and other materials shall be supported from building structure and not from pipes, conduit, ceiling systems or other non-structural members.
- D. Where ducts pass through fire-rated floors, walls or partitions, firestopping shall be provided between duct and structure, in accordance with requirements of ASTM E 48 and UL-1479.
- E. Angle iron braces or stiffeners shall be provided as necessary for rigidity.
- F. Ductwork shall be installed as high above floors as possible to allow for maximum finished ceiling heights.

- G. Vertical supply ductwork shall be supported by galvanized angle iron riveted to duct sides supported from floor construction.
- H. Ducts shall be flanged for attachment of registers, grilles and diffusers.
- I. Inlet and discharge connections on rooftop units and power roof ventilators shall be made with Ventfabrics' "Ventglas" extra wide Metaledge fire retardant material. The flex connection shall be 4-3/4" long including 1" slack. The Metaledge strips shall be sealed to the duct and secured with bolts spaced on 3" centers.
- J. Flexible ducts shall be supported at all elbows.
- K. Install ducts communicating to the outdoors to pitch toward outside air intakes and drain to outside of building. Solder or seal seams to form watertight joints.
- L. Where two different metal ducts meet, the joint shall be installed in such a manner that metal ducts do not contact each other by using proper seal or compound.
- M. Install all motor operated dampers and connect to or install all equipment furnished by others.
- N. Do not install ductwork through dedicated electrical rooms or spaces unless the ductwork is serving this room or space.
- O. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- P. Provide adequate access to ductwork for cleaning purposes.
- Q. Provide temporary capping of ductwork openings to prevent entry of dirt, dust and foreign material.
- R. Protect diffusers, registers and grilles with plastic wrap or some other approved form of protection to maintain dirt and dust free and to prevent entry of dirt, dust and foreign material into the ductwork.
- S. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
- T. Support ductwork in accordance with SMACNA HVAC Duct Construction Standards, Figure 4-4.
- U. Seal all duct, with the exception of transfer ducts, in accordance with SMACNA seal class "A"; all seams, joints, and penetrations shall be sealed.
- V. Except where serving a VAV box, install a manual balancing damper in each branch duct and for each diffuser or grille. The use of splitter dampers, extractors, or grille face dampers will not be accepted for balancing dampers.
- W. Hangers must be wrapped around bottom edge of duct and securely fastened to duct with sheetmetal screws or pop rivets. Trapeze hangers may be used at contractor's option.

3.3 ADJUSTING AND CLEANING

- A. If system is used during construction of the project, it shall be protected from damage.
 - a. All damaged parts or equipment shall be replaced prior to Substantial Completion and acceptance.
 - b. System shall be maintained, and left in like new operation prior to Substantial Completion and acceptance.

END 15820

DIVISION 15 - MECHANICAL
Section 15840- Ductwork Accessories

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Dampers, access panels, turning vanes, and take-off fittings.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on dampers and access panels.

1.3 QUALITY ASSURANCE

- A. Installer: Company specializing in performing the work of this section and approved by elevator equipment manufacturer.

- B. Perform Work in accordance with the following requirements;

- a. Applicable portions of SMACNA "HVAC Duct Construction Standards, Metal and Flexible"
- b. ASHRAE recommendations pertaining to construction of ductwork accessories.
- c. NFPA 90A "Air Conditioning and Ventilating Systems".

- C. Fire and smoke dampers shall comply with U.L. Standard 555 and 555S.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable building code for manufacture, product, and installation of system.

PART 2 PRODUCTS

2.1 DAMPERS

- A. Volume Dampers: Single or multi-blade type volume dampers shall be provided in all supply, return or exhaust branch ducts. Volume dampers shall have positive locking mechanism and operating handle.
 - a. Where neither dimension of a damper exceeds 8", a single blade type volume damper constructed of twenty (20) gauge galvanized steel securely fastened with U bolts or welded to a 1/2" square cold rolled steel operating rod shall be provided.
 - b. Where either duct dimension exceeds 8", a multi-louver type damper controlled from a single point by connecting linkage shall be provided.
 - c. Where round or oval supply ducts occur upstream of air terminal devices, a round volume damper shall be provided at each flexible duct connection to the sheet metal conical take off fitting upstream of each terminal unit.

- d. One of the following equal manufacturers and products may be used:
 - i. Greenheck
 - ii. Ruskin
 - iii. Louvers and Dampers, Inc.
 - iv. Additional approved equal products shall be considered

- B. Fire and Smoke/Fire Dampers: shall be fusible link actuated with 165 degree F. link, UL labeled and a rating as scheduled on the Drawings, per UL 555 and UL 555S. The minimum free open area of dampers shall be the duct clear area. One of the following equal manufacturers and products may be used:
 - a. Greenheck
 - b. Ruskin
 - c. Louvers & Dampers, Inc. or
 - d. Air Balance
 - e. Additional approved equal products shall be considered

2.2 ACCESSORIES

- A. Access Panels and Doors: Double cam gasketed access doors shall be provided in ductwork at all fire and smoke dampers. Doors shall be at least 18" wide, unless duct size is less and shall be at least 75 percent of the damper height. Access panels shall be provided at all concealed fire and smoke/fire dampers not otherwise accessible from ceiling space.

- B. Turning Vanes: All ductwork turns with square corners shall receive turning vanes. Where duct sizes are greater than two (2) square feet in area, acoustical turning vanes shall be installed in the first four elbows after supply fans, exhaust fans, and at each return air elbow. One of the following equal manufacturers and products may be used:
 - a. Ductmate Industries Inc.
 - b. Airsan Corp.
 - c. Dura Dyne Corp.

- C. Takeoff Fittings:
 - a. Where rectangular supply ducts occur upstream of air terminal devices, galvanized steel manufactured conical converging type spin-in duct collars shall be provided in flexible ductwork connections to sheet metal ductwork upstream of VAV boxes.
 - b. Galvanized steel manufactured spin-in duct collars with 45 degree extractors shall be provided in flexible ductwork connections to sheet metal ductwork downstream of VAV boxes.

- d. All spin-in collars in .1 and .2 above shall be furnished with factory installed integral volume dampers with positive locking wing nut and operating handle.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that area of Work is ready for work of this section..

3.2 INSTALLATION

- A. Install in accordance with manufacturer recommendations.
- B. Manual Volume Dampers: Install manual volume dampers in each branch duct and for each grille, register, or diffuser as far away from the outlet as possible while still maintaining accessibility to the damper. Install so there is no flutter or vibration of the damper blade(s).
- C. Turning Vanes: Install turning vanes in all rectangular, mitered elbows in accordance with SMACNA standards and/or manufacturer's recommendations.
- D. Fire Dampers: Install dampers in strict accordance with manufacturer's installation instructions. Install damper sleeves with retaining angles on both sides of rated partition. Connections of ductwork to fire damper assemblies to be as specified on the installation instructions. Where it is necessary to set dampers out from the rated wall, install a sleeve extension encased in two hour rated fire proofing insulation. Install an access door at each fire damper, located to permit resetting the damper replacing the fusible link.
- E. Smoke Dampers and Combination Fire/Smoke Dampers: Install smoke dampers in locations indicated on the drawings in accordance with the manufacturer's instructions. Install an access door adjacent to each damper for inspection and cleaning. Coordinate damper linkage with operators so the dampers are closed when the air system is not operating.
 - a. Install combination fire/smoke dampers as specified above for fire dampers. Coordinate damper linkage with operators so the dampers are closed when the air system is not operating.
- F. Control Dampers: Install dampers in locations indicated on the drawings, as detailed, and according to the manufacturer's instructions. Install blank-off plates or transitions where required for proper mixing of airstreams in mixing plenums. Provide adequate operating clearance and access to the operator. Install an access door adjacent to each control damper for inspection and maintenance.
- G. Smoke Detectors: Installation and wiring of detectors will be by the Electrical Contractor. Install an access door at each detector location.
- H. Access Doors: Install access doors where specified, indicated on the drawings, and in locations where maintenance, service, cleaning or inspection is required. Examples include, but are not limited to motorized dampers, fire and smoke dampers, smoke detectors, fan bearings, heating and cooling coils, filters, valves, and control devices needing periodic maintenance.

- a. Size and numbers of duct access doors to be sufficient to perform the intended service. Minimum access door size shall be 8 x 8 inch size for hand access, 18 x 18 inch size for shoulder access, or other size as indicated. Install access doors on both inlet and outlet sides of reheat coils as well as other duct mounted coils.

- I. Duct Flexible Connections: Install at all duct connections to rotating or vibrating equipment, including air handling units (unless unit is internally isolated), fans, or other motorized equipment in accordance with SMACNA Figure 2-19.

- J. Louvers: Furnish louvers to the General Contractor for mounting in exterior walls. Connect outside air intake duct to the louver, sealing all connections air and water tight.

- K. Provide bird screen on outside of active louver area where none is provided with louvers. Where louvers are equipped with inside birdscreen, remove screen at all locations where duct connections are not made.
 - a. Install insulated metal panel on unused portion of louver. Panels must be sealed weathertight to louver assembly with flashing as required for proper drainage to outside of building. Paint outside surface of panel to match louver prior to installation. Where ductwork is visible through louver when viewed from outside the building, paint inside of duct to match louver color.

END 15840

DIVISION 15 - MECHANICAL
Section 15860- Grilles and Diffusers

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Work Includes: Slot diffusers, ceiling grilles, sidewall grilles and registers

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on the grilles and diffusers.
- B. Color selection samples for grilles and diffusers

1.3 QUALITY ASSURANCE

- A. Installer: Company specializing in performing the work of this section and approved by elevator equipment manufacturer.
- B. Perform Work in accordance with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems."

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable building code for manufacture, product, and installation of system.

PART 2 PRODUCTS

2.1 DIFFUSERS AND GRILLES

- A. Slot Diffusers: for VAV supply air with internal acoustic insulation, integral duct collar and off-white finish, suitable for T-Bar or surface mounting.
 - a. Diffusers downstream of 90% or higher efficiency filters shall receive foil faced insulation in lieu of internal insulation (duct liner).
 - b. One of the following equal manufacturers and products may be used:
 - i. Trane, "VLSD and AABD"
 - ii. Titus, "ML"
- B. Eggcrate Ceiling Grilles: shall be aluminum grid, aluminum boarder grilles provided for transfer grilles and plenum return grilles with off-white finish, suitable for surface installation in either drywall or acoustical ceilings.
 - a. Return air grilles shall be provided in rooms or areas where the supply CFM exceeds the return air capacity of the light fixtures as shown on Drawings.
 - b. One of the following equal manufacturers and products may be used:
 - i. Titus, "Model 50F"
 - ii. Krueger,

- iii. Price
- C. Ceiling Diffusers: shall be S80 steel grilles provided for exhaust grilles with off-white finish, suitable for surface installation in either drywall or acoustical ceilings.
 - a. One of the following equal manufacturers and products may be used:
 - i. Titus, "Model PAS"
 - ii. Krueger, "S80".
- D. Sidewall Grilles and Registers: shall be steel construction, horizontal pattern, off-white finish sidewall grilles and registers provided in areas without ceilings, such as stairs and multi-story lobbies, finish shall be selected by Landmark to match adjacent wall finish color.
 - a. Sidewall supply registers shall be double deflection type. Sidewall return grilles shall be single deflection type.
 - b. One of the following equal manufacturers and products may be used:
 - i. Titus "Model 350-RL"
 - ii. Krueger
- E. Linear Slot Diffusers: shall be aluminum extruded slot diffuser for VAV supply air with internal acoustic insulation, integral duct collar and off-white finish, suitable for T-bar or surface mounting as required. One of the following equal manufacturers and products may be used:
 - a. Titus, "ML-38"
 - b. Trane, "VLSD"
 - c. Additional approved equal manufacturers and products shall be considered

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that area of Work is ready for work of this section.

3.2 INSTALLATION

- A. Install grilles, registers and diffusers as shown on the Drawings and in accordance with manufacturer's instructions.
- B. Unless otherwise indicated, size ductwork drops to diffusers or grilles to match unit collar size.
- C. Seal connections between ductwork and diffusers / grilles airtight.

3.3 ADJUSTING AND CLEANING

- A. If system is used during construction of the project, it shall be protected from damage.
 - a. All damaged parts or equipment shall be replaced prior to Substantial Completion and acceptance.
 - b. System shall be maintained, and left in like new operation prior to Substantial Completion and acceptance.

END 15860

DIVISION 15 - MECHANICAL
Section 15880- HVAC System Insulation

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Duct insulation, vapor barrier, duct liner, jackets, coverings, sealers, mastic, adhesives, and accessories.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on insulation, vapor barrier, duct liner, jackets, and coverings.

1.3 REGULATORY REQUIREMENTS

- A. Conform to applicable building code for manufacture, product, and installation of system.
- B. Fire Rated Assemblies: Refer to drawings for rating and assembly requirements.
 - a. Provide duct insulation and liner which is identical in materials and construction as to the system tested.
 - b. Acceptable testing agencies include Underwriters Laboratories, Inc. and Warnock Hersey International, Inc.
- C. Composite duct insulation (insulation, jackets, coverings, sealers, mastics and adhesives) shall be provided with flame-spread index of twenty-five (25) or less, and smoke-developed index of fifty (50) or less, as tested by ASTM E 84 (NFPA 255).

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Armstrong World Industries, Inc.
- B. Certain Teed Corp.
- C. Knauf Fiber Glass GmbH.
- D. Johns Manville Products Corp.
- E. Owens-Corning Fiberglas Corp.

2.2 MATERIALS

- A. Material thickness; shall be provided to meet ASHRAE Standard 90.1 and all state and local codes.
- B. Rigid Fiberglass Ductwork Insulation: ASTM C 612, Class I.
- C. Flexible Fiberglass Ductwork Insulation: ASTM C 553, Type I, Class B-4.

- D. Jackets for Ductwork Insulation: ASTM C 921, Type I.
- E. Duct Liner: Fibrous glass, complying with Thermal Insulation Manufacturers Association (TIMA) AHC-101.
- F. Duct Liner Adhesive: Shall comply with ASTM C 916 “Specifications for Adhesive for Duct Thermal Insulation.”
- G. Duct Liner Fasteners: Shall comply with SMACNA HVAC Duct Construction Standard, Article S2.11.

2.3 DUCT INSULATION

- A. Duct Liner: shall be 1” thick, 1 1/2 lb. Density liner. One of the following approved manufacturers and products may be used:
 - a. Owens-Corning, “Aeroflex Plus”
 - b. Johns Manville, “Permacote Linacoustic”
 - c. Knauf, “Duct Liner E.M.
 - d. Certainteed, “Ultralite”
 - e. Additional approved equal products shall be considered.
- B. Flexible Duct Wrap Insulation: 1-1/2” thick. Application limited to concealed locations. One of the following approved manufacturers and products may be used:
 - a. Owens-Corning, “Fiberglass all service faced duct wrap insulation”
 - b. Additional approved equal products shall be considered
- C. Rigid Board Insulation: 1-1/2” thick. One of the following equal manufacturers and products may be used:
 - a. Owens-Corning, “705 with FRK-25 foil reinforced kraft facing”
 - b. Additional approved equal products shall be considered

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that area of Work is ready for work of this section.

3.2 INSTALLATION

- A. Install in accordance with manufacturer recommendations.

- B. Protect ductwork liner, flexible wrap and rigid boards from rain, weather and the construction activity while the material is storage on site, and after installation. Do not allow water to penetrate liner or insulation. Remove and replace any damaged liner, wrap or boards.

3.3 DUCT LINER

- A. Duct liner shall be applied with 100 percent adhesive coverage and mechanical fasteners located on 12" centers and within 2" of butted joints. A heavy coat of adhesive shall be applied at joints.
- B. All dimensions shown on drawings are clear inside dimensions. Increase ductwork sizes to accommodate liner.

3.4 DUCT FLEXIBLE DUCT WRAP

- A. Seal and tape all flexible duct wrap
- B. Secure duct wrap to the bottom of large ducts to prevent sagging.

3.5 SCHEDULE - DUCT LINER LOCATIONS

- A. All return air ducts including return air transfer ducts.
 - a. Ambulatory Surgical Centers, Imaging Centers, Laboratories and other similar tenant suites return air system shall be lined within 30'-0" of air handler only. All other return and supply air ductwork in these special outpatient suites shall be wrapped.
- B. All rectangular supply air ductwork downstream of VAV boxes.
- C. All supply and return ductwork within duct shafts.
- D. All supply ductwork for a minimum of 15'-0" downstream from the outlet of the supply fan on all rooftop units.
 - a. Do not use duct liner downstream of 90% or higher efficiency filters. Duct liner is not allowed for the entire ASC Tenant Suite air handler supply duct system.

3.6 SCHEDULE - FLEXIBLE DUCT WRAP LOCATIONS

- A. All supply air ductwork upstream of VAV boxes.
 - a. At contractor's option, duct liner may be used in lieu of flexible duct wrap if ductwork is rectangular.
 - b. Wrap all rectangular supply air ducts and flexible connections downstream of 90% or higher efficiency filters.
 - c. Wrap all ductwork in Ambulatory Surgical Centers, Imaging Centers, Laboratories and other similar licensed and regulated outpatient services tenant suites.

- B. All round supply air ductwork downstream of VAV boxes.
- C. Exhaust air ductwork within 15'-0" of discharge upstream of inlet of exhaust fan.
- D. All outside air relief ducts.
- E. All ductwork in unconditioned spaces

3.7 RIGID DUCT WRAP LOCATIONS

- A. Insulate outside air ducts that are exposed in mechanical rooms with 2" rigid board insulation. Insulate all exposed supply ducts that are exposed in mechanical rooms with 2 1/2" rigid board insulation. Cover all insulation with white all service jacket.

END 15880.

DIVISION 15 - MECHANICAL
Section 15940- Building Management System

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Building management system, including control panel, software, and peripheral hardware.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on the building management system.

1.3 SUBMITTAL FOR PROJECT CLOSEOUT

- A. A disk copy of the final Building Management System shall be provided to Owner.

1.4 QUALITY ASSURANCE

- A. Installer: Company specializing in performing the work of this section and approved by elevator equipment manufacturer.

1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable building code for manufacture, product, and installation of system.

1.6 MAINTENANCE SERVICE

- A. Trane shall provide a one year remote monitoring service through the telephone modem.
- B. Trane shall make required software updates and control strategy changes for a period of one (1) year.

1.7 DEMONSTRATION

- A. Landmark, Owner, and Hospital personnel shall be instructed in the proper use, operation, and daily maintenance.
 - a. Trane shall provide the services of a factory authorized service representative to instruct the Owner's personnel in the operation, maintenance, programming and operator interface of the Building Management System.
- B. Review emergency provisions, including emergency access and procedures to be followed at the time of failure in operation and other building emergencies.
- C. Train normal procedures to be followed in checking for sources of operational failures or malfunctions.

PART 2 PRODUCTS

2.1 BUILDING MANAGEMENT SYSTEM

- A. Building Management System; shall be a Trane, "Tracer Summit" microprocessor based, stand-alone master control panel shall provide centralized control for all stand-alone unit controllers located on each piece of major equipment.
- B. Control panel; shall be provided with thirty (30) day battery back-up and internal clock, sufficient binary and analog inputs and outputs to provide the control and monitoring functions to each piece of major equipment, timed over-ride switches integral with room temperature sensing devices, remote communications and automatic dial-out capabilities through a telephone modem and Owner provided dedicated telephone line, audio, visual and remote telephone annunciation for remote equipment, program, sensor and card failure, and system diagnostics of processor and memory circuits and automatic switching of controlled equipment to a preassigned failure mode.
- C. Software: Complete system programming shall be provided by Trane, including initial program installation in the master control panel. Software capabilities shall include the following:
 - a. Windows 2000 or newer based graphical user interface for LAN communication
 - b. Anti-Recycle protection
 - c. User access through 3 security levels
 - d. Time of day scheduling, including holidays
 - e. Custom control language for custom control routines
 - f. Optimum start-stop
 - g. Night setback control
 - h. After hours over-ride
 - i. Run time and maintenance
 - j. Reports and trend logging
- D. Peripheral Hardware: shall be provided by Trane, and shall include the following:
 - a. Modem
 - b. One indoor room temperature sensor per air handling system
 - b. One duct mounted return air sensor per air handling system.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that area of Work is ready for work of this section.
- B. Verify that electrical power is available and of the correct characteristics.

3.2 INSTALLATION

- A. Install in accordance with manufacturer recommendations.

3.3 TESTS BY CONTRACTOR

- A. Trane shall provide the services of a factory-authorized service representative to perform a final inspection and verification of the installed Building Management System.
- B. The Trane representative shall perform all necessary testing and calibration and run diagnostic tests to ensure proper control sequence of operation.

3.4 ADJUSTING AND CLEANING

- A. If system is used during construction of the project, it shall be protected from damage.
 - a. All damaged parts or equipment shall be replaced prior to Substantial Completion and acceptance.
 - b. System shall be maintained, and left in like new operation prior to Substantial Completion and acceptance.

END 15940

DIVISION 15 - MECHANICAL
Section 15960- Sequence of Operation

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Sequence of Operation.

PART 3 EXECUTION

3.1 VAV ROOFTOP AIR CONDITIONING UNIT CONTROL

- A. The Building Management System shall perform the following rooftop unit control strategies and provide the specified monitoring and diagnostics:
- B. Occupied Mode: When the rooftop unit is turned "ON" by the BMS during normal occupied hours, all rooftop unit functions will be enabled. Units will operate in the cooling mode. The rooftop unit defaults to this mode whenever communication with the BMS is lost. Variable air volume fan powered boxes will control to their occupied or unoccupied setpoints, depending on the schedule of the zone.
- C. Unoccupied Mode: When the rooftop unit is turned off by the BMS after normal occupied hours, the rooftop unit will maintain space temperature setting based upon the setpoint from the rooftop unit zone sensor.
- D. Normal Operation: When in the occupied mode, as described above, dedicated rooftop unit controls shall operate economizer and stages of cooling to maintain supply air temperature setpoint. Setpoints may be reset through the BMS by the operator. Motorized inlet guide vanes shall modulate to maintain static pressure setpoint in supply air ductwork.
- E. The DDC system; shall monitor the damper position of all VAV terminal units and determine each VAV terminal (CZ), which is the VAV terminal unit that is the widest open.
 - a. When the CZ is more than 95% (adj) open, the supply fan discharge static pressure set point shall be reset downward by 10% (adj) of the previous setpoint at a frequency of 10 minutes (adj) until the CZ is more than 97% open or the static pressure set point has reset downward to the system minimum setting or the inlet vanes (or Frequency Inverter) are at their minimum setting.
 - b. When the CS is less than 95% (adj) open and the supply fan discharge static pressure set point is at the minimum setting, the discharge air temperature set point shall be reset upward in increments of 0.5 F (adj) at a frequency of 10 minutes (adj) and the static pressure set point held constant until the CZ is more than 97% (adj) open or the discharge air temperature is reset to its maximum setting of 10#F (adj) above design setting.
 - c. The reverse control sequencing shall occur when the CZ is above 98% (adj) open until the discharge air temperature set point and the static pressure set point are at their design set points.

- E. Startup Mode: When the rooftop unit is turned ON by the BMS for optimal start, warm-up is provided as required. The BMS shall hold the rooftop unit in the warm-up mode until the zone temperature is greater than the user entered occupied heating setpoint. The outside air dampers remain closed until the occupied time of the zone. In the morning warm-up mode, the fan-powered VAV boxes shall control to max flow setpoint. When morning warm-up setpoint is reached they shall index to occupied setpoints.
- F. Outdoor Air Ventilation Control: The use of outdoor air for ventilation shall be provided only during scheduled hours of occupancy and during periods of timed override. Use of the economizer overrides any outdoor air ventilation control.
- G. Low Ambient Compressor Lockout: Compressor operation shall be disabled below a user defined outdoor air temperature.
- H. Timed Override: When a timed override is initiated by the user, the rooftop unit will return to its normal occupied mode for a user determined period of time. When the timed override period has ended, the unit shall automatically shut down. VAV boxes in the affected zone shall control to their occupied setpoints while the unit is in timed override operation.
- I. Emergency Shutdown: The unit will shut down in response to a smoke detector indicating the presence of a fire or other emergency condition.
- J. Unit Status Report: For each rooftop unit, the BMS shall provide an operating status summary of all sensed values (zone temperature, discharge temperature, etc.) setpoints and modes.
- K. Diagnostics/Protection: The BMS system shall be able to alarm from all sensed points from the rooftop units and diagnostic alarms sensed by the unit controller. Alarm limits shall be designated for all sensed points.

3.2 VARIABLE AIR VOLUME TERMINAL UNIT CONTROL

- A. The BMS shall perform the following VAV terminal unit control strategies:
 - a. Grouping: The BMS shall be able to group VAV boxes via keyboard commands. These groups shall make it possible for the operator to send a common command to all boxes in a group to operate in the same mode. BMS shall also compile on a group basis, the following:
 - Minimum group temperature
 - Maximum group temperature
 - Average group temperature
 - Current airflow through boxes in group (total)
 - b. Setpoint Control: The BMS shall edit the zone space temperature setpoint of each VAV box. The zone temperature setpoint shall be operator adjustable. Individual zone setpoint and control logic shall reside at the zone level and not be dependent upon the BMS for control. In the event of communication loss, the box will continue to control to current setpoints.

- c. Cooling Valve Control: The BMS shall control the cooling air valve to a fully open, fully closed, maximum CFM, or minimum CFM positions based on operator commands. The operator shall also have the capability to adjust the maximum and minimum airflow limits of the air valve through the BMS.
 - d. Operating Mode: The BMS shall place the box in either the occupied or unoccupied mode based on an operator adjustable time schedule. Separate heating and cooling setpoints shall be enterable for each mode through the BMS. Other modes available for special applications shall include full open, full closed, maximum flow, and minimum flow.
 - e. Control Offset: The BMS shall be capable of offsetting the cooling or heating setpoints of one or more groups of boxes by an operator adjustable amount. This capability will allow for automatic zone setpoint changes based on system requirements, such as demand limiting.
 - f. Automatic Recalibration: The system shall automatically recalibrate its air flow sensing and air valve position measurement system at system startup and on a scheduled basis.
 - g. Remote Setpoint Adjustment: The BMS zone temperature setpoint programmed in software shall be capable of being manually overridden by a remote adjustment at the temperature sensor. This manual readjustment feature may be disabled through the BMS, if desired.
 - h. Override Button: The VAV shall be capable of being placed in the “occupied” mode by pressing an override button mounted on the zone temperature sensor. Associated rooftop HVAC system must also automatically index to the correct operating mode at this request.
 - i. Portable Interface Device: The VAV box shall be capable of communicating with a hand held portable operator’s terminal. This portable terminal shall give the operator the capability to interrogate and edit D.D. C.-VAV box parameters.
 - j. Terminal Unit Status Reports: For each terminal unit, the BMS shall provide an operating status summary of all unit sensed values (zone temperature, CFM, etc.), setpoints, and modes.
 - k. Terminal Unit Group Report: For each group of VAV terminal units, the BMS shall report the group mode, heating and cooling airflow, average zone temperature, minimum zone temperature, and maximum zone temperature. The report shall also display for each terminal unit in the group the present temperature control setpoints and the current zone temperature.
- B. Terminal Box Diagnostics:
- a. If zone temperature sensor input fails above its high range, unit shall control at its maximum CFM setpoint. If sensor fails below its low range, unit shall control to its minimum CFM setpoint.

- b. In both cases, all heat outputs shall be disabled. A diagnostic message shall be displayed upon operator inquiry.
 - c. If flow measuring system fails, unit shall automatically convert to a pressure dependent, damper position-based algorithm. Diagnostic message shall be displayed upon operator inquiry.
 - d. If zone temperature setpoint potentiometer on zone sensor fails, unit shall automatically control to 74 degrees Fahrenheit. Diagnostic message shall be displayed upon operator inquiry.
 - e. If communications are lost, controller shall continue to operate in the current mode of operation. All setpoints shall be retained in nonvolatile memory. If communications are not restored within fifteen (15) minutes, unit shall automatically initiate a reset-recalibrate.
- C. VAV Box Control with No Heat:
- a. Occupied Mode: Upon a rise in space temperature above cooling setpoint, the terminal unit shall modulate to provide maximum cooling CFM. A drop in space temperature will result in the unit modulating to provide zero cooling CFM.
 - b. Unoccupied Mode: During the unoccupied mode and during warm-up, the primary air valve shall modulate fully open.
- D. VAV Box with Electric Heat Control:
- a. Occupied Mode: Upon a rise in space temperature above cooling setpoint, the terminal unit shall modulate to provide maximum cooling CFM. A drop in space temperature will result in the unit modulating to provide its minimum cooling CFM. As the space temperature continues to fall, the heating coil will stage on.
 - b. Unoccupied Mode: During the unoccupied mode, the primary air valve shall modulate fully open. The heating coil shall be off.
- E. Parallel Fan Powered VAV Box Control:
- a. Occupied Mode: Upon a rise in space temperature above cooling setpoint, the terminal unit shall modulate to provide maximum cooling CFM. A drop in space temperature will result in the unit modulating to provide its minimum cooling CFM. As the space temperature continues to fall, the unit shall modulate its cooling flow to its minimum heating CFM. A further drop in space temperature will cycle the plenum fan intermittently. The heating coil will stage on if the plenum fan is constantly running with a continued drop in space temperature.
 - b. Unoccupied Mode: During the unoccupied mode, the primary air valve shall modulate fully open. The terminal fan and heating shall be off.

3.3 MISCELLANEOUS EQUIPMENT CONTROL

- A. Power Roof Ventilators and Fans: Shall be interlocked with their respective RTU's. General and toilet exhaust fans shall run continuously during the occupied cycle and shall be off during the unoccupied and warm-up cycle. Elevator equipment room exhausters shall be thermostatically controlled.
- B. Wall heaters, ceiling heaters, and baseboard radiation; shall be controlled by zone thermostats.
- C. Exhaust Fans in electrical, equipment and / or elevator equipment rooms, as indicated on the Drawings, shall be controlled from a wall mounted thermostat. When the temperature exceeds the setpoint, the fan shall turn on. Upon activation, normally closed automatic dampers shall open.

3.6 ELECTRIC DUCT HEATING COILS

- A. Run Conditions - Scheduled: The unit shall run according to a user-definable time schedule in the following modes:
- B. Individual zone setpoint and control logic shall reside at the zone level and not be dependent upon the BMS for control. In the event of communication loss, the zone controller will continue to control to current setpoints.
- C. Operating Mode: The BMS shall place the zone in either the occupied or unoccupied mode based on an operator adjustable time schedule. Separate heating and cooling setpoints shall be enterable for each mode through the BMS.
- D. Remote Setpoint Adjustment: The BMS zone temperature setpoint programmed in software shall be capable of being manually overridden by a remote adjustment at the temperature sensor. This manual readjustment feature may be disabled through the BMS, if desired.
- E. Override Button: The zone shall be capable of being placed in the "occupied" mode by pressing an override button mounted on the zone temperature sensor. Associated rooftop HVAC system must also automatically index to the correct operating mode at this request.
- F. If zone temperature setpoint potentiometer on zone sensor fails, unit shall automatically control to 74°F. Diagnostic message shall be displayed upon operator inquiry.
- G. If communications are lost, controller shall continue to operate in the current mode of operation. All setpoints shall be retained in nonvolatile memory. If communications are not restored within fifteen (15) minutes, unit shall automatically initiate a reset-recalibrate.
- H. Portable Interface Device: The zone controller shall be capable of communicating with a hand held portable operator's terminal. This portable terminal shall give the operator the capability to interrogate and edit parameters.
- I. Terminal Unit Status Reports: For each zone, the BMS shall provide an operating status summary of all unit sensed values (zone temperature, etc.), setpoints, and modes.
- J. The space sensor shall measure the zone temperature and send a 0-10VDC signal to the SCR controller at the duct heater. Electric heater to be furnished with an airflow sensor (see section 15660) to prevent heater operation upon loss of airflow.

- K. During unoccupied mode, electric heat shall be disabled.
- L. Diagnostics/Protection: The BMS system shall be able to alarm from all sensed points and diagnostic alarms sensed by the unit controller. Alarm limits shall be designated for all sensed points.

END 15960

DIVISION 15 - MECHANICAL
Section 15980- Testing, Adjusting, Balancing, and Start Up

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Testing, Adjusting, Balancing, and Start Up of mechanical systems.

1.2 SUBMITTAL FOR PROJECT CLOSEOUT

- A. Reports: Submit three (3) copies of Testing, Adjusting, Balancing, and Start Up reports after work has been completed.
 - a. All data obtained during testing, adjusting and balancing shall be recorded in accordance with, and on the forms recommended by, the referenced standards.
 - b. Report recommendations for correcting unsatisfactory mechanical performances when systems cannot be successfully balanced.
 - c. The reports shall be certified proof that the systems have been tested, adjusted and balanced in accordance with the referenced standards, are an accurate representation of how the systems have been installed; are a true representation of how the systems are operating at the completion of the testing, adjusting and balancing procedures; and are an accurate record of all final quantities measured, to establish normal operating values of the systems.

1.3 QUALITY ASSURANCE

- A. Agency Qualifications: The services of an independent testing, adjusting and balancing agency meeting one of the referenced standards specified below shall be employed by Contractor to check installation for conformity to design, measure the fluid quantities of the mechanical systems as required to meet design specifications, and record and report the results.
- B. Codes and Standards:
 - a. NEBB: "Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems".
 - b. AABC: "National Standards for Total System Balance".

1.3 REGULATORY REQUIREMENTS

- A. Conform to applicable building code and electrical code for manufacture, product, and installation of system.

PART 2 EXECUTION

2.1 GENERAL

- A. The supply, return and exhaust air systems shall be tested, adjusted and balanced.
- B. Vibration testing shall be performed on all rotating equipment.
- C. The temperature control system shall be verified for correct operation.
- D. Start-up shall be accomplished as specified herein.

3.2 TEMPORARY USE OF SYSTEMS

- A. VAV Rooftop Units may be used for temporary ventilation and heating during construction, but not cooling. Before the units are put into operation, start-up shall be completed in accordance with Section 3.3 Equipment Start-Up below.
- B. Provide each unit with a new set of filters each month while units are in use during construction.

3.3 EQUIPMENT START UP

- A. VAV Rooftop Units:
 - a. The Contractor shall complete Form No. 1 for each unit prior to energizing.
 - b. Trane shall complete Form No. 2 prior to using the unit for ventilation or heating and Form No. 3 before refrigeration is used.
 - c. Trane shall complete Form No. 4 prior to air balancing.
- B. Air Terminals: The Contractor shall test each air terminal box after it is installed and wired to assure that the damper drives from full open to full closed and electric heat and integral fan are staged on and off for fan-powered terminals.
- C. Power Roof Ventilators: The Contractor shall test each power roof ventilator to assure it is fully operational.
- D. Master Building Control Panel:
 - a. Trane shall complete a wiring point-to-point check and verify Master Building Control Panel operation by fully simulating all system control sequences specified and shown on Drawings or the Tracer Summit Program Sheets.
 - b. Start-up Form No. 4 shall be completed by Trane.

3.4 PERFORMING TESTING, ADJUSTING, AND BALANCING

- A. Prior to balancing system, Contractor shall install new filters, thoroughly clean equipment and replace damaged or worn parts.

- B. Testing and balancing procedures shall be performed on each system in accordance with the detailed procedures outlined in the referenced standards and as follows:
- a. The supply and exhaust systems shall be balanced to provide the actual design air quantities shown on Drawings for all designed areas within a range of 0% to + 10%. If areas are unfinished, the systems shall be balanced for supply air serving fan powered air terminals required to provide temporary heat. Exhaust ducts serving unfinished areas shall be capped.
 - b. The VAV rooftop unit supply fan speeds with inlet guide vanes in their full-open position shall be adjusted downward by changing belts and sheaves whenever the actual connected design air flow is less than 75% and/or 50% of the original fully developed building unit design. The original belts and sheaves shall be turned over to Landmark to accomplish subsequent changes as areas are developed and the connected design air flows exceed 50% and again at 75%.
 - c. Final VAV rooftop unit air supply balancing shall be accomplished by adjusting unit inlet guide vane maximum settings to deliver only the volume of connected air flow with all air terminals in their full-open position, and minimum settings with all air terminals set at their minimum air flow settings to supply sufficient outdoor air to slightly pressurize the building with all exhaust systems operating.
 - d. The speed of each power roof ventilator fan shall be adjusted downward such that it exhausts only the volume of required design exhaust air. Belt and sheave changes shall be provided if the actual connected exhaust load is less than the original minimum design for a fully developed building. Original belts and sheaves shall be turned over to Landmark to accomplish subsequent changes as areas are developed.
 - e. Replacement belts and sheaves for PRV's and VAV rooftop units, if required, shall be incorporated by Change Order.
- C. Insulation, ductwork and piping shall be cut for installation of test probes to the minimum extent necessary to allow adequate performance of procedures.
- a. Insulation, ductwork and housings shall be patched and sealed using materials identical to those removed.

3.5 MIDSEASON CHECK

- A. Trane shall perform a midseason check at no less than ninety (90) days and no more than one hundred twenty (120) days from the original Mechanical Refrigeration Start-Up. If this cannot be provided in the initial cooling season, it shall be completed at the following spring start-up. Trane shall complete Form No. 5 at the midseason check and submit it to Landmark.

END 15980

DIVISION 16 - ELECTRICAL
Section 16000- Basic Electrical Requirements

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Electrical systems basic requirements

1.2 BASIC ELECTRICAL REQUIREMENTS

- A. Electrical: All raceways, circuits, conduits, power, lighting, fire alarm, and special electrical systems shall be provided for a complete operating electrical system
 - a. The Electrical system shall comply with all state and local codes.
 - b. Comply with applicable NEMA, National Electric Code, National Electrical Safety Code, NFPA 90A, AND utility company requirements.
 - c. Comply with code required seismic anchorage and support systems.
- B. Provisions for openings, holes and clearance through walls, floors and partitions, and the entire work to be carried out shall be accomplished without superfluous cutting. Oversized openings shall be caulked and sealed. Openings through fire rated construction shall be sealed with fire safing and fire resistant joint sealer meeting the requirements of ASTM E184.
- C. Anchors, inserts and supports shall be provided which are suitable for the application and required to accommodate materials and equipment.
- D. Unless shown on Drawings or specified herein, no special services, distribution or equipment hook-up is included for equipment not furnished under this Contract. Typical of equipment or systems not provided are: X-ray, dental units, refractory units, intercom, paging, music, direct current, and security systems.
- E. Rough-in requirements for Owner's special equipment shall be provided to Landmark and additional rough-in provisions shall be incorporated by Change Order.
- F. Identification: All electrical apparatus including power sources, operable devices, controls and other items established elsewhere in these Specifications shall be identified with Dymo, Brady or Avery labels describing usage, voltage and equipment (per OSHA).
 - a. UL Label: All equipment shall be UL listed, except for equipment for which UL has not an established test standard.
 - i. All electrical apparatus including power sources, operable devices, controls and other items established elsewhere in these Specifications shall be identified with Dymo, Brady or Avery labels describing usage, voltage and equipment (per OSHA).

- b. Each switchboard, motor control center, distribution panelboard, and lighting panelboard shall be identified with an engraved laminated plastic nameplate containing name of board and voltage/phase. Lettering shall be 1/4" high, white text on a black field for normal power, white text on red field for emergency power.
 - c. Each disconnect switch, enclosed motor starter, and combination disconnect/motor starter shall be identified with an engraved laminated plastic nameplate containing the name of the load served. Lettering shall be 1/4" high, white text on a black field for normal power, white text on red field for emergency power.
- G. Testing: The entire electrical system shall be started up and tested for proper operation, coordinated short circuit protection, proper grounding and resistance.
- H. Exposed painted surfaces of equipment or panels which have been abused, removed or rusted during construction shall be painted to match the original factory or adjacent finished surfaces.

END 16000

DIVISION 16 - ELECTRICAL
Section 16100- Wires and Cables

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Wiring and Cables

1.2 QUALITY ASSURANCE

- A. Wire shall be delivered to the job site in original cartons.

1.3 REGULATORY REQUIREMENTS

- A. Conform to applicable building code and electrical code for manufacture, product, and installation of system.

PART 2 PRODUCTS

2.1 MATERIAL

- A. Wiring Material and Application: All conductors shall be new, soft-drawn copper with 600 volt insulation, color coded as required by Code.
 - a. No. 10 AWG and smaller shall be solid or stranded.
 - b. No. 8 and larger wire shall be stranded copper.
 - c. In general, utilize type THW or THHN-THWN.
 - d. Feeders, all conductor No. 8 and larger and all conductors in or below ground floor slab: Type THWN.
 - e. Isolated power systems: XHHW
 - f. High temperature locations: Where ambient temperature conditions warrant, code grade type RHH or otherwise with insulation suitable for 90° C operating temperature.
 - g. Branch circuit wiring in fluorescent fixture channels: Type THHN No. 12 minimum.
- B. Solderless Connectors: Joints, taps and splices in conductors No. 10 and smaller shall be made with spring and compression type solderless connectors with plastic covers of type and size as recommended by the manufacturer. Joints, taps and splices in conductors No. 8 and larger shall be taped with vinyl providing insulation not less than that of the conductor and not less than two half-lapped layers each.
- C. Fire Alarm Wiring; shall comply with NEC Article 760 and state and local codes.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer recommendations.
- B. Service, feeder and branch circuit wiring shall be installed using color coded conductors as follows:

208/120V SYSTEMS		480/277V SYSTEMS		ALL SYSTEMS	
Phase A	Black	Phase A	Brown	Equipment Ground	Green Tracer
Phase B	Red	Phase B	Orange	Single & Three-Way Return	Orange Tracer
Phase C	Blue	Phase C	Yellow	Three-Way Traveler	Yellow Tracer
Neutral	White	Neutral	Gray		

- C. A minimum of 6" of looped or free end conductor shall be left at each outlet for the installation of devices or fixtures. Conductors in outlet boxes not for connection to devices or equipment shall be identified by circuit number and "spare" and coiled, with the cut ends insulated and taped together.
- D. Branch Circuit Sizing:
 - a. Branch circuit homeruns to panels from any outlet on the circuit shall be a minimum #12 AWG.
 - b. Exit lighting and emergency wiring shall be #12 AWG.
 - c. Conductors for branch circuits of 120 volts over 150' long and of 277 volts over 230' long shall be a minimum of #10 AWG.
 - d. Class 1 remote control and signal circuit conductors shall be minimum #14 AWG.
 - e. Class 2 low energy remote control and signal conductors shall be minimum #16 AWG.
 - f. Special signal, communications, or similar systems wires (cables) shall be sized as shown on Drawings or as required by the manufacturer.
 - g. Equipment grounding conductor shall be a minimum #12 AWG, as required by Code or as shown on Drawings.
- E. Parallel conductors shall be terminated on multiple barrel lugs or on a combination of multiple barrel lugs on a common bus. Under full load operating conditions, the division of the load between conductors shall be checked. Where load differential between any

two conductors of a phase exceeds ten (10) percent, corrective measures shall be taken to establish a load differential between conductors of less than ten (10) percent. A record of such tests shall be made for each feeder, indicating the conductor size, load in each conductor, voltage, and identification of feeder. Each test record, as well as retesting following corrective measures, shall be signed by the individual conducting and the individual witnessing the test.

- F. Conductor identification shall be provided for all feeder conductors within each enclosure where a tap, splice, or termination is made. Identification shall be by means of nylon marker ties, Type "PLM" as manufactured by Panduit Corporation.
- G. Insulated grounding conductors shall be provided for all convenience receptacles.
- H. Motors shall be grounded with a separate green equipment ground conductor routed via flexible metal conduit.

END 16100

DIVISION 16 - ELECTRICAL
Section 16130 – Raceways and Boxes

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Conduits and boxes

1.2 REGULATORY REQUIREMENTS

- A. Conform to applicable building code and electrical code for manufacture, product, and installation of system.
- B. Where code allows, Armored cable-type AC (or MC) and Greenfield cable may be used in lighting and convenience outlet circuits only.
 - a. Cable used for convenience outlet circuits shall be type HCF-90.
 - b. Specific conductor type, support requirements, bends, boxes and fittings shall be in accordance with N.E.C. Article 333.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Conduit; shall be galvanized rigid conduit, PVC conduit or EMT conduit and shall be installed in accordance with applicable building codes and this specification. One of the following equal manufacturers and products may be used:
 - a. Allied
 - b. LTV
 - c. Republic
 - d. Additional approved manufacturers shall be considered
- B. Boxes; shall be galvanized steel. Exterior boxes shall be type FS. Vapor tight boxes shall be GS. Boxes shall be sized per NEC Article 370. One of the following approved manufacturers may be used:
 - a. Appleton,
 - b. Steel City
 - c. National Electric

- d. Raco
- e. Additional approved equal manufacturers may be considered

2.2 SYSTEM DESIGN AND INSTALLATION CRITERIA

- A. Heavy Wall Conduit; shall be used in or below concrete slab on grade, concrete walls, and exterior areas, and shall be galvanized, rigid (heavy wall) or intermediate metal (IMC) conduit.
- B. PVC Conduit; shall be used in or below grade, and under concrete slab on grade, and shall be rigid, non-metallic conduit, schedule 40 PVC. PVC Conduit; shall be used mounted on concrete in parking structures.
- C. Thin Wall Conduit; shall be used in interior dry locations above grade and shall be electrical metal tubing (EMT or Thin Wall Conduit)
- D. Flexible Metal Conduit Connections; shall be used at recessed lighting and equipment in dry areas.
- E. Liquid-tight Flexible Metal Conduit; shall be used at connections to HVAC equipment, vibrating or moving equipment, and in all wet or corrosive areas.
 - a. Maximum 24" long flexible conduit connections shall be provided to HVAC air handling equipment and power roof ventilators.
- G. Service Entrance; shall utilize rigid metal conduit.
- H. PVC conduit; shall not be used in plenums.
- I. Minimum of 24" long flexible conduit connections shall be provided to HVAC air handling equipment and power roof ventilators.
- J. Three (3) 3/4" spare conduits shall be provided from each flush mounted panel board stubbed up to an accessible ceiling location.
- K. "Fish" wire shall be provided in all empty conduits.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer recommendations.
- B. The complete raceway system shall be metallic and grounded so that the ground will be electrically continuous from the service to all outlet boxes.
- C. Conduit or boxes shall not be exposed except in unfinished areas or mechanical rooms.

- D. Conduit for roof mounted equipment, except for VAV rooftop units, shall be run inside the equipment's curb.
- E. Bends and offsets shall present a neat, symmetrical appearance and shall be rigidly secured in place.
- F. All components shall be sized in accordance with applicable code.
- G. PVC conduit runs shall have expansion fittings as required for temperature expansion per manufacturer's recommendations.
- H. Conduit shall not parallel streamlines, hot water pipes, flues and high temperature piping or ducts and shall cross these items with a minimum 6" clearance. Conduit shall not be routed over boilers or other high temperature equipment such that it will be in the path of hot air currents.
- I. Conduit passing between areas of different temperatures (i.e. exterior-interior) shall be sealed with duxseal at the outlet box at the point of penetration on the "warmer" side. Conduit and sleeve penetrations through floors or fire-rated walls shall be sealed with Fire Foam CTC PR-855.

3.2 SUPPORT OF CONDUIT AND CONDUCTORS

- A. All conduit shall be securely fastened to structural parts of the construction with supports at 8'-0" o.c. maximum and not more than 3'-0" from outlet boxes, junction boxes, pull boxes, cabinets and fittings, and at each elbow.
- B. Supporting devices shall be specifically designed for the application and the anticipated load. Perforated hanger iron and tie wire shall not be used.
- C. Conduit shall be supported with hot-dip galvanized channel and swivel threaded rod hangers and heavy duty pipe straps, clamps, clips and fasteners as manufactured by Unistrut, Bee-Line or Kindorf. Back straps shall be provided for all exposed conduit on exterior surfaces.

3.3 COUPLINGS, CONNECTORS AND FITTINGS

- A. Couplings, connectors and fittings shall be standard devices to properly attach conduit to conduit, to outlet boxes, panel enclosures, junction boxes, etc. Such devices shall be threaded, all-steel, rain tight and concrete tight, specifically designed for the application and bearing U.L. labels.
- B. All rigid steel conduit and IMC fittings shall be threaded type.
- C. All connectors shall have insulated throats. Connectors for use with flexible metal conduit shall be threaded type.

- D. Indentation type, set-screw type and push-on type fittings shall not be used for rigid steel, EMT or flexible metal conduits. Fittings with die-cast bodies, wholly or partially, shall not be used.

3.4 OUTLET BOXES

- A. Outlet boxes shall be provided as required to accommodate the intended device with the following minimum sizes:
 - a. Outlet boxes shall be 4" square, galvanized, set parallel to and independently attached to construction and adjusted to set level with finished surfaces. Thru-wall or back-to-back outlets shall not be used. Flush type boxes shall be 1-1/2" deep.
 - b. Ceiling boxes shall be 4" octagon by 2-1/8" deep and shall be supported with approved type box support channels.
- B. Raised covers with square corners and internally turned device hole plate continuous from end to end for mounting wiring devices shall be furnished for all flush mounted wall boxes. Flush wall outlet boxes shall include grounding terminal and must set flush with finished walls to establish ground continuity.
- C. FS or FD cast conduit bodies with weatherproof cast spring lid cover and gasket shall be provided for interior wet applications and boxes exposed to the exterior.
- D. Boxes shall be installed so that device covers are plumb and fit tightly against the adjacent wall finish.
- E. The maximum gap between the edge of the outlet box and adjacent plaster or gypsum board wall finish shall be 1/8".

END 16130

DIVISION 16 - ELECTRICAL
Section 16140- Wiring Devices

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Convenience outlets, switches, GFI protection, cover plates and supporting devices.

1.2 REGULATORY REQUIREMENTS

- A. Conform to applicable building code and electrical code for manufacture, product, and installation of system.

PART 2 PRODUCTS

2.1 SWITCHES

- A. Switches in Medical Office Building; shall be twenty (20) amp, Specification Grade, ivory color, silent type, 3-wire, provided with grounding screw. One of the following equal manufacturers and products may be used:
 - a. Hubbell, "HBL 122X Series"
 - b. Leviton, "122X Series"
 - c. Pass & Seymour "PS20ACX Series"
 - d. Additional approved equal products shall be considered.
- C. Keyed switches; shall be provided for public corridor lighting. Five keys shall be provided for each key switch.
- D. Occupancy Sensors: (used where required to satisfy energy codes)
 - a. Wall mounted: Leviton ODS15-ID, Watt Stopper WS200 or Lithonia LIRW.
 - b. Ceiling mounted: Leviton ODC0S-17-W, Watt Stopper CI-200 (and appropriate power pack) or Lithonia LIRO (with power control station).
 - c. Ceiling mounted in large toilet rooms: Leviton ODC10-UOW or equivalent by Wattstopper, Ultrasonic occupancy sensor.
- E. Digital Wall Switch Timers: Wall mounted, adjustable time-on interval, with warning signal prior to lights out. Novitas, "05-030" or approved equal manufacture and product.
- F. Toggle switches shall be quiet type.

2.2 COVER PLATES

- A. Exposed Cover Plates; shall be smooth ivory color. Blank cover plates shall be provided at all boxes which are not covered by device plates, or light fixture. One of the following equal manufacturers and products may be used:
 - a. Hubbell
 - b. Leviton
 - c. Pass & Seymour
 - d. Additional approved equal products shall be considered.
- B. Hidden Cover Plates; shall be 1/2" raised galvanized device in dry areas.
- C. Gang plates; shall be used for multiple device locations.
- D. Blank cover plates shall be provided for all boxes which are not covered by device plates or light fixtures.
 - a. 1/2" raised galvanized device covers shall be provided for exposed conduit boxes in dry areas.
- E. Gang plates shall be used for multiple device locations.

2.3 OUTLETS

- A. Convenience outlets and other wiring devices shall be twenty (20) amp Specification Grade, unless otherwise specified, ivory color.
 - a. Dedicated and computer outlets which shall be gray.
 - b. Emergency outlets which shall be red.
 - c. Wiring devices in Ambulatory Surgery or "I" occupancy areas shall be hospital grade.
- B. All specification grade convenience outlets shall be 3 wire, provided with grounding screws as follows:
 - a. Hubbell HBL 5362 Series
 - b. Leviton 5362 Series
 - c. Pass & Seymour 5362 Series
- C. GFI Outlets:
 - a. GFI outlets shall be one of the following:

- 1) Hubbel 5352 series.
 - 2) Leviton 8899 series.
 - 3) Pass & Seymour 2095 series.
- b. Exterior GFCI Outlets: Exterior outlets, and as required by code shall be weatherproof GFI protected outlets.
 - c. Interior GFCI Outlets: Interior toilet room outlets, outlets adjacent to sinks, and other outlets as required by code shall be GFI protected outlets.
 - d. Wire GFCI devices such that the downstream devices are not affected by ground fault interruption (non-feed thru). Each GFCI device shall be self protecting only.
- D. Tamperproof convenience outlets shall be provided in pediatric treatment areas and children play areas.

2.4 ACCESSORIES

- A. Supporting Devices; shall be catalog items compatible with and suitable for the intended use.
- a. Stud wall supporting devices shall be Caddy, #H23, H4, HS3, or RBS16 quick mount box supports.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer recommendations.
- B. Location of wiring devices shown on Drawings are approximate unless otherwise noted.
- C. Switches and outlets shall be mounted as follows (measured from floor to centerline of outlet) unless otherwise shown on Drawings:
- a. Outlets mounted above countertops shall be mounted horizontally.
 - b. Outlets mounted above countertops without a backsplash shall be mounted 3" from countertop to center of outlet.
 - c. Outlets mounted above countertops with a backsplash shall be mounted 2" from top of backsplash to center of outlet.
 - d. Switches and occupancy sensors shall be located at 48" AFF and within 12" of the latch side of the door serving the room that the switch is controlling.
 - e. Clock outlets shall be at 90".

- f. All other outlets shall be mounted vertically at 18".
 - g. Electric drinking fountain outlets shall be mounted directly beneath the fountain so that cords are not visible.
- D. Switches, occupancy sensors and outlet boxes shall not be installed back to back in partitions separating rooms and wherever possible shall be in different stud spaces. Boxes located on opposite sides of fire rated partitions shall be separated by a minimum horizontal distance of 24" and be located in a separate stud space.
- E. Connections to wiring devices shall be made by the binding screws only.
- F. Receptacles shall have a bonding conductor from grounding terminal to the metal conduit system and to the equipment grounding conductor for the circuit.

END 16140

DIVISION 16 - ELECTRICAL
Section 16300- Circuits

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Circuits and over-current protection devices.

1.2 REGULATORY REQUIREMENTS

- A. Conform to applicable building code and electrical code for manufacture, product, and installation of system.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Exterior Lighting Circuits: Tork 7302 ZL 3 pole single throw or equal Intermatic or Paragon time clocks shall be provided on separate circuits, for exterior lighting.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer recommendations.
- B. Duct smoke detector circuit shall be wired to shutdown respective mechanical equipment.

END 16300

DIVISION 16 - ELECTRICAL
Section 16400- Service Entrance and Distribution

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Service entrance, switchboards, panel boards, motor control centers, and busways.

1.2 SUBMITTALS FOR REVIEW

- A. Shop Drawings: Switchgear drawings in one complete package for distribution panels, load centers, and meter sockets.

1.3 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Operation and Maintenance Data:
 - a. Include a parts catalog with complete list of equipment replacement parts and identify each entry with equipment description and identifying code.
 - b. Provide technical information for servicing operating equipment.
 - c. Provide manufacturer's internal wiring diagrams.
 - d. Provide contractor's installation wiring diagrams.
 - e. Provide control system installation drawings.
 - f. Provide typed panel directories including each distribution panel and load center.
- B. Keys: Deliver keyed toggle switches (five for each switch) for panels, timer cabinets, and other equipment.
 - a. Keys shall be tagged indicating panel, location, and panel use.
 - b. Deliver keys to Landmark by security shipment direct from manufacturer.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable building code and electrical code for manufacture, product, and installation of system.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Electric Service; shall be 277/480V with a single distribution system and a single meter. Provide 277/480V panelboards for major equipment and fluorescent lighting, with step down transformers and 208/120V panelboards for receptacles and incandescent lighting. Refer to the Drawings for the service size, voltage and configuration. One of the following or equal manufacturers may be used:
 - a. General Electric
 - b. Cutler Hammer
 - c. Square D
 - d. Siemens ITE
- B. Service disconnection switches; shall be NEMA HD unless otherwise required by code.
- C. Distribution branch circuit panel board centers; shall be steel with cover and matching door.
- D. Circuit breakers shall be plug-in type for 120/208V distribution and bolt-in type for 277/480V distribution.
- E. Over-current Protection Devices; shall be circuit breaker, molded case, thermal-magnetic type with quick-make, quick break mechanism. Common trip on multiple pole breakers. Lugs shall be UL listed for use with both copper and aluminum conductors. Panelboard circuit breakers shall be plug-in type. Fuses shall be manufactured by Bussmann or approved equal. Circuit breakers shall be by one of the following equal manufacturers:
 - a. General Electric
 - b. Cutler Hammer
 - c. Square D
 - d. Siemens ITE
- F. Metering; shall be provided per the local electrical utility requirements and specifications.
- G. Grounding: Electrical service and service entrance equipment shall be grounded in compliance with the National Electric Code, Article 250, local electrical utility requirements, state and local codes.

1. APPLICATION

- a. In raceways, use insulated equipment grounding conductors.
- b. Exothermic-Welded Connections: Use for connections to structural steel and for underground connections, except those at test wells.
- c. Equipment Grounding Conductor Terminations: Use bolted pressure clamps.
- d. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
 - 1) Use insulated spacer; space **1 inch (25.4 mm)** from wall and support from wall **6 inches (150 mm)** above finished floor, unless otherwise indicated.
 - 2) At doors, route the bus up to the top of the door frame, across the top of the doorway, and down to the specified height above the floor.
- e. Underground Grounding Conductors: Use copper conductor, No. 2/0 AWG minimum. Bury at least **24 inches (600 mm)** below grade or bury **12 inches (300 mm)** above duct bank when installed as part of the duct bank.

2. EQUIPMENT GROUNDING CONDUCTORS

- a. Comply with NFPA 70, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NFPA 70 are indicated.
- b. Install an insulated equipment grounding conductor with circuit conductors for the following items, in addition to those required by NEC:
 - 1) Feeders and branch circuits.
 - 2) Lighting circuits.
 - 3) Receptacle circuits.
 - 4) Single-phase motor and appliance branch circuits.
 - 5) Three-phase motor and appliance branch circuits.
 - 6) Flexible raceway runs.
 - 7) Armored and metal-clad cable runs.
- c. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate grounding conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
- d. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate equipment grounding conductor. Isolate equipment grounding conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
- e. Nonmetallic Raceways: Install an equipment grounding conductor in nonmetallic raceways unless they are designated for telephone or data cables.

- f. Air-Duct Equipment Circuits: Install an equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners and heaters. Bond conductor to each unit and to air duct.
- g. Water Heater: Install a separate equipment grounding conductor to each electric water heater. Bond conductor to heater units, piping, connected equipment, and components.

3. INSTALLATION

- a. Ground Rods: Install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes.
 - 1) Drive ground rods until tops are **2 inches (50 mm)** below finished floor or final grade, unless otherwise indicated.
 - 2) Interconnect ground rods with grounding electrode conductors. Use exothermic welds. Make connections without exposing steel or damaging copper coating.
 - b. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
 - c. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.
 - d. Metal Water Service Pipe: Provide insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes by grounding clamp connectors. Where a dielectric main water fitting is installed, connect grounding conductor to street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
 - e. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with grounding clamp connectors.
 - f. Bond each aboveground portion of gas piping system upstream from equipment shutoff valve.
- H. Ground Fault Protection (GFI); shall be provided on the service entrance and distribution equipment where required by code. The GFI system consists of shunt trip circuit interrupters, current sensor, relaying device as an integral part of an electronic circuit breaker with integral ground fault testing. These UL listed components shall be designed to operate in conjunction with each other.

PART 3 EXECUTION

3.1 PREPARATION

- A. Proper electrical characteristics shall be coordinated with respective trades responsible for the equipment.

3.2 INSTALLATION

- A. Install in accordance with manufacturer recommendations and utility company requirements.

- B. Complete electrical hook-up including proper circuiting, breakers, conduit and wire sizes shall be provided for all mechanical equipment.
- C. Panelboards / load centers shall be complete with a typed directory mounted on the inside of the panel door to identify all breakers as to equipment or area served.
- D. Switchboards shall be installed on a nominal 4" high concrete housekeeping pad.

END 16400

DIVISION 16 - ELECTRICAL
Section 16420- Disconnect Switches

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Disconnect switches.

1.2 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Operation and Maintenance Data:
 - a. Include a parts catalog with complete list of equipment replacement parts and identify each entry with equipment description and identifying code.
 - b. Provide technical information for servicing operating equipment.
 - c. Provide manufacturer's internal wiring diagrams.
 - d. Provide contractor's installation wiring diagrams.
- B. Keys: Deliver keyed toggle switches (five for each switch) for cabinets, and other equipment.
 - a. Keys shall be tagged indicating panel, location, and panel use.
 - b. Deliver keys to Landmark by security shipment direct from manufacturer.

1.3 REGULATORY REQUIREMENTS

- A. Conform to applicable building code and electrical code for manufacture, product, and installation of system.

PART 2 PRODUCTS

2.1 DISCONNECT SWITCHES

- A. Disconnect Switches; shall be general or heavy duty type with quick-make operating mechanisms, full cover interlocks, external indicator handle for manual operation.
- B. Weatherproof switches for outdoor locations have NEMA-3R equivalent enclosures.
- C. Indoor enclosures shall be NEMA-1.
- D. Fusible safety switches shall be provided with cartridge type fuses and Class R rejection fuse clips.

- E. Disconnect and safety switches shall be manufactured by Square D. Lugs shall be UL listed for both copper and aluminum conductors.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer recommendations.

END 16420

DIVISION 16 - ELECTRICAL
Section 16440- Motor Control

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Motor control devices including disconnects, starters, relays, contactors, controllers, pilot lights, and miscellaneous items required.

1.2 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Operation and Maintenance Data:
 - a. Include a parts catalog with complete list of equipment replacement parts and identify each entry with equipment description and identifying code.
 - b. Provide technical information for servicing operating equipment.
 - c. Provide manufacturer's internal wiring diagrams.
 - d. Provide contractor's installation wiring diagrams.

1.3 REGULATORY REQUIREMENTS

- A. Conform to applicable building code and electrical code for manufacture, product, and installation of system.

PART 2 PRODUCTS

2.1 MOTOR CONTROLS

- A. Starters and contactors shall be included with the equipment, from the manufacturer or if not included, as manufactured by Square D or approved equal, and shall be installed by the electrical contractor.
- B. Thermal overload units for motor starters; shall be provided and properly sized per the motor nameplate full load amps and service factor rating.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer recommendations.

END 16440

DIVISION 16 - ELECTRICAL
Section 16460- Transformers

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Interior step down transformers (not including main service transformers)

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on the transformers.

1.3 REGULATORY REQUIREMENTS

- A. Conform to applicable building code and electrical code for manufacture, product, and installation of system.

PART 2 PRODUCTS

2.1 TRANSFORMERS

- A. Transformers; shall be buck and boost type power transformers, vented, dry type, with primary / secondary voltage and KVA ratings. Transformers are rated for a 150 degrees centigrade temperature rise above ambient. Transformer lugs shall be UL listed for both copper and aluminum conductors. One of the following equal manufacturers may be used:
 - a. Square D
 - b. General Electric
 - c. Cutler Hammer
 - d. Siemens
- b. Additional approved equal manufacturers shall be considered.

PART 3 EXECUTION

3.1 INSTALLATION

- a. Install wall-mounting transformers level and plumb with wall brackets fabricated by transformer manufacturer.
 - 1) Brace wall-mounting transformers as specified in Division 16 Section "Seismic Controls for Electrical Work."

- b. Install floor-mounting transformers level on concrete bases.[**Construct concrete bases of dimensions indicated, but not less than 4 inches (100 mm) larger in both directions than supported unit and 4 inches (100 mm) high.**]
 - 1) Anchor transformers to concrete bases according to manufacturer's written instructions, seismic codes at Project, and requirements in Division 16 Section "Seismic Controls for Electrical Work."

END 16460.

DIVISION 16 - ELECTRICAL
Section 16500- Lighting Fixtures

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Lighting fixtures, trim, and accessories.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on lighting fixtures.
- B. Color samples for selection by Landmark.

1.3 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Operation and Maintenance Data:
 - a. Include a parts catalog with complete list of equipment replacement parts and identify each entry with equipment description and identifying code.
- B. Warranty: Submit manufacturer and installer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable building code for manufacture, product, and installation of system.

1.5 WARRANTY

- A. Correct defective Work within a one year period after Date of Substantial Completion.
- B. Warranty: Include lighting fixture manufacturer's standard warranty coverage for lighting fixtures and devices.
- C. Warranty: Include manufacturer's standard two (2) year ballast guarantee

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. The basic catalog number only is indicated in the Lighting Fixture Schedule.
- B. Lighting fixtures shall be furnished with plaster frames, ends or caps, couplings, suspension assemblies, mounting brackets and all auxiliary accessories as required.

- C. Fluorescent ballasts shall bear NEMA labels, be UL listed, and be ETL and CBM certified.
 - a. Ballasts shall be sounded rated "A" or better and be guaranteed for two years.
 - b. When double switching is shown on Drawings, fluorescent fixtures shall be provided with two (2) in lieu of one (1) ballast specified on the Fixture Schedule, or shall be provided with a master / slave ballast system.
- D. Ceiling mounted exit lights shall be installed so as not to conflict with the swing of hinged doors and closer arms.
- E. Fluorescent fixtures and fixture types E, K, L, P, V and W shall be ordered with proper voltage coordinated with lighting power distribution.
- F. Recessed fluorescent fixtures specified shall be modified for mounting when installed in other than lay-in acoustical ceilings.
- G. Recessed fixtures shall be served via flexible conduit with a separate green ground wire and solid ground at either end and shall include thermal protection in accordance with local and state codes.
- H. Some of the fixtures indicated in the following Lighting Fixture Schedule will not be used on this project, but are included for reference in the case that they are added by a tenant suite build-out.

2.2 LAMPS

- A. Fluorescent lamps; shall be T-8 cool white energy saving. Lamp types shall match at completion of the work. Lamps used during construction shall be replaced before the building is delivered to the Owner. All lamps shall have a minimum CRI of 76 and provide a minimum of 89 lumens per watt. All fluorescent lamps shall be 3500 degree K. extended life / reduced mercury type, or approved equal. One of the following equal manufacturers may be used:
 - a. Phillips
 - b. Osram-Sylvania
 - c. Additional approved equal manufacturers may be considered
- B. Incandescent lamps; shall be 130 VAC frosted and extended life type. One of the following equal manufacturers may be used:
 - a. General Electric
 - b. Phillips
 - c. Osram-Sylvania
 - d. Additional approved equal manufacturers may be considered

- C. HID lamps; shall be high pressure sodium or metal halide, as scheduled, combined with high power factory ballasts. One of the following equal manufacturers may be used:
 - a. General Electric
 - b. Phillips
 - c. Osram-Sylvania
 - d. Additional approved equal manufacturers may be considered
- D. Lamp types shall match at completion

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that electrical power is available and of the correct characteristics.

3.2 INSTALLATION

- A. Install lighting fixtures in accordance with manufacturer recommendations.

3.3 ADJUSTING AND CLEANING

- A. If system is used during construction of the project, it shall be protected from damage.
 - a. All damaged parts or equipment shall be replaced prior to Substantial Completion and acceptance.
 - b. System shall be maintained, and left in like new operation prior to Substantial Completion and acceptance.
- B. Clean fixtures, replace bulbs, and adjust operating parts.

END 16500.

DIVISION 16 - ELECTRICAL
Section 16530- Fire Alarm Systems

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fire alarm system including control panel, remote annunciator, and devices as required.

1.2 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on the fire alarms system components:

1.3 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Operation and Maintenance Data:

- a. Include a parts catalog with complete list of equipment replacement parts and identify each entry with equipment description and identifying code.
 - b. Provide technical information for servicing operating equipment.
 - c. Include legible schematic of wiring diagrams of installed electrical equipment and changes made in the Work.
 - d. Include manufacturer's installation instructions.
 - e. Include manufacturer's local representative and/or distributor's name and address.
 - f. Include typed panel directory included in each fire alarm panel.
 - g. As-built fire alarm control panel drawings indicating area served by each circuit so circuit maximization can be verified.
- B. Warranty: Submit manufacturer and installer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Installer: Company specializing in performing the work of this section and approved by fire alarm equipment manufacturer.
- B. Perform Work in accordance with the following requirements;
 - a. Applicable local and state codes,
 - b. The National Electric Code,

- c. NFPA 72A.
- d. Americans with Disabilities Act (ADA) 1990-28 CFR Part 36

1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable building code and electrical code for manufacture, product, and installation of system.

1.6 WARRANTY

- A. Correct defective Work within a one year period after Date of Substantial Completion.
- B. Warranty: Include manufacturer's standard warranty coverage for operating equipment and devices.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. System Components: The specification is based on Notifier (Honeywell) components to establish function, quality and style. Equal products may be used from one of the following approved equal manufacturers:
 - a. Edwards System Technology, Inc. (EST), unit of GE Security.
 - b. Johnson Controls
 - c. Siemens Cerberus Division
 - d. Simplex Time Recorder Co.

2.2 COMPONENTS OF SYSTEM

- A. Control panel; shall be Notifier 3032-voice, 120V single-phase, 60HZ with features as follows:
 - a. Operator interface switches behind locked door: system reset, system alarm silence, system trouble silence, acknowledge/next, drill/all call, lamp test and review.
 - b. Visual LED indicators for: system normal, system alarm, supervisory, test/program, alarm silence, trouble silence and drill/all call.
 - c. Visual LCD indicators for: time, number of active points in system and number of disabled points in system. In alarm mode, LCD shall indicate the time, the alarm zone and the time that the alarm occurred.
 - d. Off-site monitoring output capability of remote fire department or central station reverse polarity, local energy master box or shut master box shall be field-selectable in the

control panel. A modem for remote dial up shall be provided.

- e. Metal Oxide Varistors (MOV) on system power supply and municipal connection circuit for transient suppression protection to control panel.
 - f. Bypass switch to permit testing without changing condition of remote functions.
 - g. Signal circuit boards shall be rated for 2 amp output and shall be provided in sufficient quantity for a fully developed building.
 - h. ZBO-8 relay(s) for powering the remote enunciator.
 - i. Integral batteries and associated charger shall be sized to provide 24-hour backup with five minutes of alarm minimum for a fully-developed building.
- B. Termination boxes; shall consist of a junction box with hinged cover and screw-type terminal block.
- D. Devices:
- a. Elevator smoke detector: Model FSP-85IRP
 - b. Manual pull station: Model NBR-12LX
 - c. Speaker strobe: Model SP2R1224 MC, semi-flush mount.
 - d. Strobe: Model 51224 MC
 - e. Duct smoke detector: Model FSD-751P with sampling tube. Length of tube should adequately span across duct.
 - f. Smoke detector: Photo electric Model FSP-851
 - g. Smoke detector; Ionization Model FSI-851
 - h. Electro-magnetic door holder: Rixson No. 998; 24 volt, or approved equal.
- E. Conductors; shall be UL listed and labeled for use as fire alarm cable. Conductors shall be color coded as follows:
- a. Power branch circuit: Black, red and white.
 - b. Initiating device: Black and red.
 - c. Signal device: Blue (positive) and white (negative).
- F. Conduit; shall be provided if required by governing code.
- G. Flow and tamper switches; shall be provided by the Fire Protection contractor.

2.3 COMPONENT REQUIREMENTS

- A. Manual pull stations: Shall be fabricated of metal or plastic, finished in red with molded, raised-letter operating instructions of contrasting color and shall include:
 - a. Double-action mechanism to require two actions, such as a push and a pull, to initiate an alarm.
 - b. Station reset: Key or wrench operated; double pole, double throw switch rated for the voltage and current at which it operates.
 - c. Integral addressable module: Arranged to communicate manual-station status (normal, alarm, or trouble) to the FACP.

- B. Automatic Smoke Detectors: Smoke detectors shall include the following features:
 - a. 24-V dc, nominal, operating voltage
 - b. Detectors shall not require resetting or readjustment after actuation to restore them to normal operation.
 - c. Detector and associated electronic components shall be mounted in a module that connects in a tamper-resistant manner to a fixed base with a twist-locking plug connection. Terminals in the fixed base shall accept building wiring.
 - d. LED type light shall indicate that the detector has operated.
 - e. Sensitivity shall be capable of being tested and adjusted in place after installation.
 - f. Integral addressable module shall be arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
 - g. Detectors shall be the analog addressable type, individually monitored at the FACP for calibration, sensitivity, and alarm condition, and individually adjustable for sensitivity from the FACP.
 - h. Photoelectric smoke detectors shall include the following features:
 - i. LED or infrared light source with matching silicon-cell receiver
 - ii. Detector Sensitivity shall be between 2.5 and 3.5 percent/foot smoke obscuration when tested according to U.L. 268A.
 - iii. Fixed-temperature type Integral Thermal Detector with 135 deg F setting.
 - i. Ionization detectors shall include the following features:
 - i. Responsive to both visible and invisible products of combustion.
 - ii. Self-compensating for changes in environmental conditions.
 - iii. Duct smoke detectors-ionization type:

- Sampling Tube: Design and dimensions shall be as recommended by the manufacturer for the specific duct size, air velocity, range, temperature and humidity for the applicable installation conditions where applied.
 - Relay Fan Shutdown: Shall be rated to interrupt fan motor-control circuit.
 - Heat detector-combination type: Shall be activated by either a fixed temperature of one hundred thirty five (135) degrees Fahrenheit or rate of rise of temperature that exceeds fifteen (15) degrees Fahrenheit per minute, unless otherwise indicated on Drawings with the following features:
 - Mounting: Adapter plate for outlet box mounting. Plug-in base, interchangeable with smoke detector bases.
 - Integral Addressable Module: Shall be arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
- C. Notification appliances: Devices shall be equipped with screw terminals for system connections. Combination devices shall be factory-integrated audible and visible devices in a single-mounting assembly.
- a. Speakers; Low profile mount speakers.
 - b. Strobes; Xenon strobe lights listed under UL 1971 with clear or nominal white polycarbonate lens, mounted on an aluminum faceplate. The word "FIRE" shall be engraved in minimum 1" high letters on the lens.
 - i. Rated light output; Multi-candela (15, 30, 75 and 110 cd) as required to satisfy NFPA 72.
 - ii. Strobe lead; Factory connected to screw terminals.
 - c. Speaker / Strobe; The low profile wall mounted speaker / strobe with multi candela strobe.
- D. Heat detectors shall be 160 degree Fahrenheit and shall be provided in boiler rooms, at each sprinkler head location in elevator shafts and as indicated on the Drawings.
- E. Remote device location indicating lights: LED indicating light shall be provided near each concealed initiating device.
- F. Magnetic door holders: Units shall be wall or surface mounted unless otherwise indicated on Drawings and shall be complete with matching door plate in US 26D finish.
- a. Electromagnet: Shall require no more than 3 W to develop 25-lbf holding force.
 - b. Rating: 24-V ac or dc.
- G. FACP:
- a. The FACP shall be sized for a fully developed building. The number of signal circuits shall be based on one per 2,000 square feet of "Suite Area" plus circuits as required for public areas.

- b. Cabinet shall be a lockable steel surface mounted enclosure. The interior components shall be arranged so operations required for testing or for normal maintenance of the system can be performed from the front of the enclosure. If more than one cabinet is required to form a complete control panel, fabricate with matching modular unit enclosure to accommodate components and to allow ample gutter space for field wiring and interconnecting panels. Identify each enclosure with an engraved, red, laminated, phenolic-resin nameplate with lettering not less than 1 inch high. Identify individual components and modules within cabinets with permanent labels.
 - d. Alarm and supervisory systems shall be separate and independent in the FACP. Alarm-initiating zone boards shall consist of plug-in cards which shall not require removal of field wiring for module replacement.
 - e. Control modules shall be of the type and capacity required to perform all functions of fire alarm system.
 - f. Indications: Local, visible and audible signals shall announce alarm, supervisory and trouble conditions. Each type of audible alarm shall have a different sound.
 - g. Resetting controls shall prevent the resetting of alarm, supervisory, or trouble signals while the alarm or trouble condition still exists.
 - h. Alphanumeric display and system controls shall be arranged for interface between a human operator at the FACP and addressable system components, including annunciation, supervision, and control.
 - i. Display: A minimum of eighty (80) characters; alarm, supervisory, and component status messages; and indicate control commands to be entered into the system for control of smoke detector sensitivity and other parameters.
 - ii. Keypad: Arranged to permit entry and execution of programming, display, and control commands.
 - j. A printed or typewritten instruction card shall be mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. The functional operation of the system under normal, alarm, and trouble conditions shall be briefly described.
- H. Remote annunciator:
- a. Annunciator functions shall duplicate the FACP functions for alarm, supervisory, and trouble indications. Manual switching functions of the FACP shall also be duplicated including acknowledging, silencing, reset, and test.
 - b. The alphanumeric display shall be identical to the FACP. Controls with associated LEDs shall permit acknowledging, silencing, resetting, and testing functions for alarm, supervisory, and trouble signals identical to those in the FACP.
- I. Emergency power supply:

- a. Components shall include a nickel-cadmium battery, charger, and an automatic transfer switch. Battery nominal life expectancy shall be a minimum of twenty (20) years.
 - b. Battery capacity shall comply with NFPA 72.
 - c. Unit shall be sized to power all required devices on the system and also operate the HVAC smoke dampers at 24 VDC.
 - d. Battery charger shall be solid-state, fully automatic, variable-charging-rate type. Provide capacity for one hundred fifty (150) percent of the connected system load while maintaining batteries at full charge. If batteries are fully discharged, the charger shall recharge them completely within four (4) hours. Charger output shall be supervised as part of the system power supply supervision.
 - e. Integral automatic transfer switch shall transfer the load to the battery without loss of signals or status indications when normal power fails.
- J. Addressable interface device:
- a. Description: Microelectronic monitor module listed for use in providing a multiplex system address for listed fire and sprinkler alarm-initiating devices with normally open contacts.
 - b. Integral Relay: Capable of providing a direct signal to the elevator controller to initiate elevator recall or to a circuit-breaker shunt trip for power shutdown.
- K. Digital alarm communicator transmitter:
- a. The digital alarm communicator transmitter shall be listed and labeled under U.L. 864 and NFPA 72.
 - b. Functional performance: When the unit receives an alarm, supervisory, or trouble signal from the FACP panel, it shall automatically capture one or two telephone lines and dial a preset number for a remote central station. When contact is made with the central station(s), the signal is transmitted. The unit shall supervise up to two (2) telephone lines. Where supervising two (2) lines, if service on either line is interrupted for longer than forty five (45) seconds, the unit shall initiate a local trouble signal and transmit a signal indicating loss of a telephone line to the remote alarm receiving station over the remaining line. When telephone service is restored, the unit shall automatically report that event to the central station. If service is lost on both telephone lines, the local trouble signal is initiated.
 - c. An integral rechargeable battery and automatic charger shall be provided.
 - d. A self test shall be conducted automatically every twenty four (24) hours with a report transmitted to the central station.
- L. System printer shall be listed and labeled as an integral part of the fire alarm system.

- M. Welded wire mesh guards shall be provided for manual stations, smoke detectors, gongs, or other devices requiring protection. Wire mesh protectors shall be factory fabricated and furnished by the manufacturer of the device, painted to match the protected device.
- N. Wire:
 - a. Conductors for non-power-limited circuits shall be solid-copper, 600-V rated, 75 deg C.
 - i. Low-voltage circuits shall be No. 16 AWG, minimum.
 - ii. Line-voltage circuits shall be No. 12 AWG, minimum.
 - b. Conductors for power-limited circuits shall be NFPA 70, types FPL, FPLR, or FPLP, as recommended by manufacturer.
 - c. Conductors shall be color coded as follows:
 - i. Power branch circuit: Black, red and white.
 - ii. Initiating device: Black and red.
 - iii. Signal device: Blue (positive) and white (negative).
- O. Termination boxes shall consist of a junction box with a hinged cover and screw-type terminal block.

2.4 SYSTEM DESIGN AND INSTALLATION CRITERIA

- B. System Performance Criteria:
 - a. Activation of any manual or automatic initiating device shall cause:
 - i. Normal LED on control panel and remote annunciator to extinguish and alarm LED to light. Control panel and remote enunciator buzzers shall sound and LCD on the control panel shall indicate the type of alarm and zone of alarm.
 - ii. All alarm horns to sound and strobe lights to flash continuously until system silence switch is operated. All strobes shall be synchronized.
 - iii. Electro-magnetic door holders to release.
 - iv. Remote location to be notified in a manner satisfying authorities having jurisdiction.
 - b. Elevator smoke detectors shall recall elevator(s) and serve as an initiating device.
 - c. HVAC duct smoke detectors shall shut down respective unit fan and serve as an initiating device.
 - d. Duct smoke detectors, for damper control, shall, via relay contact close the respective damper. At each smoke damper designated on the Drawings, provide a relay module. This module shall control 120 VAC to the damper motor. Coordinate the installation with the Temperature Control and HVAC Contractor.
 - e. Silencing of trouble alarm shall not prevent subsequent trouble or alarm being sounded.
 - f. Trouble alarm shall be non-canceling except by clearing trouble condition.

- C. System Description:
- a. System shall be controlled by the fire alarm control panel (FACP).
 - b. Supervision: Automatically detect and report open circuits, shorts and grounds of wiring for initiating device, signaling line, and notification-appliance circuits.
 - c. Priority of signals: An alarm signal is the highest priority. Automatic alarm response functions resulting from an alarm signal from one zone or device shall not be altered by subsequent alarm, supervisory, or trouble signals. Supervisory and trouble signals have second- and third-level priority. Higher-priority signals take precedence over signals of lower priority, even when the lower-priority condition occurs first. Alarm, supervisory, and trouble signals shall be displayed and annunciated regardless of the priority of the order received.
 - d. Non-interference: A signal from one zone shall not prevent the receipt of signals from other zones.
 - e. System reset: All zones shall be capable of being manually reset from the FACP after initiating devices are restored to normal.
 - f. Off-Site Monitoring: Automatically route alarm, supervisory, and trouble signals to a remote alarm receiving station by means of a digital alarm communicator transmitter and telephone lines. The remote location shall be notified in a manner satisfying authorities having jurisdiction.
- D. Alarm capability during circuit fault conditions: System wiring and circuit arrangement shall prevent alarm capability reduction when:
- a. A single ground occurs in an initiating device circuit, signal line circuit, or notification-appliance circuit.
 - b. A single ground or open circuit occurs in an initiating device circuit, signal line circuit, or notification-appliance circuit.
 - c. An open circuit, ground or wire-to-wire short occurs, or an open circuit and a ground occur at the same time in an initiating device circuit, signal line circuit, or notification-appliance circuit.
- E. Loss of primary power at the FACP shall initiate a trouble signal and illuminate an emergency power light at the FACP and at the annunciator.
- F. Basic alarm performance requirements: The alarm operation of any of the following shall initiate the basic alarm sequence:
- a. Manual stations
 - b. Automatic heat detectors

- c. Sprinkler flow devices
 - d. Smoke detectors and duct smoke detectors.
- G. The basic alarm sequence shall consist of the following:
- a. Notification-appliance operation.
 - b. Identification at the FACP and the remote annunciator of the device originating the alarm.
 - c. Transmission of an alarm signal to the remote alarm receiving station.
 - d. Operation of smoke control door openers.
 - e. Recall of elevators.
 - f. Shutdown of fans and other air handling equipment.
 - g. Close dampers in the HVAC system.
 - h. Recording of the event in the system memory.
 - i. Recording of the event by the system printer.
- H. Alarm silencing, system reset and indication: Switches in the FACP and the remote annunciator:
- a. The silencing switch operation shall halt alarm operation of notification appliances and activates an "alarm silence" light at the FACP and remote annunciator. Displays of the identity of the alarmed device(s) are retained at each location they are displayed.
 - b. Subsequent alarm signals from other devices shall reactivate the notification appliances until the silencing switch is operated again.
 - c. When the alarm-initiating devices return to normal and the system reset switch is operated, notification appliances shall operate again until the alarm silence switch is reset.
- I. Operation of a heat detector or a water flow device for the elevator shaft shall immediately shut down elevator power by operating a shunt trip fused switch feeding the associated elevator(s). A field-mounted relay actuated by either the heat detector, water flow switch or the FACP shall close the shunt trip circuit.
- J. Water-flow alarm switch operation shall initiate the flashing of the device location indicating light for the device that has operated.
- K. Sprinkler valve tamper switch operation shall initiate the following:

- a. A supervisory, audible, and visible "valve-tamper" signal indication at the FACP and the annunciator.
 - b. Flashing of the device location indicating light for the device that has operated.
 - c. Recording of the event by the system printer.
 - d. Transmission of the supervisory signal to the remote alarm receiving station.
- L. Remote detector sensitivity adjustment: Manipulation of controls at the FACP shall cause the selection of specific addressable smoke detectors for adjustment, display of their current status and sensitivity settings, and allow control of changes in those settings. The same controls shall be used to program repetitive, scheduled, automated changes in sensitivity of specific detectors. Sensitivity adjustments and sensitivity-adjustment schedule changes shall be recorded in system memory and printed by the system printer.
- M. Removal of an alarm-initiating device or a notification appliance shall initiate the following:
- a. A "trouble" signal indication at the FACP and the remote annunciator for the device involved.
 - b. Recording of the event by the system printer.
 - c. Transmission of the trouble signal to the remote alarm receiving station.
- N. Printer: On the receipt of a signal, the printer shall:
- a. Print alarm, supervisory and trouble events with the following information:
 - i. Device
 - ii. Function
 - iii. Type of signal (alarm, supervisory, or trouble)
 - iv. Time and date of occurrence
 - b. Differentiate the alarm signals from all other printed indications.
 - c. Print system reset events, including the same information for device, location, date, and time.
 - d. Printout of existing conditions and historical log: A separate command shall initiate the printout of a list of existing alarm, supervisory, and trouble conditions in the system and a historical log of events.
- O. FACP alphanumeric display shall provide:
- a. English language descriptions of alarm, supervisory, and trouble events.
 - b. Addresses and locations of alarm-initiating or supervisory devices originating the report.

- c. Displays of monitoring actions, system and component status, system commands, programming information, and data from the system's historical memory.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer recommendations.
- B. Signal circuits shall be rated two (2) amp and be capable of operating a maximum of nine (9) strobe lights and one (1) horn. Length shall be a maximum of 400'.
- C. Termination boxes shall be provided above public corridor or other accessible ceilings on each floor for connection of signal devices.
- D. The number of signal devices shall be maximized on each circuit and may overlap different suites.
- E. End of line (EOL) resistors shall be sized for the number of devices on a circuit and be installed at the last device on each signal circuit. If devices are added to a signal circuit, a new EOL shall be provided.
- F. Devices shall be mounted as follows (measured from floor to centerline of device):
 - a. Manual pull stations: 48"
 - b. Strobe and speaker / strobe units: 80"
 - c. Speakers: 80"
 - d. Magnetic door holders: 80"
- G. Components (not all components listed may be required for this project):
 - a. The FACP shall be connected with a disconnect switch with lockable handle or cover.
 - b. Manual pull stations: Mount semi-flush in recessed back boxes.
 - c. Water-flow detectors and valve supervisory switches (provided by others): Connect for each sprinkler valve station required to be supervised.
 - d. Ceiling-mounted smoke detectors: Mount not less than four (4) inches from a side wall to the near edge.
 - e. Smoke detectors near air registers: Install no closer than sixty (60) inches from their register.
 - f. Duct smoke detectors sampling tubes shall be installed so they extend the full width of the duct. Coordinate the installation with the HVAC Contractor.
 - g. Heat detectors in elevator shafts and elevator equipment rooms: Coordinate temperature rating and location with sprinkler rating and location.

- h. Audible alarm-indicating devices shall be installed on flush-mounted back boxes.
- i. Visible alarm-indicating devices shall be installed adjacent to or in combination with each alarm horn.
- j. Device location-indicating lights shall be located in a public space near the device they monitor.
- k. FACP shall be surface mounted with the top of the cabinet not more than seventy-two (72) inches above the finished floor.
- l. Annunciator shall be installed with the top of the panel not more than seventy-two (72) inches above the finished floor.
- m. Main Fire Alarm Panel, Emergency Voice / Alarm Communications and two-way Fire Department Communications System panels shall be located in the Fire Command Center.

H. Wiring:

- a. Wiring shall be installed in a metallic raceway if required by governing codes and authorities having jurisdiction.
- b. Wiring within enclosures: Separate power-limited and non-power-limited conductors as recommended by the manufacturer. Install conductors parallel with or at right angles to the sides and back of the enclosure. Bundle, lace and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.
- c. Cable taps: Use numbered terminal strips in junction, pull and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.
- d. Wiring to the remote alarm transmitting device shall be installed in 1 inch conduit between the FACP and the transmitter. Provide the number of conductors and electrical supervision for connecting wiring as required to suit the monitoring function.

I. Identification:

- a. System components, wiring, cabling, and terminals shall be identified.
- b. Framed instructions shall be installed in a location visible from the FACP.
- c. The Power-supply disconnect switch shall be painted red and labeled "FIRE ALARM."
- d. The FACP shall be complete with a typed directory mounted on the inside of the panel door to identify all circuits as to area served.

J. Grounding:

- a. Cable shields and equipment shall be grounded in accordance with the system manufacturer's written instructions to eliminate shock hazard and to minimize, to the greatest extent possible, ground loops, common-mode returns, noise pickup, cross talk, and other impairments.
 - b. The signal ground terminal shall be located at the main equipment rack or cabinet, isolated from the power system and equipment grounding.
 - c. Equipment and conductor and cable shields shall be grounded. For audio circuits, ground loops, common-mode returns, noise pickup, cross talk, and other impairments shall be minimized to the greatest extent possible. Provide 5-ohm ground at main equipment location. Measure, record, and report ground resistance.
- K. Smoke Damper Control; electrical contractor shall wire from 120 volt Life Safety Panel through relay module to respective smoke damper. Coordinate this wiring with HVAC and Temperature Control Contractors.

3.2 FIELD QUALITY CONTROL

- A. A factory-authorized service representative shall be engaged to inspect field-assembled components and connections and to supervise pre-testing, testing, and adjustment of the system. Report results in writing to Landmark.

3.3 TESTS BY CONTRACTOR

- A. The complete fire alarm system shall be tested for proper operation as required by governing codes, agencies, and authorities having jurisdiction.
- B. Provide a minimum of ten (10) days written notice shall be provided to Landmark when the system is ready for final acceptance testing.
- C. Perform the following tests in the presence of the Landmark
- D. The system shall be tested in accordance NFPA 72 with minimum required tests as follows:
 - a. Verify the absence of unwanted voltages between circuit conductors and ground.
 - b. Test all conductors for short circuits using an insulation-testing device.
 - c. With each circuit pair, short circuit at the far end of the circuit and measure the circuit resistance with an ohmmeter. Record the circuit resistance of each circuit on record drawings.
 - d. Verify that the control unit is in the normal condition as detailed in the manufacturer's operation and maintenance manual.

- e. Test initiating and indicating circuits for proper signal transmission under open circuit conditions. One connection each should be opened at not less than 10 percent of initiating and indicating devices. Observe proper signal transmission according to class of wiring used.
- f. Test each initiating and indicating device for alarm operation and proper response at the control unit. Test smoke detectors with actual products of combustion.
- g. Test the system for all specified functions. Test both primary and secondary power: Verify by test that the secondary power system is capable of operating the system for the period and in the manner specified.

3.2 TESTS BY REGULATORY AGENCIES

- A. Testing by regulatory agencies will be performed at their discretion; and shall be documented by the Contractor.
- B. Obtain required permits to perform tests. Perform tests required by regulatory agencies.
- C. Schedule tests with agencies and if possible, with Landmark present.
- D. Furnish test and approval certificates issued by jurisdictional authorities.

END 16530.

DIVISION 16 - ELECTRICAL
Section 16550- Lighting Control Equipment

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. A lighting control system for the control of exterior lighting.
- B. Automatic interior lighting control system.

1.2 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Keys: Deliver keyed toggle switches (five for each switch) for panels and other equipment.
 - a. Keys shall be tagged indicating panel, location, and panel use.
 - b. Deliver keys to Landmark by security shipment direct from manufacturer.

1.3 REGULATORY REQUIREMENTS

- A. Conform to applicable building code and electrical code for manufacture, product, and installation of system.

PART 2 PRODUCTS

2.1 LIGHTING CONTROL

- A. Exterior lighting; photocell off-day, on-night, 1500 watt tungsten rated SPST contact, 2 to 5 foot-candle adjustable light sensing range, time delayed switching, weatherproof. One of the following approved manufacturers and products may be used:
 - a. Tork, “#2100 Series”
 - b. Paragon Electric, “approved equal product”
 - c. General Electric, “approved equal product”
 - d. Additional approved equal manufacturers and products shall be considered
- B. Interior lighting; programmable microprocessor based lighting control panel shall include programmability to control all lighting control relays independent of one another. Each lighting control relay shall control line side power to all local area switches. Lighting control panel shall be included with a momentary contact, series connect, master switch(es) located throughout the facility which, upon initiation will extend “lighting circuits on” feature in adjustable increments of time. An alarm flash of the lighting circuits shall be provided to warn occupants of impending “lighting circuits off” feature.

2.2 LIGHTING CONTROL PANEL

- A. Lighting control panel; shall be 16 gauge steel construction, (18 gauge for 8 relay unit) completely painted with enamel paint. Maximum of 14" wide; height shall vary depending on the relay capacity of the enclosure. A barrier shall be provided to separate the low voltage compartment from the high voltage compartment. A cover secured by screws shall be provided to enclose the high voltage compartment marked to warn of the danger of high voltage.
 - a. The unit shall be wired to accept the maximum number of relays (8, 16, 32, 48 or 60 relays) without requiring the addition of any automation cards, relay output modules or additional electronics.
 - b. Any number of relays, up to the maximum size, may be installed in any one of the sizes listed. Door shall be hinged with key lock painted to match the enclosure. Input control power shall be 120 VAC, 60 Hz with internal fusing.
 - c. One of the following approved manufacturers and products may be used:
 - i. Triatek, "LP Series"
 - ii. Wattstopper, "LI Series"
 - iii. Lithonia "SUE Series"
 - iv. Leviton "approved equal"
 - iv. Additional approved equal manufacturers and products shall be considered
- B. Lighting Control Relay: Each controlled circuit shall be connected through a single pole, single throw momentary-pulsed mechanically latching contactor rated at 20 amps, 120-277 VAC including:
 - a. Mechanically latching relay using a dual coil technology.
 - b. Relays shall attach to the barrier and plug into the Relay Interface Board via quick connect plug in connectors. Relays that use screw terminations for low voltage connections are not acceptable.
 - c. Load contacts rated as follows: 20A, 125 VAC Tungsten; 20A @ 277 VAC) Ballast or Resistive; 0.5 HP @ 125 VAC; 1.5 HP @ 277 VAC.
 - d. Factory wiring for low voltage control without requiring rewiring in the field regardless of panel zoning requirements.
 - e. One of the following approved manufacturers and products may be used:
 - i. Triatek, "LP-3500 Series" with 16 relay enclosure or
 - ii. Wattstopper, "LI Series" with 16 relay enclosure, 120 VAC input voltage.
 - iii. Lithonia, "approved equal product"
 - iv. Leviton "approved equal product"
 - v. Additional approved equal manufacturers and products shall be considered

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer recommendations.
- B. Install control equipment with required wiring devices to achieve lighting control as shown on Drawings.
- C. Outdoor lights shall be off during daylight hours.

END 16550

DIVISION 16 - ELECTRICAL
Section 16720- Telephone Systems

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Telephone, cable television and internet service coordination, shell and core telephone lines, telephone and computer data empty conduit stubs to above ceilings, and empty outlet boxes.
 - a Telephone wiring to the tenant suites is not included in the Contract.
 - b This Contract assumes that the tenant suite telephone system installer will use CAT 5 or 6 plenum rated shielded cables and that wiring will be installed above ceilings using cable rings. A conduit system will not be required, except as herein specified.

1.2 QUALITY ASSURANCE

- A. Requirements of the Telephone Company, Cable Television Company and Internet Provider shall be followed.

1.3 REGULATORY REQUIREMENTS

- A. Conform to applicable building code and electrical code for manufacture, product, and installation of system.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Telephone, cable television and computer data system conduit and outlet boxes; shall include one standard single gang outlet box and 3/4" conduit stubbed to above accessible ceiling space. Locations shall be as indicated on the Drawings.

2.2 SYSTEM DESIGN AND INSTALLATION CRITERIA

- A. Telephone distribution conduit and outlet boxes shall be provided as follows:
 - a One outlet box and conduit in the wall of the lobby for a public pay phone.
 - b One outlet box and conduit in each Business/ Reception office, Consultation/Private office, Laboratory/Nurses Station.
- B. Unless otherwise shown on Drawings, all telephone outlets shall be mounted as follows (measured from floor to centerline of outlet):
 - a Outlets at knee spaces or typewriter drops shall be at 18".

- b. Outlets mounted above countertops shall be mounted horizontally.
- c. Outlets mounted above countertops without a backsplash shall be mounted 3" from countertop to center of outlet.
- d. Outlets mounted above countertops with a backsplash shall be mounted 2" from top of backsplash to center of outlet.
- e. Wall outlets shall be at 54".

2.3 SHELL AND CORE TELEPHONE WIRING

- A. Telephone wiring to the tenant suites is not included in the Contract, unless noted otherwise.
- B. The telephone utility company shall run telephone wiring to the main building telephone backboard. The Contractor shall provide conduit as indicated on the Drawings. The Contractor shall provide telephone wiring as noted below.
- C. Telephone wiring shall be provided between the main building telephone backboard to the telephone rooms one each floor, as follows:
 - a. Run 50 pair of plenum rated shielded cables to each telephone equipment room where the floor plan is less than or equal to 20,000 square feet.
 - b. Run 75 pair of plenum rated shielded cables to each telephone equipment room where the floor plan is greater than 20,000 square feet.
- D. A pair of plenum rated shielded cables shall be provided between the main building telephone backboard and elevator controllers for the emergency phone.
- E. A pair of plenum rated shielded cables shall be provided between the main building telephone backboard and the fire alarm system for auto dialer monitoring equipment. If the building has a Fire Command Center, provide telephone wiring to outlet in room.
- F. CAT 5 plenum rated shielded cables shall be provided between the main building telephone backboard and the Direct Digital Control system computer.
- G. CAT 5 plenum rated shielded cables shall be provided between the main building telephone backboard and the public telephone located in the lobby.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer recommendations.
- B. Telephone conduit, except for entry service, shall be installed so as to permit ceiling access.

END 16720.