Office of Facilities Management

Building Component Standards

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DB

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SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1-GENERAL

1.1 SUMMARY

A. This section includes administrative and procedural requirements for contract closeout including but not limited to, the following:

1. Inspection procedures

2. Warranties

3. Final Cleaning

1.2 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following:

1. Prepare a list of items to be completed and corrected.

2. Advise **COUNTY** of pending insurance changeover requirements.

3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.

4. Obtain and submit releases permitting **COUNTY** unrestricted use of the work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

5. Prepare and submit Project Records Documents, operations and maintenance manuals, final completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.

6. Deliver tools, spare parts, extra materials, and similar items to location designated by **COUNTY**. Label with manufacturer's name and model number where applicable.

7. Make final changeover of permanent locks and deliver keys to **COUNTY**. Advise **COUNTY's** personnel of changeover in security provisions.

8. Complete startup testing of systems.

9. Submit test/adjust balance records.

10. Terminate and remove temporary facilities from project site, along with mockups, construction tools, and similar elements.

11. Advise **COUNTY** of changeover in heat and other utilities.

12. Submit changeover information related to COUNTY's occupancy, use, operation, and maintenance.

13. Complete final cleaning requirements, including touch up painting.

14. Touch up and otherwise repair and restore marred and exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection of Substantial Completion. On receipt pf request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architects will prepare Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the work identified in previous inspections as incomplete is completed or corrected.

2. Results of completed inspection will form the basis of requirements for Final Completion.

1.3 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment.

2. Submit a certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected, endorsed and dated by Architect. The copy of the list shall state that each item has been completed or otherwise resolved for acceptance.

3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

4. Submit pest control final inspection report and warranty.

5. Instruct **COUNTY's** personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will wither proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the work identified in previous inspections as incomplete is completed or corrected.

1.4 LIST OF INCOMPLETE ITEMS

A. Preparation: Submit one copy of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including of necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest to highest floor.

2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

3. Include the following information at the top of each page:

a. Project name.
b. Date
c. Name of Architect.
d. Name of Contractor.
e. Page number.

1.5 WARRANTIES

A. Submittal Time: Submit written warranties on request of Architect for designated portions of the work where commencement of warranties other than date of Substantial Completion is indicated.

B. Organize warranty documents into an orderly sequence based on the table of contents Project Manual.

1. Bind warranties and bonds in a heavy duty, 3- ring, vinyl-covered, loose leaf binders, thickness as necessary to accommodate contents, and sized to receive 8 ½ by 11 inch paper.

2. Provide heavy paper dividers with plastic covered tabs for each separate warranty. Mark tab to identify the product of installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.

3. Identify each binder on the front and spine with the typed or printed title “WARRANTES”, Project name, and name of contractor.

C. Provide additional copies of each warranty to include operation and maintenance manuals

D. All warranties registration are to be filled out by contractor.

PARTS 2-PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by the manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3- EXECUTION

3.1 FINAL CLEANING

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

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire project or for a portion of the project.

a. Clean Project site, yard, and grounds in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.

b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.

c. Rake grounds that are neither planted nor paved to a smooth, even textured surface.

d. Remove tools, construction equipment, machinery, and surplus material from Project site.

e. Clean exposed exterior and interior hard surfaced finishes to a dirt free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.

f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.

g. Sweep concrete floors broom clean in unoccupied spaces.

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

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

j. Remove labels that are not permanent.

k. Touch up and otherwise repair and restored marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

1) Do not paint over “UL” and similar labels, including mechanical and electrical name plates.

l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

m. Replace parts subject to unusual operating conditions.

n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

o. Replace disposable air filters and clean and permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

p. Clean ducts, blowers, and coils if units were operated without filters during construction.

q. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replaced burned out light bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

r. Leave project site clean and ready for occupancy.

C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid project site of rodents, insects, and other pests. Prepare a report.

D. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on **COUNTY’s** property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from project site and dispose of lawfully.

END OF SECTION 01770

SECTION 06 40 00 – ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCE STANDARDS

A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.

B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.

C. All materials, installation and workmanship shall comply with all applicable federal, state, and local requirements, and conform to codes and ordinances of the authorities having jurisdiction.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Firm with minimum five years experience in successfully producing architectural woodwork similar to that indicated for this Project, with sufficient production capacity to produce required units without causing delay in the Work.

B. AWI Quality Standard: Comply with applicable requirements of "Architectural Woodwork Quality Standards" published by the Architectural Woodwork Institute (AWI) except as otherwise indicated.

1.4 SUBMITTALS

A. Samples:

1. Provide samples for initial selection purposes of the following materials and finishes in the form of manufacturer's color charts consisting of actual units or sections of units showing full range of colors, textures, and patterns available for each type of material indicated.

    a. Plastic laminate.

    b. Solid surfacing materials.

2. Provide samples for verification purposes of the following:

    a. Lumber with or for transparent finish, 50 square inches, for each species and cut, finished on one side and one edge.

    b. Veneer leaves representative of and selected from flitches to be used for transparent finished woodwork.

c. Wood veneer faced panel products, with or for transparent finish, 8½ inches by 11 inches, for each species and cut with one half of exposed surface finished, with separate samples of unfaced panel product used for core.

d. Lumber and panel products with factory applied opaque finish, 8½ inches by 11 inches for panels and 50 square inches for lumber, for each finish system and color, with one half of exposed surface finished.

e. Laminate clad panel products, 8½ inches, by 11 inches for each type, color, pattern, and surface finish, with separate samples of unfaced panel product used for core.

f. Corner pieces as follows:

1) Cabinet front frame joints between stiles and rail as well as exposed end pieces, 18 inches high by 18 inches wide by 6 inches deep.

2) Miter joints for standing trim.

g. Exposed cabinet hardware, one unit of each type and finish.

h. Solid surfacing materials.

B. Product Data:

1. Provide manufacturer's catalog cuts and descriptive information on each product used.

C. Shop Drawings:

1. Shop drawings showing location of each item, dimensioned plans and elevations, large scale details, attachment devices, and other components.

a. Show elevation drawings of all millwork items. Scale of drawings shall be minimum ¾"=1'-0"

b. Show plan section drawings at each unique condition. Scale of drawings shall be minimum 1"=1'-0"

c. Show vertical section drawings at each unique condition. Scale of drawings shall be 3"=1'-0"

d. Show other details full size.

e. Indicate all field measurements and all proposed deviations from the contract documents.

f. Graphically indicate on plans, elevations, and details all plastic laminate and/or painted surfaces as applicable. General notes indicating location of these finishes is not acceptable.

g. Show all approved change orders, clarification, and addendum items related to the scope of the architectural woodwork.

h. Show locations and size of furring, blocking, and hanging strips, including concealed blocking and reinforcing specified in other Sections.

i. Show locations and sizes of cutouts and holes for plumbing fixtures and other items installed in architectural woodwork.

D. Record Documents:

1. Provide record approved shop drawings, samples, and warranties.

1.5 DELIVERY, STORAGE AND HANDLING

A. Protect woodwork during transit, delivery, storage, and handling to prevent damage, soilage, and deterioration.

B. Do not deliver woodwork until painting, wet work, grinding, and similar operations that could damage, soil, or deteriorate woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas whose environmental conditions meet requirements specified in "Project Conditions."

1.6 PROJECT CONDITIONS

A. Environmental Conditions: Obtain and comply with Woodwork Manufacturer's and Installer's coordinated advice for optimum temperature and humidity conditions for woodwork during its storage and installation. Do not install woodwork until these conditions have been attained and stabilized so that woodwork is within plus or minus 1.0 percent of optimum moisture content from date of installation through remainder of construction period.

B. Field Measurements: Where woodwork is indicated to be fitted to other construction, check actual dimensions of other construction by accurate field measurements before manufacturing woodwork; show recorded measurements on final shop drawings. Coordinate manufacturing schedule with construction progress to avoid delay of Work.

PART 2 - PRODUCTS

2.1 GENERAL

A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

2.2 HIGH PRESSURE DECORATIVE LAMINATE MANUFACTURERS

A. The notes and schedules on the Drawings establish manufacturer and model/design required for the Project. Provide the products listed unless Owner approves products of other manufacturer specifically for this Project.

2.3 WOODWORK MATERIALS

A. Provide materials that comply with requirements of the AWI woodworking standard for each type of woodwork and quality grade indicated and, where the following products are part of woodwork, with requirements of the referenced product standards, that apply to product characteristics indicated:

1. High Pressure Laminate: NEMA LD 3

2. Softwood Plywood: PS 1

3. Formaldehyde Emission Levels: Comply with formaldehyde emission requirements of each voluntary standard referenced below:

a. Hardwood Plywood: Hardwood Plywood and Veneer Association

4. Medium Density Fiber Board: ANSI A 208.2, Grade MD Exterior Glue

5. Particle Board: ANSI 208.1, grade M-2 Exterior Glue

6. Hard Board: AHA A 1.5.4

2.4 FABRICATION, GENERAL

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

B. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:

1. Corners of cabinets and edges of solid wood (lumber) members less than 1 inch in nominal thickness: 1/16 inch.

2. Edges of rails and similar members more than 1 inch in nominal thickness: 1/8 inch.

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

D. Factory cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing in diagrams to produce accurately sized and shaped openings. Smooth edges of cutouts and, where located in countertops and similar exposures, seal edges of cutouts with a water-resistant coating.

2.5 FIRE RETARDANT TREATED LUMBER

A. Where indicated, pressure impregnate lumber with fire retardant chemicals of formulation indicated to produce materials with fire performance characteristics specified.

B. Fire Retardant Chemicals: Use chemical formulations specified that do not bleed through or otherwise adversely affect finishes. Do not use colorants in solution to distinguish treated lumber from untreated lumber.

1. Organic Resin Based Formulation: Exterior type per AWPA C20 consisting of organic resin solution, relatively insoluble in water, thermally set in wood by kiln drying that does not bleed through or otherwise adversely affect finishes. Do not use colorants in solution to distinguish treated lumber from untreated lumber.

C. Fire Performance Characteristics: Provide materials identical to those tested for the following fire performance characteristics per ASTM test methods indicated by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify treated lumber with classification marking of inspecting and testing organization in the form of separable paper label or, where required by authorities having jurisdiction, of imprint on lumber surfaces that will be concealed from view after installation.

1. Surface Burning Characteristics: Not exceeding values indicated below, tested per ASTM E 84 for 30 minutes with no evidence of significant combustion.

a. Flame Spread: 25

b. Smoke Developed: 50

D. Mill lumber after treatment, within limits set for wood removal that does not affect listed fire performance characteristics, using a woodworking plant certified by testing and inspecting organization.

E. Kiln dry woodwork after treatment to levels required for untreated woodwork. Maintain moisture content required by kiln drying before and after treatment.

F. Discard treated lumber that does not comply with requirements of referenced woodworking standard. Do not use twisted, warped, bowed, discolored, or otherwise damaged or defective lumber.

2.6 WOOD CABINETS (CASEWORK) FOR OPAQUE FINISH

A. Quality Standard: AWI Section 400 and its Division 400A "Wood Cabinets."

B. Grade: Premium.

C. AWI Type of Cabinet Construction: Flush overlay.

D. AWI Type of Cabinet Construction: Reveal overlay.

E. AWI Type of Cabinet Construction: Flush with exposed face frame.

F. AWI Type of Cabinet Construction: Flush without exposed face frame.

G. Species for Exposed Lumber Surfaces: Any close-grained hardwood listed in referenced woodworking standard.

H. Materials for Semi-exposed Surfaces: Match materials indicated for exposed surfaces.

2.7 LAMINATE GRADE FOR SURFACES

A. Provide laminate cladding complying with the following requirements for type of surface and grade:

1. Horizontal Surfaces Other Than Tops: HGS 0.048 inches thickness

2. Post formed Surfaces: PF 0.042-inch thickness

3. Vertical Surfaces: VGS 0.028inch thickness

4. Liner and Backer Panels: CLS/BKL 0.020-inch thickness

B. Edges: Solid, high impact, purified, color-thru, acid resistant, PVS edging with self-locking serrated tongue, machine-applies with hot melt adhesives. Machine profile all door and drawer edges and outside corners, exposed to view when doors and drawers are closed, to a 1/8-inch radius. Color to match exterior laminate.

1. 3mm edging at counter tops, drawers, doors, and splashes

2. 1mm edging at cabinet boxes, exposed shelving, and concealed shelving.

C. Edges: HGS 0.048-inch thickness

D. Edges: VGS 0.028-inch thickness

E. Semi-exposed Surfaces: Provide surface materials indicated below:

1. High pressure laminate, VGS 0.028-inch thickness

F. Provide dust panels of 1/4 inch plywood above compartments and drawers except where located directly under tops.

2.8 ARCHITECTURAL CABINET TOPS (COUNTERTOPS)

A. Quality Standard: Comply with AWI Section 400 and its Division 400C.

B. Type of Top: High pressure decorative laminate over exterior grade plywood (no particleboard) core complying with the following:

1. Grade: Premium

2. Laminate Cladding for Horizontal Surface: High pressure decorative laminate as follows:

a. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1) Match Owner's sample

a) Wood grains

b) Patterns

3. Edge Treatment: As indicated.

C. Type of Top: Solid wood for transparent finish (lumber boards, edge glued where required to produce widths indicated) as follows:

1. Grade: Premium.

2. Lumber Species: As indicated.

D. Type of Top: Panel product for transparent finish (wood veneer laminated over exterior grade plywood: (no particleboard) as follows:

1. Grade: Premium.

2. Veneer Species: As indicated.

3. Matching of Adjacent Veneer Leaves: **COUNTY** to choose.

4. Veneer Matching Within Panel Face: Balance match.

5. Edge Treatment: As indicated.

2.9 INTERIOR DOORS AND DOOR FRAMES

A. Quality Standard: Comply with AWI Section 900B.

B. Grade: Premium.

C. Grade: Custom.

D. Lumber Species for Transparent Finish: Match species and cut indicated for other types of transparent finished architectural woodwork located in same areas of building unless otherwise indicated.

E. Lumber Species for Opaque Finish: Any closed grain hardwood listed in referenced woodworking standard.

F. Fire Rated Doors and Frames: Provide fire rated wood frames for wood doors that are identical to units tested in door and frame assemblies per ASTM E152 and that are labeled and listed for ratings indicated by UL, Warnock Hersey, or other testing and inspection organization acceptable to authorities having jurisdiction.

2.10 FACTORY FINISHING OF INTERIOR ARCHITECTURAL WOODWORK

A. Quality Standard: Comply with AWI Section 1500 unless otherwise indicated.

B. The entire finish of interior architectural woodwork is specified in this section, regardless of whether factory applied or applied after installation.

1. Factory Finishing: To the greatest extent possible, finish architectural woodwork at factory. Defer only final touch up, cleaning, and polishing until after installation.

C. Preparations for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces and similar preparations for finishing of architectural woodwork, as applicable to each unit of work.

D. Opaque Finish: Comply with requirements indicated below for grade, finish system, color, effect, and sheen:

1. Color: Provide selections made by **COUNTY** from full range of standard colors available in finish system specified.

2. Sheen: Dull satin 15 20 degrees.

PART 3 - EXECUTION

3.1 PREPARATION

A. Condition woodwork to average prevailing humidity conditions in installation areas before installing.

B. Deliver concrete inserts and similar anchoring devices to be built into substrates well in advance of time substrates are to be built.

C. Before installing architectural woodwork, examine shop fabricated work for completion and complete work as required, including back priming and removal of packing.

3.2 INSTALLATION

A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

B. All installation shall be in accordance with manufacturer’s published recommendations.

C. Quality Standard: Install woodwork to comply with AWI Section 1700 for same grade specified in Part 2 of this section for type of woodwork involved.

D. Install woodwork plumb, level, true, and straight with no distortions. Shim as required with concealed shims. Install to a tolerance of 1/8 inch in 8' 0" for plumb and level (including tops) and with no variations in flushness of adjoining surfaces.

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

F. Fire Retardant Treated Wood: Handle, store, and install fire retardant treated wood to comply with recommendations of chemical treatment manufacturer including those for adhesives where they are used to install woodwork.

G. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Except where prefinished matching fastener heads are required, use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork and matching final finish where transparent finish is indicated.

H. Standing and Running Trim and Rails: Install with minimum number of joints possible, using full length pieces (from maximum length of lumber available) to the greatest extent possible. Stagger joints in adjacent and related members. Cope at returns and miter at corners.

I. Cabinets: Install without distortion so that doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated. Maintain veneer sequence matching (if any) of cabinets with transparent finish.

J. Tops: Anchor securely to base units and other support systems as indicated.

3.3 ADJUSTMENT AND CLEANING

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

B. Clean, lubricate, and adjust hardware.

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

3.4 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, which ensures that woodwork is without damage or deterioration at time of Substantial Completion.

END OF SECTION 06 40 00

SECTION 08 71 11 – FINISH HARDWARE

PART 1-GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, apply to this Section.

B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.

1.2 SUMMARY

A. This Section includes items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same Sections as the doors and door frames on which they are installed.

1. Provide cylinders for operation of lock mechanisms furnished as part of the Work of other Sections such as entrance doors, rolling doors and grilles, etc.

a. Provide cylinders keyed to building system and with finish to match adjacent surfaces.

1.3 REFERENCE STANDARDS

A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.

B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.

C. All materials, installation and workmanship shall comply with all applicable requirements and standards.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed door hardware installation similar in material, design, and extent to that indicated for this Project and whose Work has resulted in construction with a record of successful in-service performance.

B. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in- service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an experienced architectural hardware consultant (AHC) who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work, for consultation.

C. Electrified Door Hardware Supplier Qualifications: An experienced door hardware supplier who has completed projects with electrified door hardware similar in material, design, and extent to that indicated for this Project, whose Work has resulted in construction with a record of successful in-service performance, and who is acceptable to manufacturer of primary materials.

1. Engineering Responsibility: Prepare data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer’s standard units in assemblies similar to those indicated for this Project.

D. Fire Rated Openings: Provide door hardware for fire rated openings that comply with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and are identical to products tested by UL, Warnock Hersey, FM, or other testing and inspecting organization acceptable to authorities having jurisdiction for use on types and sizes of doors indicated in compliance with requirements of fire rated door and door frame labels.

E. Source Limitations: Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.

1.5 SUBMITTALS

A. Product Data:

1. Include installation details, material descriptions, and dimensions of individual components, profiles, and finishes.

B. Shop Drawings:

1. Details of electrified door hardware, indicating the following:

a. Wiring Diagrams: Detail wiring for power, signal, and control systems. Differentiate between manufacturer-installed and field-installed wiring. Include the following:

1) System schematic.

2) Point-to-point wiring diagram.

3) Riser diagram.

4) Elevation of each door.

2. Details of interface between electrified door hardware and fire alarm, access control, security, and building control system.

3. Door Hardware Schedule:

a. Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedules with doors, frames, and related Work to ensure proper size, thickness, hand, function, and finish of door hardware.

b. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the hardware schedule.

c. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door opening.

d. Use same identifying "set numbers" given in each Section. Coordinate submittal with doors and frames submittals and use same "opening number" identification as given on Drawings and in the Door Schedule.

e. Submittals not using numbering identification system shown on Drawings and Schedules will be rejected.

f. Content: include the following information:

1) Type, style, function, size, and finish of each hardware item.

2) Name and manufacturer of each item.

3) Fastenings and other pertinent information.

4) Location of each hardware set, cross referenced to indications on Drawings both on floor plans and in door and frame schedule.

5) Explanation of all abbreviations, symbols, and codes contained in schedule.

6) Mounting locations for hardware.

7) Door and frame sizes and materials.

8) Keying information.

9) Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.

g. Submittal Sequence: Submit final schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other Work that is critical in the Project construction schedule. Include with schedule the product data, samples, Shop Drawings of other Work affected by door hardware, and other information essential to the coordinated review of schedule.

4. Keying Schedule: Prepared by or under the supervision of supplier, detailing **COUNTY'S** final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.

a. Approved Manufacturer: Yale 8800FL Series x VIR

b. Approved Manufacturer: Yale 5400F-AV 626

c. Provide Yale High Security 7 Pin cylinders. These cylinders must accept Yale 5220 Security Cylinders, "ZG" Keyway, "0" Bitted with removable core.

d. Final keying to be done by **COUNTY**.

e. Stamp all keys "Do Not Duplicate".

f. Keys required:

1) 2 keys each, individually keyed in cylinder.

2) 6 Master keys.

3) 3 Construction control keys.

4) 3 Control keys (Permanent cores.)

5. Templates for doors, frames, and other specified items to be factory prepared for the installation of door hardware. Check Shop Drawings of other Work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Record Documents:

1. Provide record approved product data, shop drawings, samples, and warranties.

1.6 COORDINATION

A. Coordinate the Work of this Section with Work of other sections that interface with hardware.

B. Furnish templates for doors, frames, and other Work specified to be factory prepared for the installation of door hardware to the appropriate trades. Check Shop Drawings of other Work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

1.7 PRODUCT HANDLING

A. Tag each item or package separately with identification related to final hardware schedule and include basic installation instructions with each item or package.

B. Packaging of door hardware is responsibility of supplier. As hardware supplier from various manufacturers receives material, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two (2) or more identical sets may be packed in same container.

1. Levers, handles and pulls shall be provided with cloth or cotton covered paper coverings, of sufficient size to completely cover the items, secured to remain in place.

2. Keys: Tag and mark to identify lock, which they will pass.

C. Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.

D. Deliver individually packaged door hardware items promptly to place of installation (shop or Project Site).

1.8 FINAL HARDWARE INSTALLATION INSPECTION

Inspection of all installed hardware devices to be performed by a manufacturer representative and coordinated with the County Project Manager.

PART 2 - PRODUCTS

2.1 GENERAL

A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

2.2 SCHEDULED HARDWARE

A. Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of finish hardware are indicated in the "Hardware Schedule" at the end of Part 3 of this Section. Products are identified by using hardware designation numbers of the following:

1. Manufacturer's Product Designations: The product designation and name of one (1) manufacturer are listed for each hardware type required for the purpose of establishing minimum requirements. Provide either the product designated or, where more than one (1) Manufacturer is specified for each hardware type, the comparable product of one (1) of the other manufacturers that complies with requirements.

2. ANSI/BHMA designations used elsewhere in this Section or in schedules to describe hardware items or to define quality or function are derived from the following standards.

Provide products complying with these standards and requirements specified elsewhere in this Section.

a. Butts and Hinges: ANSI/BHMA A156.1.

b. Bored and Preassembled Locks and Latches: ANSI/BHMA A156.2.

c. Exit Devices: ANSI/BHMA A156.3.

d. Door Controls Closers: ANSI/BHMA A156.4.

e. Auxiliary Locks and Associated Products: ANSI/BHMA A156.5.

f. Architectural Door Trim: ANSI/BHMA A156.6.

g. Template Hinge Dimensions: ANSI/BHMA A156.7.

h. Door Controls Overhead Holders: ANSI/BHMA A156.8.

i. Interconnected Locks and Latches: ANSI/BHMA A156.12.

j. Mortise Locks and Latches: ANSI/BHMA A156.13.

k. Sliding and Folding Door Hardware: ANSI/BHMA A156.14.

l. Closer Holder Release Devices: ANSI/BHMA A156.15.

m. Auxiliary Hardware: ANSI/BHMA A156.16.

n. Self-Closing Hinges and Pivots: ANSI/BHMA A156.17.

o. Materials and Finishes: ANSI/BHMA A156.18.

2.3 MATERIALS AND FABRICATION

A. Manufacturer's Name Plate: Do not use manufacturers' products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire rated labels and as otherwise acceptable to Architect.

1. Manufacturer's identification will be permitted on rim of lock cylinders only.

B. Base Metals: Produce hardware units of base metal, fabricated by forming method indicated, using manufacturer’s standard alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18 for finishes. Do not furnish manufacturer’s standard materials or forming methods if different from specified standard.

C. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to commercially recognized industry standards for application intended. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.

2.4 HINGES, BUTTS, AND PIVOTS

A. Templates: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template produced units.

B. Screws: Provide Phillips flat head screws complying with the following requirements:

1. For metal doors and frames install machine screws into drilled and tapped holes.

2. For wood doors and frames install wood screws.

3. For fire rated wood doors install #12 x 1 1/4 inch, threaded to the head steel wood screws.

4. Finish screw heads to match surface of hinges or pivots.

C. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:

1. Out Swing Exterior Doors: Non-removable pins.

2. Out Swing Corridor Doors with Locks: Non-removable pins.

3. Interior Doors: Non-rising pins.

4. Tips: Flat button and matching plug, finished to match leaves, except where hospital tip (HT) indicated.

D. Number of Hinges: Provide number of hinges indicated but not less than three (3) hinges per door leaf for doors 90 inches or less in height and one (1) additional hinge for each 30 inches of additional height.

1. Fire Rated Doors: Not less than three (3) hinges per door leaf for doors 90 inches or less in height with same rule for additional hinges.

E. Continuous Hinges:

1. Hinge to be manufactured of 6063-T6- aluminum alloy with anodized finishes (painted finishes available on entire hinge or gear cap only).

2. Door and frame leaves to be machined, anodized and assembled as a matched pair. Door and frame leaves to be anodized after all machining and drilling processes are complete.

3. All hinge profiles shall be manufactured to template screw locations, with standard duty and heavy-duty hole patterns identical as to number and placement of holes. All hinge profiles to be manufactured to template bearing locations, with standard duty bearing configurations of 5-1/8 inch spacing with a minimum of sixteen (16) bearings; and heavy duty at 2-9/16 inch spacing with a minimum of thirty-two (32) bearings.

4. Hinge leaves to be extruded at a uniform 1/8-inch thickness from pivot point to outside edge of hinge leaf. Uncut hinges shall be non-handed and shall be paint less assembly of three (3) interlocking extrusions applied to the full height of the door and frame without mortising.

5. Vertical door loads shall be carried on chemically lubricated thermoplastic thrust bearings. The door and frame leaves shall be continuously geared together for the entire hinge length and this relationship secured with a full-length cover channel so that the hinge will operate through a full 180 degrees.

6. All rotating areas of the gear cap and geared leaves shall have a permanent lubrication which is factory applied along the full length of the hinge, and the lubricant shall last the life of the hinge with no additional maintenance required. Fasteners supplied shall be 410 stainless steel, brite hardened and plated.

2.5 LOCKS, LATCHES, AND BOLTS

A. Strikes: Provide manufacturer's standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame, finished to match hardware set, unless otherwise indicated.

1. Provide flat lip strikes for locks with 3-piece, antifriction latch bolts as recommended by manufacturer.

2. Provide extra-long strike lips for locks used on frames with applied wood casing trim.

3. Provide recess type top strikes for bolts locking into head frames, unless otherwise indicated.

4. Provide dust proof strikes for foot bolts, except where special threshold construction provides non recessed strike for bolt.

5. Provide roller type strikes where recommended by manufacturer of the latch and lock units.

6. Provide standard (open) strike plates for interior doors of residential units where wood door frames are used.

B. Lock Throw: Provide 5/8-inch minimum throw of latch on pairs of doors. Comply with UL requirements for throw of bolts and latch bolts on rated fire openings.

1. Provide 1/2-inch minimum throw of latch for other bored and preassembled types of locks and 3/4-inch minimum throw of latch for mortise locks. Provide 1-inch minimum throw for all dead bolts.

C. Flush Bolt Heads: Minimum of 1/2 inch diameter rods of brass, bronze, or stainless steel with minimum 12-inch-long rod for doors up to 7 feet 0 inches in height. Provide longer rods as necessary for doors exceeding 7 feet 0 inches in height.

D. Exit Device Dogging: Except on fire rated doors where closers are provided on doors equipped with exit devices, equip the units with keyed dogging device to keep the latch bolt retracted, when engaged.

E. Rabbeted Doors: Where rabbeted door stiles are indicated, provide special rabbeted front on lock and latch units and bolts.

2.6 PROGRAMMABLE/ELECTRIFIED LOCKING DEVICES

A. Programmable Locking Device:

1. Lock shall be heavy-duty cylindrical type, with a 2-¾ inches backset supplied with a ½ inch throw latch bolt as standard. Chassis shall accommodate standard 161 cylindrical lock prep for 1-¾ inch doors as standard, with 1-3/8 inches to 2-¾ inch thick doors in 1/8 inch increments available. Locksets shall be provided from the factory with the appropriate handing.

2. Outside and inside levers shall operate independently of each other. Lock shall use patented, clutch mechanism to deter vandalism and maximize durability. Disablement of secured levers shall not permit latch bolt retraction from secure side while allowing emergency egress.

3. The lock will be furnished with the Classroom and Storeroom function which is: The outside lever is normally locked. The inside lever is always free. The unit may be momentarily unlocked with an approved Normal access credential. The unit may be maintained unlocked by using a Toggle access credential.

4. Emergency mechanical key override utilizes a 1-¼ inch mortise cylinder with standard straight cam.

5. Outside escutcheon shall contain an integrated 6-button keypad.

6. Visual red and green LED indicators shall indicate activation, operational system status, system error conditions and low power conditions.

7. Device as manufactured by Best Access Systems. No substitution.

B. Electrified Locking Device: A security platform that combines mechanical hardware with the ability to monitor door openings with Owner's existing access control panel and software.

1. Complete monitoring of door from the lockset.

2. Panel interface board connects to third party access control panel.

3. Available in proximity or magnetic stripe.

4. Simplified request to exit component contained in the inside trim.

5. Industry standard HID Prox coordinates with Owner's existing credential.

6. UL tested for use on fire doors up to and including 3 hours. ANSI Grade 1.

C. **KEYPAD, ACCESS LOCK**

1. Yale Nextouch touch

2. Use keying schedule from section **08 71 11 Page 3** of this Building Component Standard

3. Style/model to be recommended through submittal process.

2.7 EXIT DEVICES

A. Exit Devices shall be touchpad type, fabricated of bronze, brass, stainless steel, or aluminum, and plated to the standard architectural finishes to match the balance of door hardware.

B. All exit devices shall incorporate a fluid damper, which decelerates the touchpad on its return stroke and eliminates noise associated with exit device operation. Touchpad shall extend a minimum of one half of the door width. All latch bolts to be dead latching type, with a self-lubrication coating to reduce wear. Mechanism case and endcap will be 0.140-gauge attachment to door. Touchpad shall match exit device finish, and shall be stainless steel for US26, US26D, US28, US32, and US32D finishes. Only compression springs will be used in devices, latches, and outside trims or controls.

C. Exit devices shall be UL listed panic exit hardware. All exit devices for fire rated openings shall be UL labeled fire exit hardware.

D. Lever trim for exit devices shall be vandal-resistant type, which will travel to a 90-degree down position when more than 35 pounds of torque are applied, and which can easily be re-set.

E. All exit devices shall be of one manufacturer. No deviation will be considered.

F. All trim shall be thru bolted to the lock stile case. Lever design to match locksets.

G. Surface vertical rod devices shall be UL labeled for fire door applications without the use of bottom rod assemblies. Where bottom rods are required for security applications, the devices shall be UL labeled for fire door applications with rod and latch guards by the device manufacturer.

2.8 CLOSERS AND DOOR CONTROL DEVICES

A. Access-Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically handicapped, provide adjustable units complying with ADA and ANSI A-117.1 provisions for door opening force.

1. At interior doors, adjust closers for door opening force not to exceed 5 foot-pounds of force. If a door has a closer, then the sweep period of the closer shall be adjusted so that from an open position of 90 degrees, the time required to move the door to a position of 12 degrees from the latch is five (5) seconds minimum.

2. At exterior doors, adjust closers for door opening force not to exceed 8.5 foot-pounds of force.

3. Where parallel arms are indicated for closers, provide closer unit one (1) size larger than recommended for use with standard arms.

B. Door closers shall have fully hydraulic, full rack and pinion action with a high strength cast iron cylinder. All closers shall be of one (1) manufacturer. All closers shall utilize a stable fluid withstanding temperature range of 120 degrees F to –30 degrees F without seasonal adjustment of closer speed to properly close the door. Closers for fire-rated doors shall be provided with temperature stabilizing fluid that complies with standards UBC 7-2 (1997) and UL 10C.

C. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force for the physically handicapped. Spring power adjustment allows for quick and accurate power adjustment and visually shows closer power size settings by way of dial adjustment gauge located on closer spring tube. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed and back check. Door closers with pressure relief valves are not acceptable.

D. All closers shall have solid forged steel main arms (and forearms for parallel arm closers) and where specified shall have a cast-in solid stop on the closer shoe.

E. All surface closers shall be certified to exceed ten million full load cycles by a recognized independent testing laboratory. All closers (overhead, surface and concealed shall be of one (1) manufacturer and carry manufacturer's ten (10) year warranty (electric closers to have two (2) Year warranty).

F. Overhead concealed closers shall have spring power adjustable for 50 percent increase in closing power and fully mortised door tracks.

G. Closers to be installed to allow door swing as shown on plans. Doors swinging into exit corridors shall provide for corridor clear width as required by code. Where possible, mount closers on inside of rooms.

H. Provide brackets, mounting plates, and fastener types for closers as required for proper installation with door and frame conditions. Closers shall be attached to wood doors with sex bolts.

I. Powder coating finish to be certified to exceed 100 hours salt spray testing by ETL, an independent testing laboratory used by BHMA for ANSI certification.

J. Combination Door Closers and Holder: Provide units designed to hold door in open position under normal usage and to release and close door automatically under fire conditions. Incorporate an integral electromagnetic holder mechanism designed for use with UL listed fire detectors, provided with normally closed switching contacts.

K. Magnetic Door Holders to be heavy duty wall or floor mounted with metal housing and complete mounting hardware. Provide 24V holding coils unless otherwise scheduled.

L. Flush Floor Plates: Provide finished metal flush floor plates for floor closers except where thresholds are indicated and cover plate is specified to be an integral part of threshold. Finish floor plate to match hardware sets, unless otherwise indicated.

M. Recessed Floor Plates: Provide recessed floor plates where no thresholds are indicated and floor closers are located in an area of resilient flooring, stone flooring, or terrazzo. Recess plates to receive an insert of the floor finish material of the normal thickness as indicated. Provide extended spindle on closer as may be necessary to accommodate thickness of floor finish.

1. Where terrazzo floor finish includes metal divider or expansion strips, match exposed ring of recessed floor plate on closer with metal of floor strips.

N. Provide grey resilient parts for exposed bumpers.

O. Provide black resilient parts for exposed bumpers.

2.9 PUSH/PULL UNITS

A. Exposed Fasteners: Provide manufacturer's standard exposed fasteners for installation, through bolted for matched pairs but not for single units.

B. Concealed Fasteners: Provide manufacturer's special concealed fastener system for installation, through bolted for matched pairs but not for single units.

2.10 DOOR TRIM UNITS

A. Fasteners: Provide manufacturer's standard exposed fasteners for door trim units consisting of either machine screws or self-tapping screws.

B. Fabricate edge trim of stainless steel to fit door thickness in standard lengths or to match height of protection plates.

C. Fabricate protection plates not more than 1-1/2 inches less than door width on hinge side and not more than 1/2 inch less than door width on pull side by height indicated.

1. Metal Plates: Stainless steel, 0.050 inch (U.S. 18-gage).

2. Metal Plates: Brass or bronze, 0.062 inch (U.S. 16-gage).

3. Plastic Plates: Clear acrylic plastic, 1/8 inch thick.

4. Plastic Plates: Plastic laminate or high impact polyethylene, 1/8 inch thick, in color selected.

2.11 HARDWARE FOR INTERIOR SLIDING DOORS

A. Provide manufacturer's standard hardware for interior sliding doors when not furnished as part of complete door package.

B. Operating Hardware for Bypassing Doors: Provide manufacturer's complete set consisting of extruded aluminum overhead track, adjustable hangers (carriages), bumpers, and floor guides designed to accommodate the number, size, thickness, and weight of door leaves indicated. Provide flush pulls for each door leaf.

C. Operating Hardware for Pocket Doors: Provide manufacturer's complete set consisting of extruded aluminum or galvanized steel overhead track, adjustable hangers (carriages), galvanized steel split jambs and split studs, wood nailers for head track, jambs and studs, galvanized steel brackets for assembly and attachment to floor and wall framing, bumpers, and nylon floor guides designed to accommodate the number (single and biparting), size, thickness, and weight of door leaves indicated. Provide flush pull and edge pull for each door leaf.

2.12 HARDWARE FOR BIFOLD DOORS

A. Provide manufacturer's standard hardware for interior bifold doors when not furnished as part of complete door package.

B. Operating Hardware: Provide manufacturer's complete sets consisting of overhead extruded aluminum track; captive nylon shoe or roller guides; rubber bumpers in track; and adjustable pivots, hinges, and door aligners all designed to accommodate the number, size, thickness, and weight of door leaves indicated.

1. Provide medium duty sets designed for leaves weighing up to 35 pounds.

C. Trim Hardware: Provide the following items as needed for operating bifold doors:

1. Pulls: Manufacturer's standard pull, one (1) per pair of leaves.

2.13 WEATHERSTRIPPING AND SEALS

A. Provide continuous weather stripping on exterior doors and smoke, light, or sound seals on interior doors where indicated or scheduled. Provide non-corrosive fasteners for exterior applications and elsewhere as indicated.

B. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strip is easily replaceable and readily available from stocks maintained by manufacturer.

C. Quality and type of materials are established herein and on the Drawings by catalogue numbers and descriptions from the catalogue of National Guard Products. Other acceptable manufacturers are: Zero International, Inc., Pemko Mfg., Co., Reese Enterprises, Inc.

1. Head/Jamb Seals: No. 2525.

2. Sweep Strip: No. 200N, mill finish.

3. Threshold: No. 425, mill finish.

4. Adjustable Head/Jamb Seals: No. 103N, mill finish.

5. Adjustable Door Bottoms: No. 222N, mill finish.

6. Threshold for Adjustable Seals: No. 950N, mill finish.

7. Rain Drip: No. 17, mill finish.

8. Top Protection: No. 16, mill finish.

2.14 HARDWARE FINISHES

A. Match items to the manufacturer's standard color and texture finish for the latch and lock sets (or push pull units if no latch or lock sets).

B. Provide finishes that match those established by ANSI/BHMA or, if none established, match the Architect's sample.

C. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.

D. Provide protective lacquer coating on all exposed hardware finishes of brass, bronze, and aluminum, except as otherwise indicated. The suffix "NL" is used with standard finish designations to indicate "no lacquer."

E. The designations used in schedules and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18, "Materials and Finishes," including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

B. All installation shall be in accordance with manufacturer’s published recommendations.

C. Mount hardware units at heights indicated in following applicable publications, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by Architect.

1. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.

2. "Recommended Locations for Builders Hardware for Custom Steel Doors and Frames" by the Door and Hardware Institute.

3. NWWDA Industry Standard I.S.1.7, "Hardware Locations for Wood Flush Doors"; applicable for flush wood doors 1-3/8 and1-3/4 inches thick by 6 feet 8 inches and 7 feet 0 inches high.

D. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing Work specified in the Division 09 Sections. Do not install surface mounted items until finishes have been completed on the substrates involved.

E. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

F. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

G. Set thresholds for exterior doors in full bed of butyl rubber or polyisobutylene mastic sealant complying with requirements specified in Division 07 Section "Joint Sealers."

H. Weather stripping and Seals: Comply with manufacturer's instructions and recommendations to the extent installation requirements are not otherwise indicated.

1. Where adhesive applied items are indicated, abrade or otherwise prepare the substrate for complete adhesion to ensure the items will not delaminate.

I. Install manufacturer supplied, temporary keyed construction cores for all exterior doors, suite entry doors, and doors where electrified hardware is scheduled. For all other doors, install Owner-provided, temporary non-keyed plastic construction cores unless keyed construction cores are specifically called for.

3.2 ADJUSTING, CLEANING, AND DEMONSTRATING

A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.

1. Where door hardware is installed more than one (1) month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

B. Clean adjacent surfaces soiled by hardware installation.

C. Instruct Owner's personnel in the proper adjustment and maintenance of door hardware and hardware finishes.

END OF SECTION 08 71 11

SECTION 09 30 00 – TILE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, apply to this Section.

B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCE STANDARDS

A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.

B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.

C. All materials, installation and workmanship shall comply with all applicable requirements and standards.

1.3 QUALITY ASSURANCE

A. Single Source Responsibility for Tile: Obtain each color, grade, finish, type, composition, and variety of tile from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

B. Single Source Responsibility for Setting and Grouting Materials: Obtain ingredients of a uniform quality from one manufacturer for each cementitious and admixture component and from one source or producer for each aggregate.

C. Installer Qualifications: Engage an experienced Installer who has successfully completed tile installations similar in material, design, and extent to that indicated for Project.

D. Pre-installation Conference: Conduct conference at Project Site.

1.4 SUBMITTALS

A. Samples:

1. Submit samples for initial selection purposes of each tile type and grout in form of manufacturer's color charts consisting of actual units or sections of units showing full range of colors, textures, and patterns available for each type of finish indicated.

    a. Where finish involves normal color and texture variations, include sample sets composed of two or more units showing full range of variations expected.

    b. Include similar samples of material for joints and accessories involving color selection.

2. Submit samples for verification purposes of each type, class, and color/ pattern of tile required, not less than 18 inches square on plywood or hardboard backing, and grouted as required. Architect's review will be for color, pattern and texture only. Compliance with all other requirements is the exclusive responsibility of the Contractor.

a. Prepare and submit new samples, if requested, until appearance is acceptable to the Architect.

B. Product Data:

1. Submit manufacturer's product data and installation/maintenance instructions for all manufactured products and materials.

C. Shop Drawings:

1. Submit plans of all areas to receive tile Work showing location of expansion and control joints, layout of tile units, and other conditions affecting the Work.

a. Include details showing setting methods, expansion joint constructions, and relationships to adjacent substrates.

b. Locate precisely each joint and crack in tile substrates by measuring, record measurements on shop Drawings, and coordinate them with tile joint locations, in consultation with Architect.

c. Provide manufacturer's Master Grade Certificate bearing TCA Certification mark and stating type, grade and location of material for all tile specified to be "Standard Grade".

D. Record Documents:

1. Provide record approved shop drawings, samples, and warranties.

E. Warranty:

1. Provide guarantee on waterproofing membrane stating that the waterproofing membrane will not leak, cause delamination of tile installation, or otherwise fail to perform as protective waterproofing for a period of five (5) years from the Date of Substantial Completion.

1.5 PERFORMANCE REQUIREMENTS

A. Load-Bearing Performance: For ceramic tile installed on walkway surfaces, provide installations rated for the following load-bearing performance level based on testing assemblies according to ASTM C 627 that are representative of those indicated for this Project.

1. Extra Heavy: Passes cycles 1 through 14

2. Heavy: Passes cycles 1 through 12

3. Moderate: Passes cycles 1 through 10

4. Light: Passes cycles 1 through 6

5. Residential: Passes cycles 1 through 3

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement of ANSI A137.1 for labeling sealed tile packages.

B. Prevent damage or contamination to materials by water, freezing, foreign matter, and other causes.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions and protect Work during and after installation to comply with referenced standards and manufacturer's printed recommendations.

B. Vent temporary heaters to exterior to prevent damage to tile Work from carbon dioxide buildup.

C. Maintain temperatures at 50 degrees F (10 degrees C) or more in tiled areas during installation and for seven (7) days after completion, unless higher temperatures are required by referenced installation standard or manufacturer's instructions.

1.8 EXTRA MATERIALS

A. Deliver extra materials to Owner. Furnish extra materials that match products installed, packaged with protective covering for storage and identified with labels clearly describing contents.

a. Furnish 10% of “Attic Stock” of all tile products to the **COUNTY**.

PART 2 - PRODUCTS

2.1 GENERAL

A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

2.2 MANUFACTURERS

A. The notes and schedules on the Drawings establish manufacturer and model/design of tile products required for the Project. Provide the products listed unless Architect approves products of other manufacturer specifically for this Project.

2.3 PRODUCTS, GENERAL

A. ANSI Standard for Ceramic Tile: Comply with ANSI A137.1 "American National Standard Specifications for Ceramic Tile" for types, compositions, and grades of tile indicated.

1. Furnish tile complying with "Standard Grade" requirements unless otherwise indicated.

B. ANSI Standard for Tile Installation Materials: Comply with ANSI standard referenced with products and materials indicated for setting and grouting.

C. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:

1. Match Architect's sample.

2. Match color, texture, and pattern indicated by reference to manufacturer's standard designations for these characteristics.

3. Provide selections made by Architect from manufacturer's full range of standard colors, textures, and patterns for products of type indicated.

4. Provide tile trim and accessories that match color and finish of adjoining flat tile.

D. Factory Blending: For tile exhibiting color variations within the ranges selected during sample submittals, blend tile in factory and package accordingly so that tile units taken from one package show the same range in colors as those taken from other packages and match approved samples.

1. Trim and Special Shapes: Rounded external corners, and trim shapes at head, jamb, and sills of opening, of same material and finish as tile, and as follows:

a. Base: At tiled walls, integral cove base; at vinyl fabric covered walls, integral cove, field tile and surface bullnose to form a base of height indicated.

b. Base: At tiled floor and walls, integral cove base; at vinyl composition tile floors and tiled walls, straight field tile base; at vinyl composition tile floors and vinyl wallcovering, straight field tile and surface bullnose to form a base of height indicated.

c. External Corners: Surface bullnose shapes.

d. Internal Corners: Field butted square, except use square corner-combination angle and stretcher type cap.

2. At locations indicated, provide tile manufacturer's abrasive grit surfaced tile for slip-resistant finish.

E. For glazed wall tile, provide "Standard Grade" units, complying with ANSI A137.1. Provide units, trim and special shapes as indicated and required.

F. Accessories for Glazed Wall Tile: Provide vitreous china accessories of type and size indicated and in color and finish to match adjoining glazed wall tile.

2.4 STONE THRESHOLDS

A. Provide stone that is uniform in color and finish, fabricated to sizes and profiles indicated or required to provide transition between tile surfaces and adjoining finished floor surfaces.

1. Fabricate thresholds to heights indicated, but not more than 1/2 inch (12.7 mm) above adjoining finished floor surfaces, with transition edges beveled on a slope of no greater than 1 to 2.

B. Marble Thresholds: Provide marble thresholds complying with ASTM C 503 requirements for exterior use and for abrasion resistance where exposed to foot traffic, a minimum hardness of 10 per ASTM C 241.

1. Match Architect's sample for color and finish.

2. Provide white, honed "Carrera" marble complying with MIA Group "A" requirements for soundness.

C. Slate Thresholds: Provide nonfading slate thresholds with honed finish complying with ASTM C 629 requirements for interior use and for abrasion resistance.

1. Match Architect's sample for color.

2.5 MORTAR SETTING BED MATERIALS

A. Provide Portland cement mortar as specified in the ANSI A 108 Series, Materials, and Installation Specifications with a Portland Cement mortar/sand mix in 1:6 proportion.

B. For "Thin Set/Dry Set" mortar bed setting, provide factory sanded Portland cement mix with manufacturer's standard acrylic latex additive conforming to ANSI A 118.4. For wall applications, provide mortar that complies with requirements for non-sagging mortar in addition to the other requirements in ANSI A118.4.

1. American Olean "759 Thinset Mortar with AO Acrylic Thin Set Additive".

2. Laticrete "Floor 'N Wall Thin Set Mortar".

3. Mapei "Kerabond Premium".

4. C Cure Chemical Co. "Permabond with C Cure Latex Admixture".

5. Use one item from 1-4 above or the equivalent.

2.6 JOINT GROUT

A. For mosaic tile and glazed tile grout, provide manufactured joint grout conforming to ANSI A 118.6.

1. American Olean "Wall and Floor Grout".

2. Laticrete "Floor Grout" or "Wall Grout".

3. Mapei "Keracolor".

4. C Cure "MP Grout".

2.7 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with requirements of referenced standards and manufacturers including those for accurate proportioning of materials, water, or additive content; type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other procedures needed to produce mortars and grouts of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine substrates and areas where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

1. Verify that substrates for setting tile are firm, dry, clean, and free from oil or waxy films and curing compounds.

2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of Work, and similar items located in or behind tile has been completed before installing tile.

B. Do not proceed with installation until unsatisfactory conditions have been corrected.

C. Blending: For tile exhibiting color variations within the ranges selected during sample submittals, verify that tile has been blended in factory and packaged accordingly so that tile units taken from one package show the same range in colors as those taken from other packages and match approved samples. If not factory blended, either return to manufacturer or blend tiles at the Project Site before installing.

3.2 INSTALLATION

A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

B. All installation shall be in accordance with manufacturer's published recommendations.

C. ANSI Tile Installation Standard: Comply with parts of ANSI 108 series of tile installation standards included under "American National Standard Specifications for the Installation of Ceramic Tile" that apply to type of setting and grouting materials and methods indicated.

1. Dry Set or latex cement set wall and floor tile: ANSI A 108.5.

2. Organic adhesive set wall and floor tile: ANSI A 108.4.

3. Tile set in portland cement mortar bed: ANSI A 108.1.

4. Tile set in chemical resistant epoxy mortar and grout: ANSI A 108.6.

5. Tile set in chemical resistant furan mortar and grout: ANSI A 108.8.

D. TCA Installation Guidelines: TCA "Handbook for Ceramic Tile Installation"; comply with TCA installation methods indicated.

E. Extend tile Work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions except as otherwise shown. Terminate Work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

F. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so that plates, collars, or covers overlap tile.

G. Carefully lay out tile in an endeavor to center the tiles to space them evenly, and to avoid cutting them. If cutting is necessary, cutting shall be done by saw cut or drilling only, no tile cutters or snipped edges allowed; all cut ends shall be rubbed smooth and even. Unless otherwise shown, lay out tile so that no tile less than 1/2 size occurs. For height stated in feet and inches, maintain full courses to produce nearest attainable heights without cutting tile. Align joints in wall tile vertically and horizontally. No staggering of joints will be permitted. All cutting and drilling shall be done without marring surfaces and shall be done neatly to fit closely around pipes, fixtures, and fittings so that cover plates will overlap cuts.

H. Unless otherwise shown, lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile Work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths unless otherwise shown.

1. Confirm locations of joints in substrate will align with planned expansion joints in tile Work. Adjust layout of tile if necessary to align expansion joints with substrate conditions.

I. Expansion Joints: Locate expansion joints and other sealant filled joints, including control, Contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw cut joints after installation of tiles.

1. Locate joints in tile surfaces directly above joints in concrete substrates.

J. Grout tile to comply with the requirements of the following installation standards:

1. For ceramic tile grouts (sand Portland cement, dry set, commercial Portland cement, and latex Portland cement grouts), comply with ANSI A108.10.

2. For chemical resistant epoxy grouts, comply with ANSI A108.6.

3. For chemical resistant furan grouts, comply with ANSI A108.8.

3.3 WATERPROOFING FOR THINSET TILE INSTALLATIONS

A. Install waterproofing in compliance with waterproofing manufacturer's instructions to produce a waterproof membrane of uniform thickness bonded securely to substrate.

B. Do not install tile over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.4 FLOOR INSTALLATION METHODS

A. Thick Set Setting Bed:

1. Mortar Bed: 1-1/4 inch to 2 inch thick latex-Portland cement mortar.

2. Bond Coat: Portland cement paste on plastic mortar bed or latex-Portland cement mortar on cured mortar bed (Contractor's option).

3. On Grade: TCA F112.

4. Above Grade: TCA F111.

5. Over Waterproof Membrane: TCA F121.

6. With Epoxy Mortar and Bond Coat: TCA F132.

B. Medium Set Setting Bed; Tiles 8" x 8" and Larger:

1. Bond Coat: 3/8 inch to ¾ inch thick medium bed dry set latex-Portland cement mortar.

2. Typical: TCA F113, except for bond coat thickness.

3. Over Waterproof Membrane: TCA F122, except for bond coat thickness.

C. Thin Set Setting Bed; Tiles 6" x 6" and Smaller:

1. Bond Coat: 3/32 inch minimum thick dry set latex-Portland cement mortar.

2. Typical: TCA F113.

3. Over Waterproof Membrane: TCA F122.

4. With Epoxy Mortar and Grout: TCA F131.

D. Set marble thresholds in thin set mortar setting beds; point threshold base flush with adjoining tile floors. Comply with TCA Method TH821.

3.5 WALL TILE INSTALLATION METHODS

A. Install types of tile designated for wall application to comply with requirements indicated below for setting bed methods, TCA installation methods related to subsurface wall conditions, and grout types:

B. Over gypsum board, use organic adhesive in accordance with TCA Method W242.

C. Over glass mesh mortar units, at typical locations, use latex portland cement mortar in accordance with TCA Method W244.

1. At Bath Tubs; TCA B412.

2. At Showers; TCA B415.

D. Over masonry or concrete use latex Portland cement mortar; TCA W202.

3.6 GROUT

A. Wall Joints (less than 1/8 inches wide): Unsanded Grout.

B. Floor and Wall Joints (1/8 inch to 5/8 inch wide): Sanded Grout.

C. Floor Joints in Showers, and all Quarry Tile Joints (1/16 inch to 3/8 inch wide): Epoxy Grout.

3.7 EXPANSION JOINT INSTALLATION

A. At all floor tile installations, provide expansion joints at perimeter of area to be tiled, at all penetrations in tile Work, and 12 feet 0 inches on center both ways as recommended in the TCA "Handbook for Ceramic Tile Installation" unless closer spacing is indicated or required by Project conditions. Install removable strips of the same depth as the finished tile system including setting bed. Remove strips after grouting and curing operations.

1. Install joints in accordance with TCA Method EJ711.

3.8 CLEANING AND PROTECTION

A. Upon completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove latex Portland cement grout residue from tile as soon as possible.

2. Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's printed instructions, but no sooner than fourteen (14) calendar days after installation. Protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.

B. Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile Work.

C. Provide final protection and maintain conditions in a manner acceptable to manufacturer and installer that ensures tile is without damage or deterioration at time of Substantial Completion.

1. When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile Work with kraft paper or

other heavy covering during construction period to prevent staining, damage, and wear.

2. Prohibit foot and wheel traffic from tiled floors for at least seven (7) calendar days after grouting is completed.

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

END OF SECTION 09 30 00

SECTION 09 51 00 – ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, apply to this Section.

B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCE STANDARDS

A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.

B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.

C. All materials, installation and workmanship shall comply with all applicable requirements and standards.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has successfully completed acoustical ceilings similar in material, design, and extent to those indicated for Project.

B. Fire Performance Characteristics: Provide acoustical ceilings that are identical to those tested for the following fire performance characteristics, per ASTM test method indicated below, by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.

1. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 for Class A products.

a. Flame Spread: 25 or less.

b. Smoke Developed: 50 or less.

2. Fire Resistance Ratings: As indicated by reference to design designations in UL "Fire Resistance Directory," for types of assemblies in which acoustical ceilings function as a fire protective membrane and tested per ASTM E 119.

a. Protect lighting fixtures and air ducts to comply with requirements indicated for rated assembly.

C. Single Source Responsibility for Ceiling Units: Obtain each type of acoustical ceiling unit from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

D. Single Source Responsibility for Suspension System: Obtain each type of suspension system from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

E. Coordination of Work: Coordinate layout and installation of acoustical ceiling units and suspension system components with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire suppression system components (if any), and partition system (if any).

F. Preinstallation Conference: Conduct conference at Project Site.

1.4 SUBMITTALS

A. Coordination Drawings:

1. Reflected ceiling plans drawn accurately to scale and coordinating penetrations and ceiling mounted items. Show the following:

a. Ceiling suspension members.

b. Method of attaching hangers to building structure.

c. Ceiling mounted items including light fixtures; air outlets and inlets; speakers; sprinkler heads; and special moldings at walls, column penetrations, and other junctures with adjoining construction.

B. Samples:

1. Samples for initial selection purposes in form of manufacturer's color charts consisting of actual acoustical units or sections of units showing full range of colors, textures, and patterns available for each type of unit indicated.

2. Samples for verification purposes of each type of exposed finish required, prepared on samples of size indicated below and of same thickness and material indicated for final unit of Work. Where finishes involve normal color and texture variations, include sample sets showing full range of variations expected.

a. 6 inch square samples of each unit pattern and color required.

b. Set of 12 inch long samples of exposed suspension system members, including moldings, for each color and system type required.

C. Product Data:

1. Submit manufacturer's product data and installation/maintenance instructions for all manufactured products and materials.

D. Record Documents:

1. Provide record approved samples, product data, and coordination drawings.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver acoustical ceiling units to Project Site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical ceiling units, permit them to reach room temperature and stabilized moisture content.

C. Handle acoustical ceiling units carefully to avoid chipping edges or damaging units in any way.

1.6 EXTRA MATERIALS

A. Deliver extra materials to Owner. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with appropriate labels.

1. Refer to Section 01 78 46 for Maintenance Material Requirements.

1.7 PROJECT CONDITIONS

A. Space Enclosure: Do not install interior acoustical ceilings until space is enclosed and weatherproof, wet Work in space is completed and nominally dry, Work above ceilings is complete, and ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

PART 2 - PRODUCTS

2.1 GENERAL

A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

2.2 METAL SUSPENSION SYSTEMS, GENERAL

A. Standard for Metal Suspension Systems: Provide manufacturer's standard metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable ASTM C 635 requirements.

B. Finishes and Colors: Provide manufacturer's standard factory applied finish for type of system indicated.

1. High Humidity Finish: Comply with ASTM C 635 requirements for "Coating Classification for Severe Environment Performance" where high humidity finishes are indicated.

C. Attachment Devices: Size for 5 times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

1. Cast In Place and Post-installed Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion resistant materials, with holes or loops for attachment of hangers of type indicated and with capability to sustain, without failure, a load equal to 5 times that imposed by ceiling construction, as determined by testing per ASTM E 488, conducted by a qualified independent testing laboratory.

a. Cast in place anchors.

b. Chemical anchors.

c. Expansion anchors.

d. Undercut anchors.

2. Powder Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion resistant materials, with clips or other accessory devices for attachment of hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing laboratory.

D. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft temper.

1. Gage: Provide wire sized so that stress at 3 times hanger design load (ASTM C 635, Table 1, Direct Hung), will be less than yield stress of wire, but provide not less than 0.106 inch diameter (12 gage).

E. Hanger Rods: Mild steel, zinc coated, or protected with rust inhibitive paint.

F. Flat Hangers: Mild steel, zinc coated, or protected with rust inhibitive paint.

G. Angle Hangers: Angles with legs not less than 7/8 inch wide, formed with 0.0365 inch thick galvanized steel sheet complying with ASTM A 446, Coating Designation G90, with bolted connections and 5/16 inch diameter bolts.

H. Edge Moldings and Trim: Metal or extruded aluminum of types and profiles indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit type of edge detail and suspension system indicated. Provide trim with hemmed edges.

1. For lay in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.

2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

3. For narrow faced suspension systems, provide suspension system manufacturer's standard edge moldings that match width and configuration of exposed runners.

I. Hold down Clips for Non Fire Resistance Rated Ceilings: For interior ceilings composed of lay in panels weighing less than 1 lb. per sq. ft., provide hold down clips spaced 2' 0" on center on all cross tees.

J. Impact Clips: Where indicated, provide manufacturer's standard impact clip system designed to absorb impact forces against lay in panels.

K. Clean-Room Gasket System: Where indicated, provide manufacturer's standard system, including gasket and related adhesives, tapes, seals, and retention clips, designed to seal out foreign material from and maintain positive pressure in clean room.

2.3 EXPOSED GRID SYSTEM

A. Provide double web main and cross runners with 15/16 inch wide face, 1-1/2 inch deep nominally, with painted galvanized steel cap.

B. Provide double web main and cross runners with 15/16 inch wide face, 1-1/2 inch deep nominally, with painted aluminum cap.

C. Provide "intermediate duty" structural classification per ASTM C 635.

D. Exposed Grid Suspension System:

1. Armstrong "Prelude XL"

2. USG Interiors Donn "DX" System

2.4 ACOUSTIC UNIT MATERIALS

A. Refer to Finish Schedule on Drawings for type of acoustic units to be provided.

B. Acoustic Unit Standard: Provide manufacturer's standard units of configuration indicated that comply with ASTM E 1264 requirements, including those indicated by reference to type, form, pattern, grade (NRC as applicable), light reflectance coefficient (LR), edge detail, and joint detail (if any).

C. Mounting Method for Measuring Noise Reduction Coefficient: Type E-400; plenum mounting in which face of test specimen is 15 ¾ inches (400 mm) away from test surface per ASTM E 795.

D. Antimicrobial Treatment: Provide acoustical units treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and which show no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

E. Lake County Approved Manufacturer: Armstrong-Dune USG-Olympia Micro ClimaPlus

2.5 ACOUSTICAL PANELS FOR ACOUSTICAL PANEL CEILINGS

A. Basis of Design Product: Subject to compliance with requirements, provide product as designated or an equivalent product that meets the sustainable design requirements.

1. Plan Designation (SAI):
   a. Armstrong, Duane
   b. USG, Olympia Micro, ClimaPlus

B. Classification: Provide panels complying with ASTM E 1264 for type, form, and pattern as follows:
1. Type and Form: Type III mineral base with painted finish; Form 2, water felted.
2. Pattern: CE (perforated small holes and lightly textured.)

C. Color: White
D. LR: Not less than 0.82
E. NRC: Not less than 0.50
F. CAC: Not less than 35
G. AC: Not less than N/A
H. Edge/Joint Detail: Tegular
I. Thickness: 5/8"
J. Modular Size: 24x24 inches
K. Antimicrobial Treatment: Fungicide based
1. BioBlock or Equivalent

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine substrates and structural framing to which ceiling system attaches or abuts, with Installer present, for compliance with requirements specified in this and other sections that affect installation and anchorage of ceiling system. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.

1. Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other Work.

C. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans.

3.2 INSTALLATION

A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

B. All installation shall be in accordance with manufacturer’s published recommendations.

C. Install acoustical ceiling systems to comply with installation standard referenced below, per manufacturer's instructions and CISCA "Ceiling Systems Handbook."

1. Standard for Installation of Ceiling Suspension Systems: Comply with ASTM C 636.

2. Standards for Installation of Ceiling Suspension Systems Requiring Seismic Restraint: Comply with ASTM C 636 and ASTM E 580.

3. CISCA's Recommendations for Acoustical Ceilings: Comply with CISCA's "Recommendations for Direct-Hung Acoustical Tile and Lay-in Panel Ceilings--Seismic Zones 0-2."

4. CISCA's Guidelines for Systems Requiring Seismic Restraint: Comply with CISCA's "Guidelines for Seismic Restraint of Direct-Hung Suspended Ceiling Assemblies--Seismic Zones 3 & 4.

5. U.B.C.'s "Metal Suspension Systems for Acoustical Tile and for Lay-in Panel Ceilings": U.B.C. Standard 25-2.

D. Arrange acoustical units and orient directionally patterned units (if any) in manner shown by reflected ceiling plans.

1. Install units with pattern running in one direction.

2. Install units with pattern running in alternating directions to form checkerboard layout.

E. Suspend ceiling hangers from building structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

3. Secure wire hangers by looping and wire tying, either directly to structures or to inserts, eyescrews, or other devices that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

4. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eyescrews, or other devices that are secure and appropriate for structure to which hangers are attached as well as for type of hanger involved, and in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.

5. Do not support ceilings directly from permanent metal forms; furnish cast in place hanger inserts that extend through forms.

6. Do not attach hangers to steel deck tabs.

7. Do not attach hangers to steel roof deck. Attach hangers to structural members.

8. Space hangers not more than 4' 0" on center along each member supported directly from hangers, unless otherwise shown, and provide hangers not more than 8 inches from ends of each member.

F. Install edge moldings of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical units.

1. Screw attach moldings to substrate at intervals not over 16 inches on center and not more than 3 inches from ends, leveling with ceiling suspension system to tolerance of 1/8 inch in 12' 0". Miter corners accurately and connect securely.

2. Do not use exposed fasteners, including pop rivets, on moldings and trim.

G. Install suspension system runners so they are squared and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

H. Install acoustical panels with undamaged edges and fitted accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

I. Install acoustical units in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations.

1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.

2. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.

3. For reveal-edged panels on suspension system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension system surfaces and panel faces flush with bottom face of runners.

4. Paint cut panel edges remaining exposed after installation; match color of exposed panel surfacing using coating recommended in writing for this purpose by acoustical panel manufacturer.

5. Install hold down clips in areas indicated and in areas where required by governing regulations or for fire resistance ratings; space as recommended by panel manufacturer, unless otherwise indicated or required.

3.3 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 00

SECTION 09 65 13 – RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.

B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.

C. All materials, installation and workmanship shall comply with all applicable requirements and standards.

1.2 QUALITY ASSURANCE

A. Single Source Responsibility for Products: Obtain each type and color of product specified from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

B. Special Requirements of Regulatory Agencies: Submit certification that system complies with VOC (Volatile Organic Compounds) requirements and regulations of the Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), State, County, City, and local Air Control District.

C. Standard of Quality Sample: After approval of submittals and prior to proceeding with the Work of this Section, at a location determined by Owner, lay not less than 10 lineal feet of resilient base in conjunction with sheet vinyl flooring. Demonstrate cutting and trimming techniques around obstructions. The Work will be reviewed by Owner and Architect and, upon approval, will become the standard upon which the quality of materials and workmanship will be judged.

1.3 SUBMITTALS

A. Samples:

1. Samples for initial selection purposes of manufacturer's standard sample sets in form of pieces cut from each type of product specified showing full range of colors and patterns available.

2. Samples for verification purposes in manufacturer's standard sizes, but not less than 12 inches long, of each different color and pattern of product specified.

B. Product Data:

1. Submit manufacturer’s catalog cuts and descriptive information on each product used. Include installation/maintenance instructions.

C. Record Documents: Provide record approved samples and product data.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver products to Project Site in original manufacturer's unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.

B. Store products in dry spaces protected from the weather with ambient temperatures maintained between 50 degrees F (10 degrees C) and 90 degrees F (32 degrees C).

C. Move products into spaces where they will be installed at least 48 hours in advance of installation.

1.5 EXTRA MATERIALS

A. Deliver extra materials to Owner. Furnish extra materials matching products installed, packaged with protective covering for storage, and identified with labels clearly describing contents.

1. Refer to Section 01 78 46 for Maintenance Material Requirements.

1.6 PROJECT CONDITIONS

A. Maintain a minimum temperature of 70 degrees F (21 degrees C) in spaces to receive products specified in this Section for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. After this period, maintain a temperature of not less than 55 degrees F (13 degrees C).

B. Do not install products until they are at the same temperature as that of the space where they are to be installed.

C. Close spaces to traffic during installation of products specified in this Section.

1.7 SEQUENCING AND SCHEDULING

A. Sequence installing products specified in this Section with other construction to minimize possibility of damage and soiling during remainder of construction period.

PART 2 - PRODUCTS

2.1 GENERAL

A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

B. The notes and schedules on the Drawings establish manufacturer and model/design required for the Project. Provide the products listed unless Architect approves products of other manufacturer specifically for this Project.

2.2 MANUFACTURERS

A. To establish standards of manufacture, operation, performance, and appearance, drawings and specifications are based on the specific manufacturer's products and color/patterns shown on the Drawings. If accepted in advance by the Architect, and subject to compliance with requirements, products of the following manufacturers may also be acceptable:

1. Burke Flooring.

a. Mercer 104 “Fudge”

B. Lengths: <Coils in lengths standard with manufacturer but not less than 100 feet.>

C. Exterior Corners: <Job formed only.>

D. Interior Corners: <Job formed only.>

E. Ends: Pre-molded.

2.3 RESILIENT BASE (RB1, RB2, RB3, RB4)

A. Resilient Base:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Johnsonite

1) Designation (RB1): Tight lock for resilient flooring.
2) Designation (RB2): Tight lock for carpet floors without spacer tab.
3) Designation (RB3): Tradition cove base.
4) Designation (RB4): Millwork base, Madalay.

b. Approved equivalent

B. Resilient Base Standard: ASTM F 1861

1. Material Requirement: Type TP (rubber, thermoplastic.)

2. Manufacturing Method: Group I (solid, homogeneous.)

3. Style:

a. Designation (RB1): Wedge-Shaped Toeless.
b. Designation (RB2): Wedge-Shaped Toeless.
c. Designation (RB3): Covered Toe Profile.
d. Designation (RB4): Millwork.

C. Minimum Thickness:

1. Designation: (RB1):1/4” tapered
2. Designation (RB3): 1/8”
3. Designation (RB4): .375”

D. Height:

1. Designation (RB1): 4-3/8” (4-1/4” face) 2.
2. Designation (RB2): 4-1/2” (4-1/4” face).
3. Designation (RB3): 4”.
4. Designation (RB4): 6”.

E. Lengths: Coil in manufacturer’s standard length.

F. Outside Corners: Job formed. Comply with manufacturer’s installation procedure.

G. Inside Corners: Job formed. Comply with manufacturer’s installation procedures.

H. Finish: As indicated.

I. Colors and patterns: Mercer- 104 “Fudge”

2.4 ACCESSORIES

A. Provide reducer strips, transition strips, and other accessories required in the Work from the same manufacturer as the resilient wall base. The following accessories are products of Johnsonite and are listed to establish configuration, size, and shape of items only.

1. Where scheduled in colors matching base, provide accessories from the same color run to assure acceptable match.

B. Accessories:

1. Carpet Reducer Strip: EG-XX-G.

2. Resilient Flooring Reducer Strip: RRS-XX.

3. Transition Strip; Resilient to Carpet: CTA-XX.

4. Transition Strip; Carpet to Ceramic: CCA-XX.

C. Provide accessories in proper thickness to accommodate adjacent flooring materials.

2.5 INSTALLATION ACCESSORIES

A. Concrete Slab Primer: Non-staining type as recommended by flooring manufacturer.

B. Trowelable Underlayments and Patching Compounds: Latex modified, Portland cement based formulation provided or approved by flooring manufacturer for applications indicated.

C. Stair Tread Nose Filler: Two part epoxy compound recommended by resilient tread manufacturer to fill nosing substrates not conforming to tread contours.

D. Adhesives: Water resistant type recommended by manufacturer to suit resilient flooring product and substrate conditions indicated.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine areas where installation of products specified in this Section will occur, with Installer present, to verify that substrates and conditions are satisfactory for installation and comply with manufacturer's requirements and those specified in this Section.

B. Comply with manufacturer's installation specifications for preparing substrates indicated to receive products indicated.

C. Use trowelable leveling and patching compounds per manufacturer’s directions to fill cracks, holes, and depressions in substrates.

D. Use stair tread nose filler per tread manufacturer's directions to fill nosing substrates not conforming to tread contours.

E. Remove coatings, including curing compounds, and other substances that are incompatible with flooring adhesives and that contain soap, wax, oil, or silicone, by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy duty wire brush.

F. Broom or vacuum clean substrates to be covered immediately before installing products specified in this Section. Following cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.

G. Apply concrete slab primer, if recommended by flooring manufacturer, prior to applying adhesive. Apply according to manufacturer's directions.

3.2 INSTALLATION

A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

B. All installation shall be in accordance with manufacturer’s published recommendations.

C. Install products specified in this Section using methods indicated according to manufacturer's installation directions.

D. Apply resilient wall base to walls, columns, pilasters, casework, and other permanent fixtures in rooms and areas where base is required. Install wall base in lengths as long as practicable. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

1. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.

2. Install inside and exterior corners before installing straight pieces.

3. Form inside corners on job from straight pieces of maximum lengths possible by cutting an inverted V shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce snug fit to substrate.

4. Form outside corners on job from straight pieces of maximum lengths possible by shaving back of base at point where bending will occur. Remove a strip perpendicular to length of base and only deep enough to produce a snug fit without bends, whitening, or removal of more than half the thickness of wall base.

E. Place resilient accessories so they are butted to adjacent materials of type indicated and bond to substrates with adhesive. Install reducer strips at edges of flooring that otherwise would be exposed.

F. Apply resilient accessories to stairs as indicated and according to manufacturer's installation instructions.

3.3 CLEANING AND PROTECTION

A. Perform the following operations immediately after completing installation:

1. Remove visible adhesive and other surface blemishes using cleaner recommended by manufacturers of resilient product involved.

2. Sweep or vacuum floor thoroughly.

3. Do not wash floor until after time period recommended by manufacturer.

4. Damp mop resilient accessories to remove black marks and soil.

5. Apply protective floor polish to resilient accessories that are free from soil, visible adhesive, and surface blemishes.

a. Use commercially available cross linked, acrylic product acceptable to resilient accessory manufacturer.

b. Coordinate selection of floor polish with Owner's maintenance service.

B. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods indicated or recommended by manufacturer of resilient product involved.

C. Clean products specified in this Section not more than four (4) days prior to dates scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Clean products using method recommended by manufacturer.

1. Strip protective floor polish that was applied after completing installation, prior to cleaning.

2. Reapply floor polish after cleaning.

END OF SECTION 09 65 13

SECTION 09 65 16 – VINYL/LUXURY VINYL TILE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, apply to this Section.

B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCE STANDARDS

A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.

B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.

C. All materials, installation and workmanship shall comply with all applicable requirements and standards.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Engage Installer that is certified by floor covering manufacturer as competent in the technique for heat welding seams.

B. Single Source Responsibility for Vinyl/Luxury Vinyl Tile: Obtain each type, color, and pattern of floor covering from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

C. Special Requirements of Regulatory Agencies: Submit certification that system complies with VOC (Volatile Organic Compounds) requirements and regulations of the Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), State, County, City, and local Air Control District.

D. Standard of Quality Sample: After approval of submittals and prior to proceeding with the Work of this Section, at a location determined by **COUNTY**, lay Vinyl/Luxury Vinyl Tile of not less than 100 square feet including not less than 10 lineal feet of resilient base. Demonstrate cutting and trimming techniques around obstructions. The Work will be reviewed by Owner and Architect and, upon approval, will become the standard upon which the quality of materials and workmanship will be judged.

1.4 SUBMITTALS

A. Samples:

1. Samples for initial selection purposes in form of manufacturer's color charts consisting of actual sections of Vinyl/Luxury Vinyl Tile coverings showing full range of colors and patterns available for each different product indicated.

2. Samples for verification purposes in form of 6 inch by 9 inch sections of each different color and pattern of Vinyl/Luxury Vinyl Tile covering product specified, showing full range of variations expected in these characteristics.

B. Product Data:

1. Submit manufacturer's catalog cuts and descriptive information on each product used. Include information on installation materials substantiating that they are recommended for use by the Vinyl/Luxury Vinyl Tile manufacturer.

2. Submit manufacturer's installation and maintenance instructions for all manufactured products and materials.

C. Shop Drawings:

1. Shop drawings showing location of seams and edge strips. Indicate location of columns, doorways, enclosing partitions, built-in cabinets, and locations where cutouts are required in flooring.

D. Record Documents:

1. Provide record approved samples, product data, and shop drawings.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver Vinyl/Luxury Vinyl Tile floor coverings and installation accessories to the Project Site in original manufacturer's unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.

B. Store flooring materials in dry spaces protected from the weather with ambient temperatures maintained between 50 degrees F (10 degrees C) and 90 degrees F (32 degrees C).

C. Move Vinyl/Luxury Vinyl Tile coverings and installation accessories into spaces where they will be installed at least 48 hours in advance of installation.

1.6 EXTRA MATERIALS

A. Deliver extra materials to Owner. Furnish extra materials matching products installed, packaged with protective covering for storage and identified with labels clearly describing contents.

1. This will be known as "County Attic Stock."

1.7 PROJECT CONDITIONS

A. Maintain a minimum temperature of 70 degrees F (21 degrees C) in spaces to receive Vinyl/Luxury Vinyl Tile coverings for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. After this period, maintain a temperature of not less than 55 degrees F (13 degrees C).

B. Do not install Vinyl/Luxury Vinyl Tile coverings until they are at the same temperature as the space where they are to be installed.

C. Close spaces to traffic while installing Vinyl/Luxury Vinyl Tile covering.

1.8 SEQUENCING AND SCHEDULING

A. Install Vinyl/Luxury Vinyl Tile coverings and accessories as late in the construction schedule as practical, and after other finishing operations, including painting, have been completed.

B. Do not install Vinyl/Luxury Vinyl Tile floor coverings over concrete slabs until the slabs have cured and are sufficiently dry to bond with adhesive as determined by floor covering manufacturer's recommended bond and moisture test.

PART 2 - PRODUCTS

2.1 GENERAL

A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

2.2 MANUFACTURERS

A. The notes and schedules on the Drawings establish manufacturer and model/design required for the Project. Provide the products listed unless Architect approves products of other manufacturer specifically for this Project.

1. Tandus Centiva Venue Series
2. Tandus Centiva Venue Stone UVS
3. Tandus Centiva Grand Ash CGA
4. Tandus Centiva Travertine ETR
5. Burke Flooring LVT-702/20 MIL Red Giant 18”X18”

B. To establish standards of manufacture, operation, performance, and appearance, drawings and specifications are based on the specific manufacturer's products and color/patterns shown on the Drawings. If accepted in advance by the Architect, and subject to compliance with requirements, products of other manufacturers may also be acceptable:

C. NO SUBSTITUTIONS

2.3 INSTALLATION ACCESSORIES

A. Concrete Slab Primer: Non-staining type as recommended by flooring manufacturer.

B. Trowelable Underlayments and Patching Compounds: Latex modified, portland cement based formulation provided or approved by floor covering manufacturer for applications indicated.

C. Adhesives (Cements): Water resistant, stabilized type as recommended by manufacturer to suit Vinyl/Luxury Vinyl Tile products and substrate conditions indicated.

PART 3 - EXECUTION

3.1 PREPARATION

A. General: Examine areas where installation of Vinyl/Luxury Vinyl Tile coverings will occur, with Installer present, to verify that substrates and conditions are satisfactory for installation and comply with floor covering manufacturer's requirements and those specified in this Section.

B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:

1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials whose presence would interfere with bonding of adhesive. Determine adhesion

and dryness characteristics by performing bond and moisture tests recommended by floor covering manufacturer.

2. Finishes of subfloors comply with tolerances and other requirements specified in Division 03 Section "Cast in Place Concrete" for slabs receiving resilient flooring.

3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits of any kind.

C. Do not proceed with installation until unsatisfactory conditions have been corrected.

D. Comply with manufacturer's installation specifications to prepare substrates indicated to receive Vinyl/Luxury Vinyl Tile coverings.

E. Use trowelable leveling and patching compounds per floor covering manufacturer's direction to fill cracks, holes, and depressions in substrates.

F. Remove coatings, including curing compounds, and other substances that are incompatible with flooring adhesives and that contain soap, wax, oil, or silicone, by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy duty wire brush.

G. Broom or vacuum clean substrates to be covered by Vinyl/Luxury Vinyl Tile coverings immediately before installation. Following cleaning, examine substrates to determine if there is visually any evidence of moisture, alkaline salts, carbonation, or dust.

H. Apply concrete slab primer, if recommended by flooring manufacturer, prior to application of adhesive. Apply according to manufacturer's directions.

3.2 INSTALLATION

A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

B. All materials and installation methods shall be in accordance with manufacturer’s published recommendations. Where installation methods and, or materials are at variance with manufacturer’s recommendations, Contractor shall bear full responsibility for any resulting deficiencies.

C. Installation of Vinyl/Luxury Vinyl Tile shall be accomplished as late in the construction schedule as is practical.

D. Comply with Vinyl/Luxury Vinyl Tile covering manufacturer's installation instructions and other requirements indicated that are applicable to each type of floor covering installation included in Project.

E. Install resilient sheet floor coverings on covers for telephone and electrical ducts, and similar items occurring within finished floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on these covers. Tightly adhere edges to perimeter of floor around covers and to covers.

F. Adhere resilient sheet floor coverings to flooring substrates by method approved by floor covering manufacturer.

1. Produce completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections.

2. Comply with floor covering manufacturer's directions including those for trowel notching, adhesive mixing, and adhesive open and working times.

3.3 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing Vinyl/Luxury Vinyl Tile coverings:

1. Remove visible adhesive and other surface blemishes using cleaner recommended by floor covering manufacturers.

2. Sweep or vacuum floor thoroughly.

3. Do not wash floor until after period recommended by floor covering manufacturer.

4. Damp mop floor to remove black marks and soil.

5. Apply protective floor polish to Vinyl/Luxury Vinyl Tile covering surfaces that are free from soil, visible adhesive, and surface blemishes.

a. Use commercially available cross linked acrylic product acceptable to floor covering manufacturer.

b. Coordinate selection of floor polish with Owner's maintenance service.

B. Where application of a surface sealer is recommended by the flooring manufacturer, provide sealer materials, and number of coats, as recommended or approved by the flooring manufacturer and apply following printed instructions.

C. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods indicated or recommended in writing by floor covering manufacturer.

1. Do not move heavy and sharp objects directly over Vinyl/Luxury Vinyl Tile coverings. Place plywood or hardboard panels over floor coverings and under objects while they are being moved. Slide or roll objects over panels without moving panels.

D. Clean Vinyl/Luxury Vinyl Tile not more than two (2) days prior to dates scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Clean floor coverings by method recommended by manufacturer.

END OF SECTION 09 65 16

SECTION 09 68 00 – CARPET

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, apply to this Section.

B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCE STANDARDS

A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.

B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.

C. All materials, installation and workmanship shall comply with all applicable requirements and standards.

1.3 QUALITY ASSURANCE

A. Carpet Surface Burning Characteristics: Provide carpet identical to that tested for the following fire performance characteristics, per test method indicated below, by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify carpet with appropriate markings of applicable testing and inspecting organization.

1. Test Method: DOC FF 1 70.

2. Rating: Pass.

B. Factory Runs: Provide Carpet from one factory run and one dye lot with colors and shades guaranteed to be uniform throughout the entire area run for type of carpet specified.

C. Vermin and Dampproofness: Provide moth and vermin proofed carpet, compatible with installation over concrete slab on grade floors.

1.4 SUBMITTALS

A. Shop Drawings:

1. Layout and seaming diagrams:

a. Indicate pile or pattern direction and locations and types of edge strips.

b. Indicate columns, doorways, enclosing walls or partitions, built in cabinets, and locations where cutouts are required in carpet.

c. Show installation details at special conditions.

B. Samples:

1. Samples for verification purposes in manufacturer's standard size, showing full range of color, texture, and pattern variations expected. Prepare samples from same material to be used for the Work. Submit the following:

    a. 12 inch square samples of each type of carpet material required.

    b. Two (2) full-size samples of each carpet tile required.

    c. 12 inch long samples of each type exposed edge stripping and accessory item.

    d. 6 inch square samples of each type of carpet cushion.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to Project Site in original factory wrappings and containers, labeled with identification of manufacturer, brand name, and lot number.

B. Store materials in original undamaged packages and containers, inside well ventilated area protected from weather, moisture, soilage, extreme temperatures, and humidity. Lay flat, blocked off ground. Maintain minimum temperature of 68 degrees F (20 degrees C) at least three days prior to and during installation in area where materials are stored.

1.6 EXTRA MATERIALS

A. Furnish extra materials matching products installed, packaged with protective covering for storage and identified with labels describing contents. Deliver extra materials to Owner's storage location at The University of Texas, MD Anderson Cancer Center, Physical Plant, 7777 Knight Road.

1. Refer to Section 01 78 46 for Maintenance Material Requirements.

1.7 PROJECT CONDITIONS

A. Substrate Conditions: No condensation within 48 hours on underside of 4 foot by 4 foot polyethylene sheet, fully taped at perimeter to substrate.

B. Substrate Conditions: pH of 9 or less when substrate wetted with potable water and Hydrion paper applied.

1.8 WARRANTY

A. General Warranty: The special warranty specified in this Section shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Carpet Warranty: Submit a written warranty executed by carpet manufacturer and Installer agreeing to repair or replace carpet that does not meet requirements or that fails in materials or workmanship within the specified warranty period. Failures include, but are not limited to:

1. Wear: Carpet materials shall evidence no more than 10 percent loss of face fiber.

2. Edge Raveling: Carpet material shall exhibit no edge ravel, snags, and runs under normal use.

3. Delamination: Carpet materials shall not delaminate from primary or secondary backing.

4. Shrinkage: Carpet materials shall show no shrinkage.

C. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL

A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

B. The notes and schedules on the Drawings establish manufacturer and model/design required for the Project. Provide the products listed unless Architect approves products of other manufacturer specifically for this Project.

2.2 MANUFACTURERS

A. To establish standards of manufacture, operation, performance, and appearance, drawings and specifications are based on the specific manufacturer's products and color/patterns shown on the Drawings. If accepted in advance by the Architect, and provided compliance with requirements, products of other manufacturers may also be acceptable:

2.3 CARPET MATERIALS

A. Carpet Type I: Tandus Centiva Tatami III

B. Carpet Type II: Tandus Centiva Color Spectrum

C. Carpet Type III: Tandus Abrasive Action II

D. Carpet Type IV: Tandus Centiva Aftermath II

E. Carpet Type V: Tandus Centiva Assertive Series

2.4 ACCESSORIES

A. Tackless Carpet Stripping: Water resistant plywood in strips, 3/8 inch or 9/32 inch thick, as required to match cushion thickness and in compliance with CRI 104, 11.3.

B. Carpet Edge Guard: Extruded aluminum carpet edge similar to #416 by National Guard Products Inc., mill finish aluminum.

C. Seaming Cement: Hot melt adhesive tape or similar product recommended by carpet manufacturer for taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.

D. Carpet Adhesive: Non-solvent based, water resistant, and non-staining as recommended by carpet and carpet tile manufacturer to comply with flammability requirements for installed carpet and compatible with substrate.

E. Trowelable Underlayments and Patching Compounds: Latex modified, Portland cement based formulation provided or approved by floor covering manufacturer for applications indicated.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clear away debris and scrape up cementitious deposits from concrete surfaces to receive carpet; apply sealer to prevent dusting.

B. Patch holes and level to a smooth surface. If previous finish chemically stripped, reseal concrete. Seal powdery or porous surfaces with sealer recommended by carpet manufacturer.

C. Patch holes and cracks. Sand to level. Remove wax. Seal surface with sealer recommended by carpet manufacturer.

D. Replace missing pieces of existing resilient flooring or patch to level. Cut out peaked sheet goods seams and fill with latex underlayment.

E. Remove chemical finish on terrazzo; patch grout lines and cracks to level with latex underlayment.

3.2 INSTALLATION

A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

B. All installation shall be in accordance with manufacturer’s published recommendations.

C. Dry fit sections of carpet prior to application of adhesive.

D. Apply adhesive uniformly to substrate in accordance with manufacturer's instructions. Butt edges tight to form seams without gaps.

E. Adhere perimeter tiles and partial tiles with a full spread of adhesive. Dry fit cut tiles and apply adhesive to tile back after tile has been cut. In corridor areas, use full tiles down the center and cut perimeter tile borders.

F. Direct Glue-Down Installation: Comply with CRI 104, Section 8: "Direct Glue-Down."

G. Carpet with Attached-Cushion Installation: Comply with CRI 104, Section 10: "Attached Cushion."

H. Stair Installation: Comply with CRI 104, Section 12: "Carpet on Stairs."

I. Comply with manufacturer's recommendations for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under door in closed position; do not place seams perpendicular to door frame, in direction of traffic through doorway. Do not bridge building expansion joints with continuous carpet.

J. In rooms or areas whose smallest dimension is less than the standard roll width of the specified carpet, install only full widths of carpet. No seams in such areas will be permitted.

K. Extend carpet under removable flanges and furnishings and into alcoves and closets of each space.

L. Provide cutouts where required, and bind cut edges where not concealed by protective edge guards or overlapping flanges.

M. Install carpet edge guard where edge of carpet is exposed; anchor guards to substrate.

N. Fit sections of carpet prior to application of adhesive. Trim edges and butt cuts with seaming cement.

O. Apply adhesive uniformly to substrate in accordance with manufacturer's instructions. Butt edges tight to form seams without gaps. Roll entire area lightly to eliminate air pockets and ensure uniform bond.

3.3 CLEANING

A. Remove adhesive from carpet surface with manufacturer's recommended cleaning agent.

B. Remove and dispose of debris and unusable scraps. Vacuum with commercial machine with face beater element. Remove soil. Replace carpet where soil cannot be removed. Remove protruding face yarn.

C. Vacuum carpet.

3.4 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, to ensure carpet is not damaged or deteriorated at time of Substantial Completion.

END OF SECTION 09 68 00

SECTION 09 91 00 – PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General Conditions, apply to this Section.

Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCE STANDARDS

The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.

All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.

All materials, installation and workmanship shall comply with the applicable requirements and standards.

1.3 DEFINITIONS

"Paint" includes coating systems materials, primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate, or finish coats.

“Substrate" as used herein means the surface to which paint is to be applied. In the case of previously painted existing surfaces, substrate means the surface to which the existing paint was applied.

1.4 QUALITY ASSURANCE

Single Source Responsibility: Provide primers and undercoat paint produced by the same manufacturer as the finish coats.

Coordination of Work: Review other sections in which primers are provided to ensure compatibility of the total systems for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

Notify the Architect of problems anticipated using the materials specified.

Material Quality: Provide the manufacturer's best quality trade sale paint material of the various coating types specified. Paint material containers not displaying manufacturer's product identification will not be acceptable.

1. Proprietary names used to designate colors or materials are not intended to imply that products named are required or to exclude equal products of other manufacturers.

2. Federal Specifications establish a minimum quality level for paint materials, except where other product identification is used. Provide written certification from the manufacturer that materials provided meet or exceed these criteria.

3. Products that comply with qualitative requirements of applicable Federal Specifications, yet differ in quantitative requirements, may be considered for use when acceptable to the Architect. Furnish material data and manufacturer's certificate of performance to Architect for proposed substitutions.

Odor Eliminating Additive: At all locations scheduled to receive solvent or alkyd-based coatings, provide an odor-eliminating additive to minimize the presence of odor from wet and drying paint films.

4. Provide additive recommended and approved by the primer/finish coat manufacturer for use with their paint. Benjamin Moore does not recommend an “odor eliminator additive” for Benjamin. Moore Paints.

5. Subject to compliance with above requirements, "Bio Zapp Paint Odor Eliminator" by Bio Zapp Laboratories, (941/922-9199) is acceptable.

1.5 SUBMITTALS

Samples:

1. Samples for initial color selection in the form of manufacturer's color charts.

   a. After color selection, the Architect will furnish color chips for surfaces to be coated.

2. Samples for verification purposes:

   a. Provide samples of each color and material to be applied, with texture to simulate actual conditions, on representative samples of the actual substrate.

   b. Define each separate coat, including block fillers and primers.

   c. Use representative colors when preparing samples for review.

   d. Resubmit until required sheen, color, and texture are achieved.

   e. Provide a list of material and application for each coat of each sample. Label each sample as to location and application.

   f. Submit samples on the following substrates for the Architect's review of color and texture only:

      1) Concrete: Provide two 4-inch-square samples for each color and finish.

      2) Concrete Masonry: Provide two 4 by 8-inch samples of masonry, with mortar joint in the center, for each finish and color.

      3) Painted Wood: Provide two 12 by 12-inch samples of each color and material on hardboard.

      4) Stained or Natural Wood: Provide two 4 by 8-inch samples of natural and stained wood finish on actual wood surfaces.

      5) Ferrous Metal: Provide two 4-inch-square samples of flat metal and two 8-inch-long samples of solid metal for each color and finish.

      6) Drywall: Provide two 12 by 12-inch samples of each color and finish.

Product Data:

3. Submit manufacturer’s catalog cuts and descriptive information on each product used. Include preparation requirements and application instructions.

Record Documents: Provide record approved samples and product data.

1.6 DELIVERY, STORAGE AND HANDLING

Deliver materials to the job site in the manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:

1. Product name or title of material.
2. Product description (generic classification or binder type).
3. Federal Specification number, if applicable.
4. Manufacturer's stock number and date of manufacture.
5. Contents by volume, for pigment and vehicle constituents.
6. Thinning instructions.
7. Application instructions.
8. Color name and number.

Store materials not in use in tightly covered containers in a well ventilated area at a minimum ambient temperature of 45 deg F (7 degrees C). Maintain containers used in storage in a clean condition, free of foreign materials and residue.

9. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

1.7 PROJECT CONDITIONS

Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 degrees F (10 degrees C) and 90 degrees F (32 degrees C).

Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 degrees F (7 degrees C) and 95 degrees F (35 degrees C).

Do not apply paint in rain, fog, or mist, when the relative humidity exceeds 85 percent, at temperatures less than 5 degrees F (3 degrees C) above the dew point, or to damp or wet surfaces.

1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by the manufacturer during application and drying periods.

PART 2 - PRODUCTS

2.1 GENERAL

All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

2.2 MANUFACTURERS

Sherwin Williams

Color Wheel

2.3 PAINTING SERVICES SPECIFICATION

A. General work requirements

1. The Contractor shall perform all work in accordance with applicable codes, local ordinances, and requirements of Lake County.

2. The Contractor shall provide all required licenses, permits, plans, engineering, and inspections to provide a completed project.

3. The term paint shall mean both paint and coatings including emulsions, enamels, stain, varnishes, sealers, and all other coatings whether organic or inorganic and whether used as a prime, intermediate, or finish coats.

4. All painting work shall be done in strict accordance with the paint manufacturer's recommendations.

5. Do not apply paint until substrates are free of conditions that will inhibit proper coating adhesion or appearance.

6. Ensure substrates' moisture content is within tolerances recommended by paint manufacturer prior to application of paint.

7. Paint shall only be applied when environmental conditions recommended by the manufacturer are met.

8. All surfaces to be painted shall be prepared in a workmanlike manner with the objective of obtaining a clean dry surface free from dust, dirt, debris, rust, scale, and all foreign matter. No surface shall be painted before the surface meets the requirements of the paint manufacturer.

9. All surfaces shall be patched, sanded, repaired, caulked, or skim coated as needed to achieve a finished product free of imperfections, blemishes and holidays.

10. Hardware accessories, picture tracks, machined surfaces, plates, lighting fixtures, locksets, hinges, and similar items in place prior to cleaning and painting, and not intended to be painted, shall be protected or removed, as directed by the **COUNTY's** Designated Representative, during painting operations and shall be promptly reinstalled after painting operations.

11. Paint shall be applied by experienced painters with brushes, rollers, or other applicators designed for particular application and shall be free of runs, sags, holidays, or unacceptable marks.

12. Paint may be applied by experienced painters using airless sprayers where recommended by the manufacturer. All products used for thinning must be in strict accordance with the manufacturer's instruction.

13. All substrates shall receive a minimum of one (1) coat of primer and two (2) finish coats of paint. Additional coats of paint shall be applied, if necessary, to obtain an aesthetically pleasing appearance and the specified thickness and coverage.

14. Where manufacturer's recommended materials, surface preparation, number of coats or mil thickness exceed what is shown in the specifications, the recommendations of the manufacturer shall govern.

15. Drying times between coats shall conform to the manufacturer's instructions.

16. The Contractor shall use tarps, drop cloths, and painter's tape to protect work wherever such covering is necessary.

17. Any unwanted paint shall be carefully removed without damage to any finish or surface.

18. The Contractor shall not use any plumbing or waste piping for mixing of, or disposal of paint.

B. Treatment of rust on iron and steel substrates

1. All rusted surfaces shall be treated with OSPHO rust converter (or equivalent equal), which shall generate a chemical reaction to convert existing rust into a stable, black protective polymeric coating and protect against future rust and corrosion. Prior to applying OSPHO, use a wire brush or wire wheel to remove loose paint, rust scales, dirt, oil, and anything else accumulated on the surface. Rust converter shall be compatible with all substrates and top coats.

2. The Contractor shall notify the **COUNTY's** Project Manager 24 hours prior to the completion of rust treatments so that an inspection can be made of all areas. No primer or paint shall be applied until all rusted areas have been inspected.

C. Primer and paint types to be used (or equivalent equal upon approval from **COUNTY** Project Manager)

1. Interior Office Wall, Trim & Doors: Sherwin-Williams ProMar 200 Zero VOC Interior Latex Primer & Paint with Anti-microbial agents.

2. Exterior Wood/Steel/Vinyl/Aluminum: Sherwin-Williams All Surface Enamel Latex Primer.

3. Exterior Wood/Steel/ Vinyl/Aluminum: Sherwin-Williams A-100 Exterior Acrylic Latex Paint.

4. Exterior Masonry: Sherwin-Williams Loxon Primer & Paint.

5. Structural Steel: Sherwin-Williams Kem Kromik Alkyd-Metal Primer.

D. Finishes types to be used (unless otherwise specified.)

1. Interior Office Wall, Trim & Doors: Walls- egg shell, trim & doors-semi gloss.

2. Exterior Wood/Steel/Vinyl/Aluminum: Satin.

3. Exterior Masonry: Satin.

4. Structural Steel: Satin.

E. Standard color matches (unless otherwise specified, **COUNTY** Project Manager to approve all colors prior to installation.)

1. Interior/Office Wall paint: Sherwin-Williams SW6105 "Divine White" Egg shell finish

2. Moderate white SW 6140

3. Contented SW 6191

4. Trim & Door Frame Paint: Color Wheel CL 3257N-4/L33 "Eclipse" semi-gloss finish

5. Common Area Wall Paint: Color Wheel "Old Washer" satin finish

6. Walls: Color Wheel "Desert Fawn" 8222W or "Crisp Khaki" 3233M

7. Walls: Sherwin Williams "Tranquil Aqua" SW7611

8. Accents: Color Wheel "Quasar Blue" 8545D,
Sherwin Williams "Nomadic Desert" SW 6107,
Sherwin Williams "Latte" SW 6108,
Sherwin Williams "Contented" SW 6191,
Sherwin Williams "Gibraltar" SW 6257.

Sherwin Williams "Quasar Blue" PT-14

Formula

CCE*Colorant	OZ	32	64	128
B1-Black	4	43	1	
G2-New Green	20		1	

One Gallon B20W00653 Deep Base 640387411
Pro Green 200 EG-SHEL Interior

Sherwin Williams "Stradivari" Comp (F003) CL 1566A

Formula

CCE* Colorant	OZ	32	64	128
B1-Black			7	1
R2-Maroon	2		13	1
Y1-Yellow	2		43	1
Y3-Deep Gold	4		63	

One Gallon B20W02253 Deep Base 640354130
Pro Mar 200 EG-SHEL Interior

9. Stairwell metal pan: Color Wheel “Daplin” 8234M

10. Ceiling: Color Wheel “Soaring White” CW024W

F. Dry wall repair

1. Please Note: The Contractor shall provide workers experienced in installation, repair, taping, finishing, and texturing of drywall. If the Contractor exhibits an unacceptable finished products as a result of inadequate repairs and finishes made to drywall, the Contractor, at the sole discretion of the **COUNTY’**s project Manager, may not be included in future efforts that require such work.

G. Clean-up

1. The contractor shall leave the site clean and neat. All work must be cleaned up prior to the next day of business. At no time shall the specified work interfere with the regular operating hours of the Lake County. The contractor must have ample cleaning supplies and a minimum of two (2) vacuums cleaners on site for clean-up. At no time shall the contractor use the county’s cleaning supplies or equipment.

Please note: If the contractor fails to clean up the work area to acceptable standards the **COUNTY** shall retain outside cleaning services and the cost for this clean up shall be deducted from the Contractor’s final payment with the minimum cost of $50.00 to offset the **COUNTY** labor for securing services and vehicle usage required to inspect the project.

PART 3 - EXECUTION

3.1 PREPARATION

Examine substrates and conditions under which painting will be performed for compliance with requirements for application of paint. Do not begin paint application until unsatisfactory conditions have been corrected.

1. Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.

General Procedures: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items in place that are not to be painted, or provide surface applied protection prior to surface preparation and painting. Remove these items if necessary for complete painting of the items and adjacent surfaces. Following completion of painting operations in each space or area, have items reinstalled by workers skilled in the trades involved.

2. Clean surfaces before applying paint or surface treatments. Remove oil and grease prior to cleaning. Schedule cleaning and painting so that dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

Surface Preparation: Clean and prepare surfaces to be painted in accordance with the manufacturer's instructions for each particular substrate condition and as specified.

3. Provide barrier coats over incompatible primers and existing surfaces, or remove and reprime. Notify Architect in writing of problems anticipated with using the specified finish coat material with substrates primed by others.

4. Cementitious Materials: Prepare concrete, concrete masonry block, cement plaster, and mineral fiber reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of

surface preparation.

a. Use abrasive blast cleaning methods if recommended by the paint manufacturer.

b. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause blistering and burning of finish paint, correct this condition before application. Do not paint surfaces where moisture content exceeds that permitted in manufacturer's printed directions.

c. Clean concrete floors to be painted with a 5 percent solution of muriatic acid or other etching cleaner. Flush the floor with clean water to remove acid, neutralize with ammonia, and rinse; allow to dry and vacuum before painting.

5. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.

a. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer before application of primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.

b. When transparent finish is required, back prime with spar varnish.

c. Back prime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on backside.

d. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately upon delivery.

6. Ferrous Metals: Clean non-galvanized ferrous metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with recommendations of the Steel Structures Painting Council.

a. Blast steel surfaces clean as recommended by the paint system manufacturer and in accordance with requirements of SSPC specification SSPC-SP 10.

b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.

c. Touch up bare areas and shop applied prime coats that have been damaged. Wire brush, clean with solvents recommended by the paint manufacturer, and touch up with the same primer as the shop coat.

7. Galvanized Surfaces: Clean galvanized surfaces with non-petroleum based solvents so that the surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.

Materials Preparation: Carefully mix and prepare paint materials in accordance with manufacturer's directions.

8. Maintain containers used in mixing and application of paint in a clean condition, free of foreign materials and residue.

9. Stir material before application to produce a mixture of uniform density; stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.

10. Use only thinners approved by the paint manufacturer, and only within recommended limits.

Tinting: Tint each undercoat a lighter shade to facilitate identification of each coat where multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.2 INSTALLATION

Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

All installation shall be in accordance with manufacturer’s published recommendations

3.3 APPLICATION

Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.

Paint exposed surfaces whether or not colors are designated in "schedules," except where a surface or material is specifically indicated not to be painted or is to remain natural. Where an item or surface is not specifically mentioned, paint the same as similar adjacent materials or surfaces. If color or finish is not designated, the Architect will select from standard colors or finishes available.

1. Painting of mechanical, electrical, and plumbing items is limited to exposed natural gas piping, exposed fire sprinkler piping, and roof top exhaust fan hoods. Items in mechanical and electrical rooms shall not be field painted unless otherwise scheduled on Drawings.

At "unoccupied" interior areas, painting is not required on prefinished items or finished metal surfaces.

2. Do not paint over Underwriter's Laboratories, Factory Mutual or other code required labels or equipment name, identification, performance rating, or nomenclature plates.

Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.

3. Paint colors, surface treatments, and finishes are indicated in "schedules."

4. Provide finish coats that are compatible with primers used.

5. The number of coats and film thickness required is the same regardless of the application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. Sand between applications where sanding is required to produce an even smooth surface in accordance with the manufacturer's directions.

6. Apply additional coats when undercoats, stains, or other conditions show through final coat of paint until paint film is of uniform finish, color, and appearance. Give special attention to ensure that surfaces, including edges, corners, crevices, welds, and exposed fasteners, receive a dry film thickness equivalent to that of flat surfaces.

7. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convector covers, covers for finned tube radiation, grilles, and similar components are in place. Extend coatings in these areas as required to maintain the system integrity and provide desired protection.

8. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment or furniture with prime coat only before final installation of equipment.

9. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, nonspecular black paint.

10. Finish interior of wall and base cabinets and similar field- finished casework to match exterior.

11. Finish exterior doors on tops, bottoms, and side edges same as exterior faces.

12. Sand lightly between each succeeding enamel or varnish coat.

13. Omit primer on metal surfaces that have been shop primed and touch up painted.

Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

14. Allow sufficient time between successive coats to permit proper drying. Do not recoat until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure and where application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

Minimum Coating Thickness: Apply materials at not less than the manufacturer's recommended spreading rate. Provide a total dry film thickness of the entire system as recommended by the manufacturer.

Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.

15. Prime Coats: Before application of finish coats, apply a prime coat of material as recommended by the manufacturer to material that is required to be painted or finished and has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to assure a finish coat with no burn through or other defects due to insufficient sealing.

Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling such as laps, irregularity in texture, skid marks, or other surface imperfections.

Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections.

16. Provide satin finish for final coats.

Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not in compliance with specified requirements.

3.4 FIELD QUALITY CONTROL

The Owner reserves the right to invoke the following test procedure at any time and as often as the Owner deems necessary during the period when paint is being applied:

1. The Owner will engage the services of an independent testing laboratory to sample the paint material being used. Samples of material delivered to the project will be taken, identified, sealed, and certified in the presence of the Contractor.

2. The testing laboratory will perform appropriate tests for the following characteristics as required by the Owner:

    a. Quantitative materials analysis.

    b. Abrasion resistance.

    c. Apparent reflectivity.

    d. Flexibility.

    e. Wash ability.

    f. Absorption.

    g. Accelerated weathering.

    h. Dry opacity.

    i. Accelerated yellowness.

    j. Recoating.

    k. Skinning.

    l. Color retention.

    m. Alkali and mildew resistance.

3. If test results show material being used does not comply with specified requirements, the Contractor may be directed to stop painting, remove noncomplying paint, pay for testing, repaint surfaces coated with rejected paint, and remove rejected paint from previously painted surfaces if, upon repainting with specified paint, the two coatings are noncompatible.

3.5 CLEANING

At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from the site.

Upon completion of painting, clean glass and paint spattered surfaces. Remove spattered paint by washing and scraping, using care not to scratch or damage adjacent finished surfaces.

3.6 PROTECTION

Protect work of other trades, whether to be painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.

Provide "wet paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.

1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

END OF SECTION 09 91 00

SECTION 10 28 13 – TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, apply to this Section.

B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCE STANDARDS

A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.

B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.

C. All materials, installation and workmanship shall comply with all applicable requirements and standards.

1.3 QUALITY ASSURANCE

A. Inserts and Anchorages: Furnish accessory manufacturers' standard inserts and anchoring devices that must be set in concrete or built into masonry. Coordinate delivery with other Work to avoid delay.

B. Single Source Responsibility: Provide products of same manufacturer for each type of accessory unit and for units exposed to view in same areas, unless otherwise acceptable to Architect.

1.4 SUBMITTALS

A. Product Data:

1. Submit manufacturer's product data and installation/maintenance instructions for all manufactured products and materials.

B. Shop Drawings:

1. Submit a complete listing of all manufacturers, products, model numbers, locations, and designs proposed for use.

C. Record Documents:

1. Provide record approved product data and shop drawings.

1.5 PROJECT CONDITIONS

A. Coordination: Coordinate accessory locations, installation, and sequencing with other Work to avoid interference with and ensure proper installation, operation, adjustment, cleaning, and servicing of toilet accessory items.

PART 2 - PRODUCTS

2.1 GENERAL

A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

2.2 MANUFACTURERS

A. The notes and schedules on the Drawings establish manufacturer and design required for the Project. Subject to compliance with requirements, manufacturers offering toilet accessories that may be incorporated in the Work include, but are not limited to, the following:

1. A & J Washroom Accessories.

2. American Specialties, Inc.

3. Bradley Corporation.

4. Bobrick Washroom Equipment, Inc.

5. Georgia-Pacific LLC.

2.3 ACCESSORY SCHEDULE

A. As indicated on the Drawings.

2.4 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, 0.0312-inch minimum nominal thickness, unless otherwise indicated.

B. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.0359 inch minimum nominal thickness.

C. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

D. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper and theft resistant where exposed, and of galvanized steel where concealed.

E. Chrome Plating: ASTM B 456, Service Condition Number SC2 (moderate service.)

F. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear glass mirrors, nominal ¼ inch thick.

G. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

2.5 PUBLIC AND STAFF USE WASHROOM ACCESSORIES

A. Basis of Design Product: The design for accessories is based on the Bobrick products indicated. Subject to compliance requirements, provide the named product or a comparable product by one of the following:

1. Bobrick Washroom Equipment, Inc.

2. San Jamar (Basis of Design.)

B. Grab Bar

1. Basis of Design Product: Bradley #817.
2. Mounting: Flanges with exposed flanges.
3. Material: Stainless steel, 0.05 inch thick
    a. Finish: Smooth, No. 4, satin finish in ends and slip resistant texture (safety grip finish) in grip area.
4. Outside Diameter: 1-1/2 inches.
5. Configuration and Length: Straight, 36 inches long.

C. Grab bar

1. Basis of Design Product: Bradley # 817.
2. Mounting: Flanges with exposed flanges.
3. Material: Stainless steel, 0.05 inch thick.
    a. Finish: Smooth, No. 4, satin finish on ends and slip-resistant texture (safety grip finish) in grip area.
4. Outside Diameter: 1-1/2 inches.
5. Configuration and Length: Straight, 42 inches long.

D. Mirror Unit

1. Basis of Design Product: Bradley #747 or #7471.
2. Frame: Frameless
    a. Secure mounting clips (metal) mounted to wall with screws.
3. Hangers: Produce rigid tamper and theft resistant installation, using method indicated below.
4. Size: 18x30

E. Toilet Paper Dispenser

1. Basis of Design Product: Bobrick #B-2888

F. Paper Towel (Folded) Dispenser

1. Basis of Design Product: Jan Jamar #T1790 (Oceans Style.)
2. Mounting: Surface mounted
3. Minimum Capacity: 450 C-fold or 750 Multi-fold towels.
4. Material and Finish: Impact resistant plastic.
5. Lockset: Tumbler type.
6. Refill Indicators: Visibility through housing.

G. Liquid Soap Dispenser

1. Basis of Design Product: San Jamar “Oceans”.
2. Description: Designed for dispensing bulk lotion soap and gel sanitizer.
3. Mounting: Horizontally oriented, surface mounted.
4. Capacity: 800 ml bag in a box cartridge (up to 1000 ml.)
5. Materials: Impact resistant plastic.
6. Lockset: Tumbler type.
7. Refill Indicator: Visibility through housing.

H. Sanitary Napkin Disposal Unit

1. Basis of Design Product: Bradley 4722-15.
2. Mounting: Surface Mounted.
3. Door or Cover: Self-closing disposal-opening cover and hinged face panel with tumbler lockset.
4. Receptacle: Removable.
5. Material and Finish: Stainless steel, No. 4 finish (satin.)

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

B. All installation shall be in accordance with manufacturer’s published recommendations.

C. Install toilet accessory units according to manufacturers' instructions, using fasteners appropriate to substrate as recommended by unit manufacturer. Install units plumb and level, firmly anchored in locations and at heights indicated.

D. Secure mirrors to walls in concealed, tamperproof manner with special hangers, toggle bolts, or screws. Set units plumb, level, and square at locations indicated, according to manufacturer's instructions for type of substrate involved.

E. Install grab bars to withstand a downward load of at least 400 lbf, complying with ASTM F 446 test methods.

3.2 ADJUSTING AND CLEANING

A. Adjust toilet accessories for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.

B. Clean and polish all exposed surfaces strictly according to manufacturer's recommendations after removing temporary labels and protective coatings.

C. All paper products are to be stocked at turnover, with attic stock provided per **COUNTY** Quantities.

END OF SECTION 10 28 13

SECTION 14 21 00 – ELECTRIC TRACTION ELEVATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions.

B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.

1.2 SUMMARY

A. This Section includes electric traction passenger and service elevators.

1.3 REFERENCE STANDARDS

A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.

B. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references:

1. ASME A17.1 Safety Code for Elevators and Escalators, latest edition or as required by the local building code.

2. NFPA 70 National Electrical Code.

3. NFPA 80 Fire Doors and Windows.

4. Americans with Disabilities Act – Accessibility Guidelines (ADAAG).

5. ASME A17.1, Buildings and Facilities, Providing Accessibility and Usability for Physically Handicapped People.

6. ASME UL 10B and ASTM E152, Fire tests of door assemblies.

7. The Texas Department of Licensing and Regulation, Texas Accessibility Standards of the Architectural Barriers Act, Article 9102, Texas Civil Statutes (TAS).

8. Model building codes.

9. All other local applicable codes.

1.4 DEFINITIONS

A. Definitions in ASME A17.1 apply to work of this Section.

B. Defective Elevator Work: Operation or control system failure, including excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.

C. Service Elevator: A passenger elevator that is also used to carry freight.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain all elevators specified in Division 14 Section through one source from a single manufacturer.

1. Provide major elevator components, including driving machines, controllers, signal fixtures, door operators, car frames, cabs, and entrances, manufactured by a single manufacturer.

B. Regulatory Requirements: In addition to local governing regulations, comply with applicable provisions in ASME A17.1, “Safety Code for Elevators and Escalators.”

C. Accessibility Requirements: Comply with Section 4.10 in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)”; and the Texas Department of Licensing and Regulation, Texas Accessibility Standards of the Architectural Barriers Act, Article 9102, Texas Civil Statutes (TAS).

D. Installer Qualifications: Elevator Contractor must be able to demonstrate that Elevator Contractor has installed and maintained similar elevators to those specified and which have given satisfactory service; has been in successful operation for at least ten (10) years; maintains locally, an adequate stock of new parts for replacement or emergency purposes; has available qualified persons to do the work.

E. Contractor guarantees they will sell parts and printed circuit boards to the Owner or the Owner’s Agent. The same shall not be dependent on an exchange component. Contractor agrees replacement parts will be available for a minimum of ten (10) years.

1.6 EXTRA MATERIALS

A. Refer to Section 01 78 46 for Maintenance Material Requirements.

1.7 SUBMITTALS

A. Product Data: Submit manufacturer’s product data for each system proposed for use. Include the following:

1. Signal and operating fixtures, operating panels and indicators.

2. Cab design, dimensions and layout.

3. Hoistway door and frame details.

4. Electrical characteristics and connection requirements.

5. Expected heat dissipation of elevator equipment in machine rooms.

6. Comp chain detail specification.

7. Door hanger detail specification.

8. Roller guide detail specification.

B. Record Documents:

1. Manufacturer's warranty form in which manufacturer agrees to repair or replace components that fail in materials or workmanship within specified warranty period.

C. Shop Drawings: Submit approval layout drawings. Include the following:

1. Provide floor plan and elevation drawings drawn to scale showing hoistway, elevator cab(s), lifting apparatus and their associated components, machine room with equipment and elevator pit. Elevator submittal is subject to rejection without these drawings.

2. Driving machine, controller, governor and other machine room component locations.

3. Car, counterweight, sheaves, guide rails, buffers, ropes, and other components in hoistway.

4. Rail bracket spacing; maximum loads imposed on guide rails requiring load transfer to building structural framing.

5. Load reactions at all points of support.

6. Location of hoisting beams for machine room equipment.

7. Clearances and over travel of car and counterweight.

8. Locations in hoistway and machine room of traveling cables and connections for car light and intercom system.

9. Location and sizes of access doors and frames.

10. Hoistway door and frame details.

D. Samples: All exposed materials with finish and all custom fixture fabrications.

1. Omit all logos from exposed finishes or components.

2. All cab finishes.

E. Manufacturer Certificates: Signed by elevator manufacturer certifying that hoistway, pit, and machine room layout and dimensions, as shown on Drawings, and electrical service, as shown and specified, are adequate for elevator system being provided.

F. Qualification Data: For Elevator Contractor (Installer).

G. Operation and Maintenance Data: Provide written information necessary for proper maintenance and adjustment of the equipment prior to final acceptance as follows:

1. Straight line wiring diagrams of as-installed elevator circuits with index of location and function of all components. Leave one set in machine rooms. Provide two (2) corrected sets for Owner's file 90 days after acceptance.

2. Lubricating instructions and recommended lubricant grade.

3. Parts catalogs and maintenance manuals.

4. Include any special tools, pass words and manuals that are required for maintenance, trouble shooting, adjustments or performance of safety tests for the Owner's use.

5. If the Contractor requires the Owner to sign a lease for a special trouble-shooting tool, a copy of the agreement, with all costs associated with its use, shall be submitted with the bid.

H. Continuing Maintenance Proposal: Service agreement specified in this Section.

1.8 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, and handle materials, components, and equipment in manufacturer's protective packaging.

B. Store materials, components, and equipment off of ground, under cover, and in a dry location. Handle according to manufacturer's written recommendations to prevent damage, deterioration, or soiling.

1.9 COORDINATION

A. Coordinate installation of sleeves, block outs, elevator equipment with integral anchors, and other items that are embedded in concrete or masonry for elevator equipment. Furnish templates, sleeves, elevator equipment with integral anchors, and installation instructions and deliver to Project Site in time for installation.

B. Coordinate sequence of elevator installation with other work to avoid delaying the Work.

C. Coordinate locations and dimensions of other work relating to electric traction elevators including pit ladders, sumps, and floor drains in pits; entrance subsills; machine beams; and electrical service, electrical outlets, lights, and switches in pits, machine rooms, and hoistways.

D. The electrical and mechanical design is based on the following power characteristics and heat releases. The Contractor shall submit with bid, any power characteristics or heat releases of their equipment that exceeds these listed below. Any additions or modifications requested at a later date will be at the expense of the Contractor.

Elevator #	Capacity	Speed	H.P.	Accelerating Amps	Running Amps	Heat Release *
Low Rise						
High Rise						
Service						

1. * BTU per Elevator per Hour.

2. All amperages based on 480 volt, 3 phase, 60-hertz system.

3. Maintain 50 to 90 degrees F temperature with 90 percent non-condensing humidity.

1.10 WARRANTY

A. Provide written warranty to replace, repair, or restore parts or components that fail or do not operate properly due to poor field or factory workmanship, engineering or design for a period of twelve (12) months from the date of Substantial Completion.

1.11 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, provide three (3) months full maintenance service by skilled employees of Elevator Contractor. The maintenance service shall comprise regular examinations of the installation by competent and trained mechanics on a weekly basis, and shall include all necessary adjustments, greasing, oiling, cleaning, and supply of parts and accessories necessary to keep the equipment in good operating condition, except such replacement of parts made necessary by misuse, accidents not attributable to failure of equipment or workmanship, and negligence of the Owner. For the aforementioned period, spare parts shall be available within 24 hours. Maintenance documentation shall be submitted to Owner within one week of completion of prescribed tasks. Emergency Service response time shall be one hour or less, 24 hours a day.

B. Repair work shall be carried out only by the Elevator Contractor's personnel using only standard new parts furnished by the Elevator Contractor and shall not be assigned or transferred to any agent.

C. Continuing Maintenance Proposal: Provide a separate continuing maintenance proposal from Elevator Contractor to Owner, in the form of a five-year maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options. Proposal shall include 24-hour emergency callback service. Submit this proposal with the equipment bid for **COUNTY'S** review.

PART 2 - PRODUCTS

2.1 GENERAL

A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

B. Inspection: The Texas Department of Licensing and Regulation (TDLR) inspector must be approved by the Owner's Facilities Management/Campus Operation's Representative.

C. Logic Control Equipment: Provide a non-proprietary microprocessor controller for each individual elevator and group controller. Store all programming in non-volatile memory. Provide a microprocessor control system that includes all hardware and software required to service and maintain the elevator and a technical support service that is routinely provided to any elevator service provider.

D. On Board Diagnostic Panel

1. Provide for each individual elevator microprocessor controller, an on-board diagnostic control and LCD display panel that allows unrestricted access to the comprehensive range of adjustable parameters necessary to perform installation, adjusting, service, maintenance and testing for the elevator.

2. For each elevator group control, provide a separate on-board diagnostic control and LCD display penal that allows unrestricted access to the comprehensive range of options and adjustments necessary to perform installation, adjusting, service, maintenance, and testing of the elevator group.

3. For both individual and group controllers, provide fault log capability to store all fault logs for up to one (1) year of elevator history. The on-board display shall provide the capability to display and monitor any and all fault logs, trouble calls and fault history for up to one (1) year of elevator service history. The on-board LCD display shall also provide the capability to display and diagnose trouble calls, faults, and shut downs.

E. Maintenance and Diagnostic Software: Provide three (3) copies of the manufacturer's maintenance and service diagnostic software, with complete software documentation, that shall enable the same level of unrestricted access to all controllers of the same make and model, regardless of the installation date of location. Provide signed certification, from the manufacturer's corporate headquarters, that guarantees the microprocessor software and access system will not terminate the unlimited and unrestricted access at any future date.

F. Acceptable Controller Suppliers

1. Elevator Controls Corporation
   3525 La Grande Boulevard
   Sacramento, CA 95823

2. G.A.L. Manufacturing Corporation
   50 East 153rd St.
   Bronx, New York 10451

3. Motion Control Engineering, Inc.
   11354 Whiterock Rd
   Rancho Cordova, CA 95742-6522

4. Virginia Controls, Inc.
   2513 Mechanicsville Turnpike
   Richmond, VA 23223

2.2 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following manufacturers.

1. Fujitec America, Inc.

2. KONE Inc.

3. Otis Elevator Company

4. Schindler Elevator Corporation

2.3 SYSTEMS AND COMPONENTS

A. General Performance:

1. Speed: +/- 3 percent under any loading condition.

2. Capacity: Safely lower, stop and hold up to 125 percent rated load.

3. Leveling: +/- 1/8 inches under any loading condition.

4. Door Closing time, Thrust and Kinetic Energy shall comply with ASME Code and ADA.

B. Machine Room Equipment:

1. Identification: Provide identifying numbers on drive, machine, governor, controller, disconnect switch and 120 volt light switch.

2. Geared Machine: The machines shall be of the geared single wrap traction type with the motor, brake, and traction sheave mounted on a continuous bedplate. Sound isolation pads shall be installed beneath the machine bedplate to reduce vibration and noise transmission to the building structure.

3. Gearless Machine: The machine shall be of the gearless traction type with the traction sheave and brake drum mounted directly on the motor shaft. The machine shall be provided with a steel bedplate. Sound isolation pads shall be installed beneath the machine bedplate to reduce vibration and noise transmission to the building structure.

4. Motors: The motor shall be designed for elevator service with high starting torque and low starting current and be provided with devices to protect against overloading. The motor shall be of alternating current type. Motor armature shall be dynamically balanced and supported by appropriate ball or roller bearings.

5. Brake: The brake shall be spring applied and electrically released and designed to hold the car at the floor after it has come to rest and provide smooth stops under variable loads.

6. Governor: The car safety shall be operated by a centrifugal speed governor located at the top of the hoistway in the machine room. The governor shall actuate a switch when excessive speed occurs, disconnecting power to the motor and applying the brake application of the safety.

7. Drive System:

    a. A variable voltage variable frequency AC regenerative drive system shall be provided. Power for the system will be taken from the building 3 phase power supply. Provide means for absorbing regenerated power when elevator system is operating on standby power. Provide line filters or chokes to prevent electrical peaks or spikes from feeding back into building power system. The AC voltage will be changed to DC, and a power transistor inverter circuit will change the DC voltage to AC to power the elevator motor. Motor speed and torque will be controlled by varying the frequency and amplitude of the AC. A digital velocity encoder shall be provided on the motor giving feedback to the controller on motor speed and position. Provide line filters, noise spike or notching suppressors to insure other computer-operated equipment in the building will not be affected.

    b. The drive system shall be designed to suppress noise and prevent transient voltage feedback into the building power supply. Isolation transformers and filter networks shall be utilized to ensure that waveform distortion and harmonic content will not adversely affect the operation of standby generator and other equipment.

    c. The power for the system is to be protected for phase loss and phase unbalance protection.

    d. The drive system shall meet or exceed all requirements of IEEE 519 1981 standard for general systems. The position selector shall be part of the microprocessor system. The car position in the hoistway shall be digitized through a primary position encoder. The microprocessor control system shall store the floor position and slowdown points in memory.

e. The drive control system shall be a dual-loop feedback system based primarily on car position. The velocity profile shall be calculated by the microprocessor control system producing extremely smooth and accurate stops. The velocity encoder shall permit accurate position/velocity feedback and shall permit a fast and accurate control of acceleration and deceleration. The vertical acceleration rate shall be not less than 3.3 ft./sec.^{2} for speeds through 700 fpm, and 4 ft./sec.^{2} for speeds over 700 fpm.

f. Provide isolation transformers to compensate for building voltage fluctuations.

C. Automatic Two-Way Leveling:

1. Each elevator shall have two-way leveling to automatically bring the car to a stop approximately 1/8 inch level with any floor for which a stop has been initiated, regardless of load, rope stretch of direction of travel.

2. Automatic leveling control shall permit the synchronization of door opening with the stopping of the car at a floor.

D. Elevator Successive Starting: After all variable frequency drives in a group have been shut down due to lack of normal power, only a single drive shall be allowed to start up at one time.

E. Normal Stopping Devices: Provide slow-down and normal stopping devices on top of each car.

F. Guards: In addition to guards for sheaves and other similar items hereinafter specified, attention is directed to the requirements relative to guarding of exposed gears, sprockets, tape or rope sheaves, or devices of selectors, floor controllers, or signal machines, and the ropes, chains, or tapes for driving same in machine rooms and secondary spaces. Kick angles shall be included around all unprotected openings in the machine room floor.

G. Motion Control:

1. Furnish and install microprocessor based motion controller for each elevator.

2. The motion control system shall perform all of the functions of safe elevator motion and elevator door control. This shall include all the hardware and software required to connect, transfer and interrupt power, and protect the equipment against overloads. The motion controller shall interface with the microprocessor control system.

H. Guide Rails: Car and counterweight guide rails shall be machined. Rails, brackets, and bracket spacing shall conform to ASME A17.1 Code requirements. Guide rails shall be pinned or welded after alignment. Locate brackets at maximum intervals allowed by Code where such spacing can eliminate the need for intermediate support structure, and does not impact the quality of car operation. Bracket design shall accommodate offsets or variations in hoistway walls. Include ladder brackets where necessary.

I. Pit Switch: Provide an additional pit switch where pit depth exceeds 66 inches per code requirement.

J. Ropes: Steel suspension ropes and their connections shall conform to ASME A17.1, Section 2.12.

K. Elevator Counterweights: A counterweight shall be provided for each elevator equal in weight to approximately the weight of the car plus a minimum of 40 to 45 percent of the rated load. Counterweight fillers shall be fabricated of precision flame cut steel plates. They shall lay flat in the weight frame and not rattle when the car is in motion. They shall be sized in a way to facilitate accurate balance of the elevator car.

L. Car and Counterweight Buffers: Suitable oil buffers with necessary blocking and extensions shall be provided under the elevator car and counterweight. Buffers shall be provided with a switch that prevents the car from moving if the plunger is not in its fully extended position. Only synthetic based fluids permitted and shall be fire-resistant containing antioxidant, anticorrosive, antifoaming and metal-passivating additives.

M. Overhead Switches: One emergency stop switch shall be located beside top access door of elevators without overhead machine location.

N. Hoistway Door Interlock: Each elevator hoistway door shall be equipped with a hoistway unit system hoistway door interlock. The interlock shall prevent the operation of the elevator driving machine by the normal operating device unless the hoistway is locked in the closed position. The interlock shall also prevent the opening of the hoistway door from the landing side unless the car is either stopped or being stopped. Provide door restrictors.

O. Hoistway Door Unlocking Devices: Unlocking devices shall be provided at all floors. Escutcheons shall be provided in all openings; finish of escutcheons shall be metal and match door finish.

P. Hoistway: Coordinate to provide enclosure of adequate size to accommodate any required guide rail/bracket support structure within the hoistway, without interruption of surrounding shaft wall by support structure.

Q. Elevator Compensation: Compensation, when required, shall be provided for the weight of hoisting ropes and unbalanced portion of traveling cables. Such compensation shall consist of iron or steel wire ropes attached to the underside of the car and counterweight. Where ropes are provided, pit sheaves shall be included. Provide alternate quotation for whisper flex systems with sway-less dampening devices where applicable.

R. Electrical Wiring:

1. Electrical wiring shall comply with the ASME A17.1 and NFPA 70, National Electrical Codes and all applicable local codes. Wiring shall be included for all devices installed.

    a. Furnish and install complete insulated wiring and conduit to connect all parts of the equipment. Properly ground all components as required by NFPA 70, National Electric Code.

    b. Insulated wiring shall have a flame retarding and moisture resisting outer cover and shall be run in a metal conduit, metallic tubing, or wire ducts.

    c. Provide 6 percent spare wires between each controller, leveling device, hoistway junction box, and control panel, also, provide 6 percent spare conductors in each trail cable; all spares shall be properly tagged or otherwise identified with clear and indelible markings.

    d. Tag code all field wiring at junction points; control wiring in traveling cables at their terminals in the machine room: elevator car junction box and connections within the car. Test entire wiring system for insulation to ground.

e. Provide four – two pair (eight total conductors) 18 AWG stranded copper cable with overall shield dedicated for cardreader use in each elevator cab. These pairs shall be located in a cable that is not used to carry alternating current circuits. The cabling shall have two feet of available length at the cardreader installation location within the elevator cab. The cabling shall route into the elevator machine room then into the cardreader interface panel in the elevator machine room. The cabling shall have three feet of available length in the cardreader interface panel. The card reader interface panel and all terminations shall be provided by the security subcontractor.

f. Provide four – two pair (eight total conductors) 18 AWG stranded copper cable with overall shield dedicated for security intercom system (SIS) remote use in each elevator cab. These pairs shall be located in a cable that is not used to carry alternating current circuits. The cabling shall have two feet of available length at the intercom installation location within the elevator cab. The cabling shall route into the elevator machine room then into the SIS interface panel in the elevator machine room. The cabling shall have three feet of available length in the SIS interface panel. The SIS interface panel and all terminations shall be provided by the security subcontractor.

g. Provide two (2) stranded core RG6U coax cable to each elevator cab for closed circuit television (CCTV) security surveillance camera use. The cable shall have two feet of available length at the CCTV camera installation location within the elevator cab for each cab required to have a CCTV camera as shown on the security drawings. The cable shall have fifteen feet of available length at the top of the cab for cabs not required to have a CCTV camera as shown on the security drawings. The cabling shall route into the elevator machine room and then into the CCTV interface panel in the elevator machine room. The CCTV interface panel and all terminations shall be provided by the security subcontractor.

h. Provide a dedicated GFI outlet on top of the cab for a camera.

S. Top of Car Operating Device: Each elevator shall be provided with an operation device mounted from or on the car cross-head which will permit slow speed (150 fpm or less) operation for purposes of adjustment, inspection, maintenance, and repair. A transfer switch shall be provided in the top of the car operating device fixture, which will permit the disconnection of hoistway switch or switches and render the top of car operating device operative. The operating device shall be mounted in a metal box and shall be rigidly secured in a position conveniently accessible to workmen on top of the car and accessible from the landing side without getting on the car top.

T. Lubrication: Suitable means shall be provided for lubrication, with oil or grease, for all bearing surfaces in connection with the elevator installation. Grease gun fittings, if used, shall be suitable for high-pressure guns. Grease cups, if used, shall be automatic compression type.

U. Car Top Lights: Electric light with wire guard and GFCI convenience outlet fixture on car top, which shall meet the requirements of ASME A17.1, Rule 204.7a (4).

V. Door Operator:

1. A heavy duty, DC master door operator capable of opening door at not less than 1½ inch fps and accomplishing reversal in 2½ inch maximum door movement. Doors shall open automatically when car arrives at floor to permit transfer of passengers; after timed interval, door shall automatically close. Arrange operator so doors can be opened by hand from inside car in case of power failure, if car is within leveling zone.

2. Door operation shall be “closed loop” system which gives constant feedback of the position and velocity of the elevator doors. System shall automatically overcome door resistance by increasing the power supply to the motor and increasing the torque required to maintain velocity. If a service tool is needed to make digital adjustments, provide the Owner with the service tool and all required manuals.

W. Final Limit Switches:

1. In addition to the normal limit switches, a hoistway final limit switch shall be installed at the top and at the bottom of each hoistway.

2. Final limit switches shall be so located that they open at or about the time the buffer is engaged by the time the buffer is engaged by the car or counterweight.

X. Car Frame and Safety: Car frame shall be fabricated from formed or structural steel members and shall have adequate bracing to support the platform and car enclosure. The car safety shall be an integral part of the car frame with safety blocks located in the bottom members of the car frame. The safety shall be flexible guide clamp type.

Y. Platform:

1. The car platform shall be constructed of steel with ¾ inch Marine grade plywood sub-floor and fire proofing on the underside. The platform shall rest on rubber pads designed to form an isolating cushion between the car and car frame.

2. The finish flooring for the elevators shall be furnished and installed by others; refer to Owner’s Interior Standards.

Z. Roller Guides: Rubber tired spring dampening roller guides, set in adjustable castings, shall be mounted on the top and bottom of the car and counterweight to engage the guide rails.

AA. Car Door Hangers and Tracks: Hang doors on sheave type hangers with polyurethane that roll on a polished steel track and are guided at the bottom by non-metallic shoes sliding in a smooth threshold groove.

BB. Car Door Electrical Contact: Shall operate in conjunction with car door so elevator cannot operate unless doors are closed or within the tolerance allowed by Code.

2.4 OPERATION SYSTEMS

A. Service: Provide “Simplex Collective” operation using a microprocessor-based controller. Operation shall be automatic by means of the car and hall buttons. If all calls in the system have been answered, the car shall park at the last landing served.

B. Provide “Group Automatic” operation and control systems for all passenger groups.

C. General Operation and Control: A microprocessor based control system shall be provided to perform all of the functions of safe elevator motion and elevator door control. This shall include all of the hardware required to connect, transfer and interrupt power, and protect the motor against overloading. The system shall also perform car operational and group supervisory control. Each controller cabinet containing memory equipment shall be properly shielded from line pollution. Micro-computer system shall be designed to accept reprogramming with minimum system down time.

D. Anticipated in Rush Device: To maintain sufficient lobby elevator capacity to handle anticipated heavy in rush traffic the system shall include a device to call all of the cars in the group to the lobby without waiting for a lobby call. The device shall only operate predetermined heavy rush periods. During these periods, cars shall be automatically dispatched from the lobby when they become loaded nearly to capacity or, if not loaded to capacity, on a variable time interval calculated on the basis of the number of cars at the lobby and other data representative of traffic in the system. The cars shall continue to operate in this manner until the end of the pre-determined period.

E. Off Peak Geographical Spacing: When the cars are at rest, they shall be assigned throughout the building to pre-determined zones. The first car entering a zone shall become assigned to that zone. A car may run through an occupied, assigned zone in search of an occupied zone in which to park. While there are no calls registered the cars shall remain in a zone parked with door closed. The lowest zone shall consist of the main floor and adjacent floor, above or below, as required to suit design requirements. The remaining floors shall be divided into equal zones with one car randomly assigned to each zone. Optimized response to hall calls shall be below, as required to suit design requirements. The remaining floors shall be divided into equal zones with one car randomly assigned to each zone. Optimized response to hall calls shall be achieved by computing a relative system response (RSR) time for each registered hall call. The computation of each car's (RSR) time to a hall call shall be based on, but not limited to, such relevant factors as distance, service to previously assigned car, and hall calls, car load, direction, door and car motion status, and coincidence of car and hall calls. The call with the least RSR shall have this car assigned to it. RSR computation for each hall call is repeated several times a second and the hall call assignment might be changed if a more suitable car is found.

F. Moderate Up and Moderate Down Traffic Programs: When incoming traffic at the lobby floor increases as indicated by two cars leaving the lobby in the up direction, filled to capacity with a re-determined adjustable time period, cars assigned to upper zones shall be called to the lobby without waiting for a lobby call. Calls shall be automatically dispatched from the lobby when they become loaded nearly to capacity or, if not loaded to capacity, on a variable time interval calculated on the basis of the number of cars at the lobby and other data representative of traffic in the system. The cars shall continue to operate in this manner until the lobby traffic has been reduced to a predetermined level. When down calls above the lobby increases to a predetermined level, assignment of a car to the lobby ceases and the lobby car shall travel up to assist the other cars. Cars arriving at the lobby, after discharging passengers shall be dispatched upward. The cars shall continue to operate in this manner until the down traffic has been reduced to a pre-determined level.

G. Anticipated Exit Device: To prepare the system for heavy outgoing traffic, operation shall be such that upon arrival at the lobby of any car, loaded more than a pre-determined capacity during a regularly anticipated exit period, assignment of a car to the lobby ceases and the lobby car shall travel up to assist the other cars. Cars arriving at the lobby, after discharging passengers, shall be dispatched upward. The cars shall continue to operate in this manner until the end of the regularly anticipated exit period.

H. Car to Lobby Operation: Provide a key operated switch for each elevator in the Life Safety Panel which, when actuated, shall cause the corresponding elevator to make a trip to the lobby as soon as the car is available for response to the special call. Switch shall be keyed to a 2395.

I. Load Weighing Dispatching: A load weighing device shall be provided which shall dispatch the cars away from the main lobby floor when the load in the car reaches a pre-determined capacity. The load dispatch weight shall be adjustable.

J. Load Weighing Bypass: A load weighing device shall be provided which shall be set to operate at a pre-determined percentage of the load in the car. The car shall bypass hall calls when this device is actuated. The bypass load weight shall be adjustable and separate from the load weighing dispatch weight.

K. Anti-nuisance: A system shall be provided so that when the number of car calls is greatly disproportionate with the weight of the car all car calls shall be canceled without making any stops. The ratio of calls to weight shall be adjustable.

L. Car Button Independent Service all Elevators: A Switch shall be provided in the car operating station which, when actuated, shall disconnect the elevator from the hall buttons, and permit operation from the car buttons only. The switch shall be an EPCO1 type. If Independent Service key switch is situated behind a lockable compartment, the compartment shall be keyed to an EPCO2 with a flush mounted and/or vandal resistant locking device.

M. Car Reversal Operation: A car without registered car call arriving at a floor where both up and down hall calls are registered shall initially respond to the hall call in the direction that the car was traveling. If no car call or hall call is registered for further travel in that direction, the car shall close its doors and immediately reopen them in response to the hall call in the opposite direction.

N. Car Delay Operation: If, for any reason, the doors are prevented from closing and the car is unable to respond to a call, the calls shall be transferred to another car.

O. Transfer Floor Operation: The car button of the transfer floor for the high rise elevators shall only operate in the down direction. There shall only be up directions hall buttons at the transfer floor lobby of the high rise elevators. Up hall lanterns only shall be provided for the high rise elevators at the transfer lobby. This limited operation forces the tenants on the transfer floor to ride the low rise elevators to and from the first floor lobby.

P. General Operations and Control:

1. Control of the elevator shall be automatic in operation by means of pushbuttons in the car numbered to correspond to floors served, for registering car stops and by up/down push buttons at each intermediate landing and call pushbuttons at terminal landings.

2. The momentary pressing of one or more buttons shall dispatch the car to designated landings in the order in which the landings are reached by the car, irrespective of the sequence in which buttons are pressed.

3. Each landing call shall be canceled when answered.

4. When the car is traveling in the up direction, it shall stop at all floors for which car buttons or up hall buttons have been pressed. It shall not stop at floors where down buttons only have been pressed unless the stop for the floor has been registered by a car button, or unless the down call is at the highest floor for which any buttons have been pressed.

5. The pressing of an up button when the car is traveling in the down direction shall not interrupt the travel unless the stop for that floor has been registered by a car button, or unless the up call is the lowest for which any button has been pressed.

6. When the car has responded to high or lowest stop, and stops are registered for the opposite direction, its travel shall reverse automatically and it shall then clear the calls registered for that direction.

7. Should both up and down call be registered at an intermediate floor, only the call corresponding to the direction in which the car is traveling shall be canceled upon the stopping of the car at the landing.

8. An adjustable time delay shall be provided so that after the car has stopped in response to a hall button, the entering passenger may register his car button before the car will reverse to answer calls in opposite direction.

9. Car station shall contain a key operated toggle switch for the car light, a fan switch and a door open button for stopping the closing motion of the doors and causing them to return automatically to their position.

10. The buttons in the car and hall stations shall be of the LED light-up type and shall indicate that a call has been registered for that landing.

11. Elevators shall have car button independent service keyed to EPCO 1. When a key operated switch in the car panel is activated, the car shall be disconnected from the hall buttons and shall only respond to car buttons. Car doors shall be closed by pressing the door close button.

Q. Auxiliary Operation and Controls:

1. General: In addition to primary control system features, provide the following controls or operational features for the passenger and service elevators, except where otherwise indicated.

   a. Special Emergency Service – Phase I: The activation of a MFD1 key switch in a lobby level hall station shall return all cars in the group express to the designated floor and by-pass all car and hall calls. The cars shall park at the designated floor with the doors open and will not respond to car or hall calls unless the SES-II switch in the car is activated. This system shall be in conformance with the current ASME code, Section 211.3.

   b. Special Emergency Service – Phase II: In-car control of each elevator during the emergency operation, by means of a MFD1 key switch in each car shall be provided. Operation shall be per ASME A17.1, Rule 211.3.

   c. Emergency Lighting and Alarm Bell (Power to Car): Remote emergency alarm bell, located where directed, so it can be heard outside the hoistway, to be arranged to sound automatically in response to activation of alarm button.

   d. Emergency Lighting and Alarm Bell (No Electrical Power to Car): Car mounted 12 volt battery unit including solid state charger and testing means enclosed in common metal container rechargeable lead acid or nickel cadmium battery with 10 year minimum life expectancy. When normal power to the car fails the system shall automatically provide power to the car emergency light and to the alarm bell circuit. Operation shall be in accordance with ASME A17.1, Rule 204.7.

   e. Emergency Fan: Any glass elevators located where direct sunlight can reach the cab and parking garage elevators shall be equipped with an emergency battery back-up exhaust fan. Car fans shall be keyed to an EPCO1.

   f. For cars equipped with individual air-conditioning units, the air-conditioning units shall be on emergency power.

g. Elevators shall be equipped with pit flood switches so that when switches are activated when water is present, the elevators will park on the second floor with the doors open.

h. Software provision to allow for any number of cars in given bank to run on emergency power as determined by Owner.

i. Elevators shall have the capability to receive pre-signal from Automatic Transfer Switch for generator testing.

2.5 DOOR OPENING AND DOOR CONTROL DEVICES

A. Provide Janus 40+ door reopening devices with uniform array of 36 or more microprocessor-controlled, infrared light beams projecting across car entrance.

B. Door open timing features:

1. Operate in conjunction with proximity devices to provide adjustable, reduced, hold open time once beams are broken and re-established.

2. When doors are held open beyond an adjustable time, buzzer sounds and doors shall close at reduced speed and force per ADA and TAS requirements.

3. There shall be a difference in door hold open times between car and hall calls. Door speed, thrust and kinetic energy shall comply with the ASME A17.1 Code. Door hold open times shall comply with “Handicapped Requirements”.

2.6 FINISH MATERIALS

A. The passenger cabs shall be in accordance with the Architectural Drawings. The interior panels shall be in accordance with Owner’s Elevator Finish standards. The sub floors shall be marine grade plywood.

2.7 CAR ENCLOSURES

A. Provide a steel shell for the service elevator with lights mounted flush with the canopy; refer to Owner’s Interior Standards for service cars. No. 4 stainless steel car door, front return panels and car operating panel finish. Provide a two speed fan and manufacturer’s standard No. 4 stainless steel hand rail 1-¼ inches on each side wall. Provide ¼ inch checkered aluminum plate for the floor.

B. Lighting plan shall be submitted to Owner for approval prior to final design.

C. Car Doors:

1. Car doors shall be 1 inch thick, of flush design metal construction, with interior reinforcing and sound deadening insulation. They shall be adequately reinforced to withstand operational stresses and as required to accept hangers, interlocks and other accessories. The finish of the car doors shall be No. 4 stainless steel for the service elevator. Provide Warnock-Hersey Label.

2. The car return panels and car operating panels shall be No. 4. Stainless steel finish for the service elevator.

3. The car door system shall be designed so that the car doors may not be opened more than 4 inches from the inside of the car if the car is outside the unlocking zone of a landing.

D. Emergency Exits: All cars shall have ceiling emergency exits.

2.8 HOISTWAY ENTRANCES

A. Entrances shall be complete with frames, doors, sight guards, sills, fascia plates, toe guards, headers, struts, hanger covers, tracks, hangers, dust covers, miscellaneous hardware and related parts. Entrances shall carry UL label for Class "B" 1 ½ hour fire rating. Sill support angles shall be included. Entrance profiles and details as shown on the Drawings.

B. Frames: Frame finish shall be No. 4 stainless steel at entrances at all floors for the passenger and service elevators. Floor designations/ braille plates on hoistway door frames shall be permanently attached to frames. Adhesive application is not acceptable.

C. Doors and Sight Guards: Provide sound deadened, horizontal sliding doors of flush construction. [The following sizes are typically used. Confirm with Owner if different size is required; edit to suit project requirements.] Passenger elevator doors shall be 8'-0" high and service elevator doors shall be 9'-0" high. Doors shall be No. 4 stainless steel at all floors for the passenger and service elevator entrances.

D. Sills: Provide extruded aluminum sills at all floors. Sills shall be level with finished floor. Space between the sill and sill support shall be grouted.

E. Sill Support Angles: Any support angles required shall be furnished and installed by the Elevator Contractor.

F. Hanger Supports: Hanger supports or headers shall be formed sections securely bolted to the strut angles.

G. Fascia Plates: Concealed fascia plates shall be No. 14 gauge steel, reinforced to insure a flat even surface throughout, and shall be securely fastened to hanger housings and sill above. Fascia plates shall be finish painted with one coat of rust inhibitive prime paint.

H. Struts and Closers: Structural steel angles and other similar methods shall be furnished of sufficient size to accommodate the door closers. Angles shall be continuous and be securely bolted to the sills and building beams above.

I. Header: 3/16 inch thick steel formed to provide stiffening flanges.

J. Door Hangers and Tracks: Hangers for each hoistway entrance shall be of the sheave type arranged for two point suspension of the doors, and shall have brackets integral with door, or applied. Sheave and rollers shall be of steel with sealed ball bearings and there shall be adjustable ball bearings rollers to take up thrust of doors. Tracks shall be cold drawn or cold rolled steel of smooth surface and working section and shall be oiled with wick type lubrication.

K. Hanger Cover Plates: Shall be made of No. 14 gauge steel and shall be removable type. Cover plates shall be arranged to assure hanger accessibility from within the car. Cover plates shall be finish painted with one coat of rust-inhibitive prime paint.

L. Floor Numbers: Provide floor numbers within the hoistway in compliance with ASME A17.1 Code. Provide cast plates on each elevator entrance jamb in compliance with requirements of ADA and TAS. Stick-on plates are not acceptable. Submit sample for Owner's approval.

2.9 SIGNAL EQUIPMENT

A. Hall Button Fixtures:

1. Low and high-rise passenger elevators shall have two risers of hall buttons. The service elevators shall have one riser of hall buttons for each bank. The buttons for the passenger elevators shall be LED light-up type. Provide manufacturer's standard fixtures for the service elevator. Face-plates for all elevators shall have a No. 4 stainless steel finish.

2. Include rated boxes and wiring as required. Membrane penetration of minimum 1-hour, up to maximum 2-hour fire rating walls and partitions by recessed steel electrical boxes that do not exceed 16 square inches in area are permitted, provided the aggregate area of the openings does not exceed 100 square inches in any 100 square feet of wall area. The annular space between the wall membrane and the box shall not exceed 1/8 inch. Such boxes on opposite sides of the wall or partition shall be either separated by a horizontal distance of not less than 24 inches or separated by protecting both boxes by listed putty pads or other listed materials and methods. If electrical box exceeds 16 square inches, listed putty pads or other listed materials and methods are also required.

3. Include integral fireman's stereo-type phone jacks at each lobby. Include all wiring and conduit to Life Safety Panel. Fire phone jacks provided by the elevator vendor shall be compatible with fire phones supplied by fire detection vendor.

4. Hall button fixtures in spaces that are not air-conditioned (such as in parking garage elevator lobbies) shall be watertight.

B. Hall Lantern Fixtures:

1. Provide LED hall lanterns with a chime at each landing entrance for each elevator. The lanterns, when illuminated with red for down and green for up, shall indicate which elevator car will stop at the landing and in which direction the car is set to travel.

2. When the car reaches a pre-determined distance from the floor where it is going to stop, the corresponding hall lantern shall illuminate and the chimes sound once for up and twice for down. The hall lantern shall remain illuminated until the car doors close in preparation for leaving the floor.

   a. Passenger elevators shall not have face plates. Provide LED hall lanterns for the service elevator with No. 4 stainless steel face plates.

   b. Hall lanterns for the passenger elevators shall have triangular milk white lenses and project out 5/8 inches from the finished wall surface.

   c. Visual elements shall be at least 2-1/2" in the smallest dimension.

3. Hall lantern fixtures in spaces that are not air-conditioned (such as in parking garage elevator lobbies) shall be watertight.

C. Car Position Indicator:

1. The elevators shall have one digital readout fixture, with 1 inch high characters, above each car operating panel.

2. Fixtures shall be LED type and include floor sounding single adjustable tone of no less than 20 Decibels at not more than 1500 hertz, shall sound as the car is passing or stopping at a floor.

D. Car Operating Panels:

1. Passenger elevators and service elevators shall have two (2) car operating panels per car. The service elevator panel shall be applied. The service elevator return and car operating panel shall have a No.4 stainless steel finish. The car operating panels shall include the following:

    a. Self-illuminating LED floor registration circular milk white buttons without markings on buttons.

    b. Alarm, door control buttons.

    c. Firefighter's key switch (MFD1), pilot light, call cancel, and buzzer.

    d. Stereo type jack for Firefighter's headset. Include wiring to fire control panel. Fire phone jacks provided by the elevator vendor shall be compatible with fire phones supplied by fire detection vendor.

    e. All buttons shall be designated by raised markings with Braille, applied with concealed fasteners to meet ADA requirements. Stick-on markings are not acceptable.

    f. Engraved elevator number, Phase II fireman's instructions, no smoking signs and elevator capacity on each faceplate or return panel.

    g. Lockable service cabinet mounted flush with the wall and keyed to EPCO2, containing controls for car stop switch, fan switch, car light switch, light rheostat, independent service, inspection service, and 110 volt convenience outlet.

    h. Locate to meet ADA and TAS requirements.

    i. ADA/TAS compliant hands free phone shall be flush mounted in the swing front return.

    j. Logos or manufacturer's name are not permitted on exposed surfaces.

    k. Permanently engraved "NO SMOKING" signs above each car operating panel.

    l. Provide space for one card reader in each cab. Others will provide the card readers.

    m. As occupancy determines, provide Code Blue Operation that operates by providing a car to any Code Blue landing. Existing car functions are overridden (existing Car Calls and Hall Call assignments are canceled), and a call is placed for a single landing. Must provide specific key # EX513.

E. Communications Systems:

1. The emergency communication system shall be mounted behind the main car-operating panel and be designed to provide two-way communication between the elevator and a point outside the hoistway. Audio and visual two-way communication is required. System shall automatically dial a programmable number to a point outside hoistway.

2. Visual messages shall be provided to indicate the status of an emergency call. The visual message will illuminate and shall read: "Message Received" when the emergency call button is pressed.

3. Raised letter and Braille shall be integrated and permanently marked on the faceplate identifying the device as a speech independent emergency telephone. Surface painted or applied graphics shall not be acceptable.

4. Emergency communication system must be able to provide receiving agent with information identifying building and elevator number and callback whenever an emergency call is placed.

5. Emergency communication system shall comply with Federal Communication Commission (FCC) regulations, Americans with Disabilities Act (ADA), and Texas Accessibility Standards (TAS).

6. When the party called by someone in the cab hangs up, the telephone shall disconnect immediately without giving a busy signal in the cab.

F. Smoke Sensor Tie-In:

1. System to interface with smoke sensors, including alternate level refuge. (Others will run wiring from the smoke sensors to the elevator machine room interface where the Elevator Contractor connects to their controls).

2. Coordinate elevator controls, features and functions with Fire Alarm system (Division 28) requirements.

G. Life Safety Panel:

1. Elevator bid price shall include the cost of all wiring and conduit from various elevator banks to the fire command panel. Faceplate shall be No. 4 finish stainless steel. Life safety panel shall include all elevators.

a. Position indicators for all elevators.

b. One fireman's SES switch (on/off) per elevator bank.

c. Stereo-type jack for Firefighters headset, compatible with equipment supplied by fire detection vendor.

d. Interlocking push button switches for override of the emergency power automatic selection system, buttons to be behind lockable door.

H. Security Monitor:

1. Elevator bid price shall include the cost of all wiring and conduit from the various elevator banks to the security desk. Security monitor shall include all elevators.

a. Provide a full function monitor that allows hall and car call cutouts. Include onboard security feature that allows the use of car buttons to access restricted floors.

b. Communications station with conduit and wiring for communication with each elevator.

c. Monitor shall have the capability to provide hall call waiting time reports. Include a printer and flat screen monitor to be coordinated with Architect for placement in desk.

I. Security Interface for Elevators with Card readers:

1. Elevator Contractor shall provide cut-out in one faceplate with a tinted non-scratch glass window and space behind within each elevator that requires a security cardholder. Refer to the security drawings. The security contractor shall furnish the card reader to the Elevator Contractor for mounting. The Elevator Contractor shall provide all required mounting accessories and shall mount the card reader within the elevator cab. Brackets to hold the card reader in place shall be durable and non-metallic. The elevators shall have security software. Security contractor shall furnish a key switch (Best Lock keyed to an A-2) in the machine room that when activated will override card reader functions and allow the elevator to return to normal operation.

2. The security contractor shall terminate the traveling cable provided by the Elevator Contractor within the elevator cab to the mounted card reader. The Elevator Contractor shall provide and mount glass panel to cover the mounted card reader. Mount the card reader so the glass panel is flush to the front of the mounted card reader.

3. The security contractor shall terminate the traveling cable provided by the Elevator Contractor within the elevator machine room to the security remote field panel.

4. The security contractor shall provide an interface panel within the elevator machine room. This panel shall contain two terminal strips. The security contractor shall label the terminal strips with the required connections from the elevator controller. The Elevator Contractor shall wire from the elevator controller to these terminal strips. Coordinate with the security contractor to provide all required connections and compatible low voltage contact closures from the elevator controller to this terminal strip to allow the following operation:

    a. Signal from the security system to initiate elevator control by the card reader.

    b. On card reader mode: The security system shall indicate to the elevator controller which floors are selectable by the cardholder within that elevator. The elevator controller shall enable those floor selection buttons only. When a floor is selected, the elevator controller should disable all other floors from being selected and signal the security system that a selection has been made.

    c. Signal from the security system to remove the elevator from under card reader control to normal operation.

    d. Submit an alternate price at bid if this interface can be accomplished via an RS-32 protocol interface.

J. Zoned Access at Upper and Bottom Landings:

1. This feature, activated by a key switch located at the landing, shall permit the operation of the car at the landing with the hoistway door and car door open, in order to permit access to the hoistway and pit. Movement of the car away from the landing shall be limited or “zoned” as required by the applicable codes.

K. Rope Brakes:

1. Provide new ASME A17.1-2000 approved ascending car over speed emergency brake and un- intended car movement protection devices.

L. Remote Elevator Monitoring:

1. Provide a microprocessor based system that continuously monitors the elevators on a 24-hour per day, year round basis. The system shall notify a centralized dispatching center that an elevator is inoperative by sending a message via telephone line. The dispatching center shall dispatch mechanics based upon the level of message received from the remote elevator monitoring system.

2. The system shall also collect data on the equipment condition including but not limited to, door operation, leveling, and whether the operation of the unit has been interrupted.

M. Pit Switches:

1. Cars with stops below the first floor shall be equipped with high water pit switches that when activated parks the elevator on an intermediate floor.

2.10 ELEVATOR SCHEDULE [EDIT FOR PROJECT]

A. Passenger Elevators:

1. Quantity:

2. Capacity and Speed:

3. Floors Served:

4. Stops and Openings:

5. Operation and Control:

6. Machine Location:

7. Cabs:

8. Doors:

9. Canopy Height:

10. Cab Inside:

11. Car Enclosures:

    a. Platform:

    b. Door Sills:

    c. Front Walls:

    d. Car Fixtures:

    e. Side and Rear Wall Panels:

    f. Reveals:

    g. Door Faces (Interior):

    h. Ceiling:

    i. Handrails:

    j. Floor:

12. Hoistway Entrances:
    a. Sills:
    b. Door Finishes:
    c. Frame Finishes:
    d. Hall Fixtures:
    e. Additional Requirements:
        1) Provide inspection certificate in each car, mounted under acrylic cover with frame finish to match car enclosure exposed metal.

B. Service Elevators:

1. Quantity:
2. Capacity and Speed:
3. Freight Loading Classification and Maximum Unit Load (as applicable):
4. Floors Served:
5. Stops and Openings:
6. Operation and Control:
7. Machine Location:
8. Cabs:
9. Doors:
10. Canopy Height:
11. Cab Inside:
12. Car Enclosures:
    a. Platform:
    b. Door Sills:
    c. Front Walls:
    d. Car Fixtures:
    e. Side and Rear Wall Panels:
    f. Reveals:
    g. Door Faces (Interior):
    h. Ceiling:
    i. Handrails:
    j. Floor:

13. Hoistway Entrances:

    a. Sills:

    b. Door Finishes:

    c. Frame Finishes:

    d. Hall Fixtures:

    e. Additional Requirements:

        1) Provide inspection certificate in each car, mounted under acrylic cover with frame finish to match car enclosure exposed metal.

        2) Provide protective blanket hooks in all cars and two complete sets of full-height blankets for each car size.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine elevator areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Examine hoistways, hoistway openings, pits, and machine rooms as constructed; verify critical dimensions; and examine supporting structure and other conditions under which elevator work is to be installed.

    1. For the record, prepare a written report, endorsed by Installer, listing dimensional discrepancies and conditions detrimental to performance or indicating that dimensions and conditions were found to be satisfactory.

        2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

B. All installation shall be in accordance with manufacturer's published recommendations.

C. Welded Construction: Provide welded connections for installing elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts. Comply with AWS standards for workmanship and for qualifications of welding operators.

D. Sound Isolation: Mount rotating and vibrating equipment on vibration-isolating mounts designed to minimize transmission of vibrations to structure and thereby minimize structure-borne noise from elevator system.

E. Lubricate operating parts of systems, including ropes, as recommended by manufacturers.

F. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with car. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum, safe, workable dimension at each landing.

1. Entire front of hoistway will be left open until the hoistway entrances have been installed. After the guide rails have been erected and aligned, install frames in alignment with the guide rails, after which the wall may be completed. Coordinate this phase of the Work to provide minimum delay in completion.

G. Leveling Tolerance: 1/8 inch up or down, regardless of load and direction of travel.

H. Set sills flush with finished floor surface at landing. Fill space under sill solidly with no shrink, nonmetallic grout.

I. Painting: All elevator equipment not painted, wire duct, and miscellaneous iron and steel work located within the machine room or hoistway, shall be given a finish coat of paint. Material that has factory finish paint shall have all scratches or mars painted after installation. Paint the machine room and pit floors.

1. Finish coat shall have hard, tough semi-gloss surface.

J. Clean-up: Remove daily trash from hoist ways, pits, and machine rooms including all packing material and debris resulting from this Work. Leave all elevator spaces broom clean.

3.3 TESTING

A. Make application for, secure and pay for all necessary permits and certificates of inspection for all equipment included herein, as required by the various departments of the Local and State Authorities. Furnish the Owner certificates and approval as required by the local governing authorities having jurisdiction.

B. In addition to the permits, inspections and tests specified and the governing codes, the Elevator Contractor will be required to have performed speed and load carrying capacity and heat tests at Elevator Contractor's own expense.

C. Damage of any kind to the car or the adjoining structure which results from performance of any tests shall be repaired at no additional cost to the Owner.

D. Acceptance Testing: On completion of elevator installation and before permitting use (either temporary or permanent) of elevators, perform acceptance tests as required and recommended by ASME A17.1 and by governing regulations and agencies. Tests shall be performed by the Elevator Contractor at Elevator Contractor's expense in the presence of the Owner's representative. In addition to tests required by reference standards and codes, elevators shall be subjected to the following acceptance inspection and tests:

1. Test safety circuit, loop circuit, and the drive circuits at 500 volts. Minimum resistance to ground shall be one megohm.

2. General ride quality, leveling accuracy, and quietness of operation shall be acceptable to the Owner's representative.

3. Owner's representative will conduct ride quality PMT measurements; Elevator Contractor will witness PMT measurements. The PMT shall apply ISO Whole Body standards and performance expectations as follows:

a. Gearless

1) X axis, not to exceed 20 mg

2) Y axis, not to exceed 20 mg

3) Z axis, not to exceed 20 mg

b. Geared

1) X axis, not to exceed 25 mg

2) Y axis, not to exceed 25 mg

3) Z axis, not to exceed 25 mg

c. Hydro

1) X axis, not to exceed 30 mg

2) Y axis, not to exceed 30 mg

3) Z axis, not to exceed 30 mg

E. Operating Test: Load each elevator to rated capacity and operate continuously for 30 minutes over full travel distance, stopping at each level and proceeding immediately to the next. Record temperature rise of elevator machine during 30-minute test period. Record failure to perform as required.

F. Advise Owner, Architect, and authorities having jurisdiction in advance of dates and times tests are to be performed on elevators.

3.4 PROTECTION

A. The elevators shall not be used for construction purposes or during the period prior to turning over the Project to the Owner. Should the Owner authorize elevators for temporary use, the following conditions shall apply:

1. Provide a temporary acceptance form for the Owner's authorization.

2. Neither the new installation period nor the Warranty Period shall start at this time unless specifically approved in writing by the Owner.

3. Provide all temporary enclosures, guards, or other protection of the hoistway openings, power, signal devices, car lights, and protection of any elevator entrances, cars, fixtures, and any other equipment that is installed.

4. Provide and maintain manufacturer's recommended equipment room environment prior to Substantial Completion while operating equipment for Contractor's benefit.

5. Provide written operation and maintenance documentation to the Owner that Contractor has provided proper maintenance and adjustment of the equipment while operating equipment for Contractor's benefit during construction and prior to Substantial Completion.

6. Replace all frequently repaired/high maintenance parts after Contractor's use prior to Substantial Completion to assure minimal carry-forward maintenance problems.

7. Return the elevators in the same condition they were in prior to being placed on temporary service and pay for any repairs, clean up, and cost of temporary service.

8. The Elevator Contractor shall be allowed to perform routine maintenance or repairs.

B. As elevator installation is completed, the Owner may accept and use the elevators, shut them down, or accept them under an Interim Service Agreement described below:

1. The Owner shall have the option of continuing the Interim Service Agreement until all elevators in the group (or building) are completed.

2. The guarantee period and new installation service shall start at the termination of the interim service period.

3. The cost of interim service shall not exceed the prorated cost of the monthly maintenance bid required by these specifications.

3.5 TRAINING

A. Before Substantial Completion, instruct Owner’s personnel on elevator operation during automatic operation, independent service, secured mode, and fireman’s service.

B. Check operation of each elevator with Owner's personnel present and before date of Substantial Completion. Determine that operation systems and devices are functioning properly.

C. Check operation of each elevator with Owner's personnel present not more than one month before end of Warranty Period. Determine that operation systems and devices are functioning properly.

3.6 ACCEPTANCE

A. Final acceptance of the installation shall be made only after all field inspections and tests are complete, punch list items are complete, all submittals have been furnished, and the Owner’s representative is satisfied that the installation has been satisfactorily completed.

END OF SECTION 14 21 00

SECTION 22 40 00 – PLUMBING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, apply to this Section.

B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.

1.2 SUMMARY

A. This section includes the furnishing of all labor and materials necessary for a complete installation of all plumbing fixtures indicated on the Drawings and specified herein.

1.3 REFERENCE STANDARDS

A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.

B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.

C. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references:

1. 2015 Edition of the International Plumbing Code

2. NOTE: MD Anderson takes various exceptions to the International Plumbing Code and has adopted the more stringent requirements within the Uniform Plumbing Code. These exceptions are included within Project Specifications and/or Project Design Drawings.

3. Texas Department of Licensing and Regulation, Texas Accessibility Standards of the Architectural Barriers Act, Article 9102, Texas Civil Statutes

4. Americans with Disabilities Act, 28 CFR Part 35 Nondiscrimination on the Basis of Disability in State and Local Government Services, Final Rule, as published in the Federal Register

5. ICC/ANSI A117.1, "Accessible and Usable Buildings and Facilities" relative to plumbing fixtures for people with disabilities

6. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water

7. Texas Health and Safety Code, Chapter 372, Environmental Performance Standards for Plumbing Fixtures

8. ANSI/ASME A112, Plumbing Standards

1.4 PRODUCTS NOT FURNISHED BUT INSTALLED UNDER THIS SECTION

A. Rough-in for and make final connection to Owner furnished fixtures and equipment requiring plumbing services.

B. Rough-in for and make final connection to fixtures and equipment furnished under other divisions of these Contract Specifications requiring plumbing services.

1.5 QUALITY ASSURANCE

A. Fixtures, trim, accessories and carriers of any one type shall be by the same manufacturer throughout.

B. All fixtures and trim shall be new, institutional/commercial quality and free from mars, chips, scratches, blemishes or any defects.

1.6 SUBMITTALS

A. Product Data:

1. Provide manufacturer's data sheets indicating Code and Standards compliance, illustrations of fixtures, physical sizes, rough-in dimensions, utility sizes, trim and finishes.

B. Record Documents:

1. Provide full written description of manufacturer's warranty.

2. Manufacturer's installation instructions.

C. Operation and Maintenance Data:

1. Include installation instructions, exploded assembly views, servicing requirements, inspection data, installation instructions, spare parts lists, replacement part numbers and availability, location and contact numbers of service depot, for all plumbing specialties installed.

1.7 DELIVERY, STORAGE AND HANDLING

A. Accept fixtures on Site in factory packaging. Inspect for damage.

B. Protect all fixtures and trim before and after installation from exposure to rain, freezing temperatures and direct sunlight. EXCEPTION: Materials manufactured for installation within exterior environments.

C. Protect installed fixtures and trim from damage and/or entry of foreign materials by temporary covers during the construction phase of this project.

D. Do not allow use of installed fixtures and trim for any reason, other than testing, during the construction phase of this project.

1.8 EXTRA MATERIALS

A. Refer to Section 01 78 46 for Maintenance Material Requirements.

1.9 FIELD MEASUREMENTS

A. Verify that field measurements are either as indicated on Shop Drawings or as instructed by the manufacturer. Designate within submittals that measurements have been verified, and note which measurements are the basis for construction.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Stainless Steel Sinks:	Just, Elkay
B. Mop Sinks:	Crane/Fiat, Stern Williams
C. Drinking Fountains:	Elkay
D. Bariatric Toilets:	Acorn, Whitehall, Willoughby
E. Vitreous China Water Closets:	American Standard, Kohler, Crane, Eljer
F. Vitreous China Clinical Flushing Rim Sinks:	American Standard, Kohler, Crane, Eljer
G. Vitreous China Urinals:	American Standard, Kohler, Crane, Eljer
H. Vitreous China Lavatories:	American Standard, Kohler, Crane, Eljer
I. Cast Iron Bathtubs:	American Standard, Kohler, Crane, Eljer
J. Manual Lavatory/Sink Faucets:	Hydrotek
K. Electronic Lavatory/Sink Faucets:	Hydrotek
L. Manual Flush Valves:	Sloan “Royal” or “Aqua Vantage”
M. Manual Flush Valves with Bedpan Washer:	Sloan “Royal” or “Aqua Vantage”
N. Electronic Flush Valves (DC Powered):	Hydrotek HB8RFKC-U
O. Electronic Flush Valves (AC Powered):	Sloan “Optima” or “Aqua Sense”
P. Shower/Bathtub Mixing Valves:	Chicago “Tempshield”, Powers “Hydroguard”
Q. Shower Heads/Hand Sprayer:	Chicago, Powers, Leonard, Speakman
R. Bedpan Washers (Hand held):	Chicago
S. Fixture Stops & Supplies:	Chicago
T. Fixture Traps:	Chicago, McGuire
U. Toilet Seats:	Church, Bemis, Olsonite
V. Fixture Carriers:	Wade, Josam, Smith
W. A.D.A. Insulation Kits:	Mcguire, Truebro, Plumberex
X. Tankless Electrical Water heater	Rheem RTE 3-27
AA. Wall Hydrant	Chicago
BB. Hydrpexants (Freezeless)	Woodford 65/B65/RB65

CC. Wall Faucet — Woodford Anti-Siphon Model 24

2.2 GENERAL

A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

B. Provide plumbing fixtures as indicated and scheduled on the Contract Drawings and as specified herein.

C. Fixtures, trim and accessories of any one type shall be by the same manufacturer.

D. All vitreous china fixtures shall be white in color unless noted otherwise on Drawings.

E. All plumbing fixture trim within public toilet rooms shall be furnished with vandal-proof trim.

F. All exposed brass fixture trim shall be heavily chrome plated.

G. Fittings and piping shall be brass and, wherever exposed, shall be polished chrome-plated. Provide tight fitting wall or floor escutcheons of chrome-plated brass or stainless steel wherever pipes pass through floors, walls or ceilings.

H. Fixture supplies shall be loose key angle stops with 1/2" I.P.S. female inlets and shall include wall flanges and brass risers. All components shall be chrome plated. In all cases, all piping, tubing, fittings and faucets shall be installed using mechanical non-slip connections, such as bull-nose, flanged, ferrule or threaded fittings. Fittings requiring a friction fit using slip-on or gasket connections are not acceptable. [EXCEPTION: Hose type riser supplies are acceptable when supplied and required by the fixture manufacturer]. Supply riser tubing for lavatories and sinks shall be minimum 3/8” O.D.

I. Provide A.D.A. compliant molded insulation on exposed water and drain piping beneath handicap accessible lavatories and sinks. Insulation shall be designed to allow removal and re-installation for pipe servicing.

J. Unless noted otherwise, install each lavatory, sink and drinking fountain with chrome-plated, 17 gauge trap with cleanout plug that is easily removable for servicing and cleaning. Slip joints shall be permitted only on the fixture trap inlet, within the trap seal and at outlet connection to the trap adapter.

K. Wall mounted water closets, lavatories, urinals and drinking fountains shall be supported with commercial carriers bolted to floor, model to suit installation. Provide concealed arm type carriers for lavatories.

1. Water Fountain to be Elkay LZWSRK-EZH20, unless otherwise noted by the **COUNTY**.

L. Fixtures shall have flow control devices to limit the flow of water to a maximum rate in accordance with the following table:

FIXTURE	MAXIMUM WATER USAGE
Patient Shower Valve or Head	2.5 GPM (at 80 psi)
Non-Patient Shower Valve or Head	2.0 GPM (at 80 psi)
Staff Lavatory Faucet	2.2 GPM (at 60 psi)
Public Toilet Room Lavatory Faucet	0.5 GPM (at 60 psi)
Sink Faucet	2.2 GPM (at 60 psi)
Water Closet	1.28 Gallons Per Flush
Urinal	0.25 Gallon Per Flush

M. Stainless Steel Sinks

1. Stainless steel sinks shall be 18 gauge, Type 304 stainless steel with insulation undercoating.

2. Provide stainless steel covers for all unused sink faucet/accessory holes. Covers shall be secured with stainless steel bolt and wing nut. Snap-in type covers are not acceptable. Covers shall provide a watertight seal by utilizing rubber gasket or plumbers putty.

3. Sink strainer shall be 316 stainless steel.

N. Housekeeping Mop Sinks

1. Provide mop sink having dimensions as scheduled on Contract Drawings

2. Receptor shall be precast terrazzo composed of marble chips and Portland cement, ground smooth, grouted and sealed to resist stains.

3. Stainless steel caps shall be cast integral on all curbs.

4. Shoulders shall not be less than 9-3/4" high inside (12” high outside) measurement, and not less than 1-1/4" wide. Drop front shoulders shall have 6” high outside measurement.

5. Tiling flanges shall be cast integral and extend 1" above shoulder on 1, 2 or 3 sides (as required per Project).

6. Drain shall be cast brass with stainless steel strainer cast integral and shall provide for a code compliant connection to a 3" pipe.

O. Bariatric Toilets

1. Unit shall conform to ADA requirements and withstand loads up to 2,000 pounds with no measurable deflection and loads up to 5,000 pounds with no permanent damage.

2. Fixture shall be floor mounted fabricated from 14 gage, type 304 stainless steel with side access panels. Construction shall be seamless welded construction and white epoxy anti-microbial finish.

3. Toilet shall be ASME A112.19.3 and CSA B45.4 compliant. Toilet shall evacuated bowl contents with a minimum water consumption of 1.28 gallons per flush. Toilet trap shall be fully enclosed and have a minimum 3-1/2" seal that shall pass a 2-1/8" diameter ball.

4. Toilet shall have a floor mounted elongated bowl with a self-draining flushing rim and top spud.

5. Provide unit having wall or floor waste outlet as required.

6. Provide hinged open-front seat (less cover) rated for minimum 1,200 pounds.

7. Provide in-patient room toilets with bedpan lugs.

P. Water Closets

1. Water closets shall be vitreous china, wall-mounted elongated bowl having siphon jet flushing action design.

2. Water closet bowls installed within non-ambulatory patient toilet rooms shall be furnished with slotted rim for bedpan holding.

3. Water closet bowl gaskets shall be neoprene, felt gaskets and wax rings are not permitted.

4. Wall mounted water closets shall be supported with extra-heavy duty commercial carriers bolted to floor and rated for a 500 pound load. Carrier model shall be designed for the actual fixture being supported and provided with all options and accessories manufactured by the carrier manufacturer for a complete installation. Provide auxiliary foot support as recommended by the manufacture to prevent bending of fixture support stud bolts.

5. Water closet seats shall be commercial/institutional grade, white in color, have open front and stainless steel self-sustaining check hinges.

Q. Flush Valves

1. Water closet and urinal flush valves shall be chrome plated brass exposed type.

2. Urinal flush valves shall be electronic sensor operated.

3. All electronic flush valves shall be provided with manual override activators. EXCEPTION: Flush valves located within specimen collecting toilet rooms shall be hard-wired without manual override activator.

4. AC powered electronic flush valves located within Patient Care areas and critical Research areas shall be connected to the emergency electrical system.

5. Flush valves in non-ambulatory patient toilet rooms shall be manually operated and have integral bedpan washer.

R. Faucets

1. Provide faucets with laminar flow outlets. Aerators shall not be acceptable. Faucet flow control devices shall be located at the spout outlet.

2. Provide vacuum breakers for all faucets that have threaded or serrated hose connection outlets (including laboratory pure water faucets).

3. Gooseneck spout outlets shall terminate five inches minimum and six & one half inches maximum above top rim of lavatory or sink. Horizontal dimension from spout inlet to spout outlet shall be a minimum five & one half inches.

4. Provide integral hot and cold water inlet check stops in all mixing type sink faucets that have hose connection outlets.

5. All non-public use electronic faucets shall be designed and manufactured to allow continuous water flow during usage for at least sixty seconds after initial activation.

6. All electronic lavatory faucets located within public toilet rooms shall be designed and manufactured to allow continuous water flow during usage for a maximum duration of ten seconds after initial activation.

7. AC powered electronic faucets located within Patient Care areas and critical Research areas shall be connected to the emergency electrical system.

8. All lavatory faucets within non-patient room toilets shall have low-profile (non-gooseneck) spouts and electronic sensor activation.

9. Lavatory faucets within patient rooms shall have gooseneck spouts and manually activated four-inch wrist blade operation.

10. Staff Lavatory Faucets:

    a. Hydrotek HB 5000 EM AC MODE

11. Public Toilet Room Lavatory Faucets

    a. Hydrotek HB 5000 EM AC MODE

S. Shower and Bathtub Mixing Valves

1. Shower and bathtub mixing valves shall be ASME A112.18.1M, CSA B125, ASSE 1016 and ADA compliant, having combination thermostatic/pressure balancing replaceable cartridge, integral check valves, integral stops and high temperature limit set at 110° F.

2. Thermostatic/pressure balance mixing valves shall have brass body construction with polished chrome plated finish, lever control handles for volume and temperature, and 1/2" NPT connections.

3. Provide showerheads, tub spouts, hand-held shower systems, diverters, vacuum breakers and other trim accessories as scheduled on Contract Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.

B. Confirm that millwork is constructed with adequate provision for the installation of countertop lavatories, sinks, faucets and related trim and accessories.

C. Verify that electric power is available and of the correct characteristics.

3.2 PREPARATION

A. Rough-in fixture piping connections in accordance with minimum sizes required by code, as recommended by the manufacturer, and as indicated in Contract Drawings fixture rough-in schedule.

3.3 INSTALLATION

A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

B. All installation shall be in accordance with manufacturer’s published recommendations.

C. Furnish and install all labor, materials, equipment, tools and services and perform all operations required in connection with or properly incidental to the installation of complete plumbing fixtures, as indicated on Contract Drawings, reasonably implied therein or as specified herein, unless specifically excluded.

D. Each piece of trim shall be furnished whether specifically mentioned or not, in order to provide a complete first-class installation. Furnish and install all required water, waste, soil and vent connections to all plumbing fixtures, together with all fittings, supports, fastening devices, cocks, valves, traps, etc., leaving all in complete working order.

E. Provide accessible check valves in the individual cold and hot water fixture supply lines serving mixing valve type faucets or assemblies having hose connection outlets that are not equipped with integral check stops.

F. Coordinate mounting heights of plumbing fixtures with architectural details/elevations.

G. Install A.D.A. compliant water closet flush valve handles on wide side of toilet stalls.

H. Install fixtures and trim in accordance with manufacturer's instructions.

I. All exposed chrome plated, polished or enameled fixtures and trim shall be installed with special care, leaving no tool marks on finishes. Install flexible brass fixture supply risers using manufactured tube bending tools. Bending tubes only with the use of hands shall not be permitted.

J. Install each fixture trap, easily removable for servicing and cleaning.

K. Provide chrome-plated deep escutcheons where required to cover non-chrome-plated piping projecting through walls.

L. Thoroughly fill spaces between fixtures and walls, countertops and/or floors with waterproof, mold resistant, non-toxic, non-shrinkable white tile caulking.

M. Install components firmly fixed, level and plumb.

N. Install and secure all wall mounted fixtures in place with commercial carriers and bolts in accordance with manufacturer's instructions. Fixture weight shall not be transmitted to walls, partitions or service piping. Installation shall prevent any movement of fixture during use.

O. All non-monolithic shower floors shall be provided with drain pan attached to floor drain flange in accordance with the latest edition of the Uniform Plumbing Code. Refer to Architectural Contract Specifications and Drawings for pan materials and additional installation requirements.

3.4 INTERFACE WITH OTHER PRODUCTS AND TRADES

A. Review millwork Shop Drawings. Confirm location and size of fixtures and openings before rough-in and installation.

B. Provide templates for all fixtures to be mounted in millwork to General Contractor.

C. Coordinate with Electrical Contractor and insure proper power is provided for electric drinking fountains, sensor operated faucets and sensor operated flush valves

3.5 TESTING

A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise or overflow.

B. Adjust and set sensor faucet mixing valves to provide desired water temperature at spout outlet.

C. Insure that all traps are filled with water and maintain trap seal. Each fixture shall be filled and then drained. Traps and fixture connections shall be proven water tight by visual inspection.

D. After fixtures have been installed and water systems are pressurized, test each fixture and associated trim for proper operation and inspect for leaks. Replace malfunctioning fixtures and components, then retest. Repeat procedure until all components operate properly.

E. Test drain pans installed for non-monolithic shower floors prior to installation of finished flooring. Fill pan with water to within 1" of top. Pan must maintain test water level without leakage for at least eight hours

3.6 CLEANING

A. Thoroughly clean all plumbing fixtures and equipment furnished under this Contract prior to final acceptance.

B. Thoroughly flush and clean all faucet spout outlet screens and flow control devices.

3.7 PROTECTION OF FINISHED WORK

A. Do not permit use of fixtures until after Substantial Completion has been announced by Owner.

END OF SECTION 22 40 00

SECTION 23 37 00 – HVAC SYSTEMS, AIR OUTLETS, AND INLETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, apply to this Section.

B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.

1.2 SUMMARY

A. Perform all Work required to provide and install diffusers, diffuser boots, registers/grilles, louvers, louver penthouses, roof hoods, and goosenecks indicated by the Contract Documents with supplementary items necessary for proper installation.

1.3 REFERENCE STANDARDS

A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.

B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.

C. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references:

1. AMCA 500 - Test Method for Louvers, Dampers and Shutters.

2. ANSI/NFPA 90A - Installation of Air Conditioning and Ventilating Systems.

3. ARI 890 – Rating of Air Diffusers and Air Diffuser Assemblies.

4. ASHRAE 70 - Method of Testing for Rating the Air Flow Performance of Outlets and Inlets.

5. SMACNA 1035 - HVAC Duct Construction Standards - Metal and Flexible.

1.4 QUALITY ASSURANCE

A. Test and rate performance of air outlets and inlets in accordance with ASHRAE 70.

B. Test and rate performance of louvers in accordance with AMCA 500.

1.5 SUBMITTALS

A. Product Data:

1. Submit product data and Shop Drawings, indicating type, size, location, application, noise level, finish, and type of mounting.

2. Review requirements of outlets and inlets as to size, finish, and type of mounting prior to submitting product data.

B. Operation and Maintenance Data:

1. Submit manufacturer's installation instructions under provisions of Division 01.

PART 2 - PRODUCTS

2.1 GENERAL

A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

B. Grilles, registers and diffusers shall be as scheduled on the Drawings Grilles, registers and diffusers shall be provided with sponge rubber or soft felt gaskets where noted on the Drawings Grilles, slot diffusers and laminar flow bars shall not be internally insulated. If a manufacturer other than the one scheduled is used, the sizes shown on the Drawings shall be checked for performance, noise level, face velocity, throw, pressure drop, etc., before the submittal is made. Selections shall meet the manufacturer's own published data for the above performance criteria. The throw shall be such that the velocity at the end of the throw in the five (5) foot occupancy zone will not exceed 50 fpm nor be less than 25 fpm except where indicated otherwise. Noise levels shall not exceed those published in ASHRAE for the type of space being served (NC level). In the vicinity of lab hoods, terminal velocity at face of hood shall not exceed 20 fpm.

C. Locations of air distribution devices on Drawings are approximate and shall be coordinated with other trades to make symmetrical patterns and shall be influenced by the established general pattern of the lighting fixtures or architectural reflected ceiling plan, but primarily located to maintain proper air distribution. Where called for on Drawings, grilles, registers and diffusers shall be provided with deflecting devices and manual dampers. These grilles, registers, and diffusers shall be the standard product of the manufacturer, and subject to review by the Architect.

D. Provide a frame compatible with the type of ceiling or wall in which the devices are installed. Refer to Architectural Drawings for exact type of ceiling specified.

E. Coordinate color and finish of the devices with the Architect.

F. When possible, a 20"x20"x1" filter back on return grilles will be used as a pre-filter or instead of the filter in the unit.

2.2 MANUFACTURERS

A. Grilles, Registers, and Diffusers:

1. Krueger Manufacturing Company.

2. Titus Products.

3. Price Industries.

4. Nailor Industries.

5. MetalAire

B. Louvers:

1. American Warming and Ventilating.

2. Ruskin.

3. Greenheck.

4. Arrow.

C. Roof Hoods:

1. Greenheck.

2. Cook.

3. Acme.

D. Split systems/package units/duct work/chilled water systems:

1. 1.5-5 ton split systems shall be Grandaire, minimum 15 SEER heat pump.

2. 2 -5 ton package units shall be Grandaire, minimum 14 SEER heat pump.

3. 7.5 -25 ton split systems shall be Carrier or Trane, minimum 11.5 SEER.

4. 7.5 -12 ton package units shall be Carrier or Trane, minimum 11.5 SEER.

5. Mini splits systems shall be Mitsubishi 23 SEER.

6. Duct work ceiling grills shall be 3 or 4 depending on location. All supply drops shall have control damper. When possible 20x20x1 filter back return grills as a pre filter or instead of the filter in the unit.

7. Chilled water systems-larger buildings with VAV boxes shall have the VAV number located on the ceiling grid under the box.

2.3 ROUND CEILING DIFFUSERS

A. Round, adjustable pattern, stamped or spun, multicore type diffuser to discharge air in 360-degree pattern, with sector baffles where indicated.

B. Project diffuser collar above ceiling face and connect to duct with duct ring. In plaster ceilings, provide plaster ring.

C. Fabricate of aluminum, unless otherwise noted, with factory baked enamel, off-white finish.

D. Provide multi-louvered equalizing grid where noted on Drawings.

2.4 RECTANGULAR CEILING DIFFUSERS

A. Rectangular, full louvered face, directional, removable multi-core type diffuser to discharge air in 360-degree pattern. Neck size shall be as scheduled on the Drawings. Provide filler panels, where required, for directional throw diffusers.

B. Fabricate frame and blades of extruded aluminum with factory baked enamel, off-white finish.

C. Provide multi-louvered equalizing grid .where noted on Drawings

D. Provide round neck connection as scheduled on Drawings.

2.5 PERFORATED FACE CEILING DIFFUSERS

A. Perforated face with fully adjustable pattern and removable face.

B. Fabricate of aluminum with factory baked enamel, off-white finish.

C. Provide multi-louvered equalizing grid where noted on Drawings.

D. Provide round neck connection as scheduled on Drawings.

2.6 SQUARE PANEL FACE SUPPLY AND RETURN AIR CEILING DIFFUSER

A. Architectural diffuser with a square panel centered within a square housing similar to the Titus OMNI model. Drawings that depict three-way and four-way throw options are achieved with the use of filler panel (where required) for directional throw diffusers.

B. Opposed blade volume dampers shall be provided with the diffuser, if scheduled on the Drawings. The volume damper design shall be similar to the Titus AG-75.

C. Although the manufacturers show this model being used only as a supply air device, this same diffuser can also be used as a return air device. The neck connection shall be the largest available neck size provided by the manufacturer.

D. Provide round neck connection as scheduled on Drawings.

2.7 CEILING EXHAUST AND RETURN REGISTERS/GRILLES

A. Streamlined blades, depth of which exceeds 3/4-inch spacing, with spring or other device to set blades, vertical face.

B. Fabricate 1-inch margin frame with concealed mounting.

C. Fabricate of steel with minimum 20 gage frames and minimum 22 gage blades, steel and aluminum with minimum 20 gage frame, or aluminum extrusions, with factory baked enamel finish.

D. Opposed blade damper with removable key operator, operable from face shall only be provided with the grille when it is scheduled on the Drawing.

2.8 PERFORATED FACE RETURN/EXHAUST GRILLES

A. Perforated face with back pan, removable face, and neck sizes as indicated on Drawings.

B. Provide frame type as indicated on Drawings.

C. Fabricate completely of 22 gage steel with a baked enamel off-white finish.

2.9 LIGHT TROFFER DIFFUSERS

A. Single plenum type constructed independent of light troffers with volume and pattern controllers with oval top or side air inlet as scheduled.

B. Match diffusers to light troffers and connect in airtight connection without tools.

C. Fabricate of galvanized steel with welded or soldered joints and finish matte black inside.

2.10 PERFORATED FACE CEILING EXHAUST AND RETURN REGISTERS/GRILLES.

A. 0.0375-inch stainless steel non-aspirating perforated panels with stainless steel plenum for low-velocity applications.

B. Provide quick-opening fasteners with safety chains.

C. Provide multi-louvered equalizing grid where noted on Drawings.

2.11 CEILING EGG CRATE EXHAUST AND RETURN REGISTERS/GRILLES

A. Fixed series of cubes comprised of 1/2 x 1/2 x 1-inch aluminum strips.

B. Fabricate one-inch margin aluminum frame.

C. Fabricate of aluminum with factory baked enamel finish.

D. Provide square uniform height plenum for ducted return and exhaust application of scheduled neck size.

2.12 CEILING LINEAR SLOT DIFFUSERS

A. Continuous linear flow bar slot with adjustable vanes for left, right, or vertical discharge, with volume control. Provide slot width, length and number of slots as scheduled on the Drawings.

B. Fabricate of aluminum extrusions with factory baked enamel finish.

C. Provide support clips and gasket as required for ceiling system.

D. Provide alignment strips for hairline joints and end caps where the slot terminates. Provide mitered corners.

E. Provide black matte finish for all interior exposed-to-view components.

F. Provide externally insulated supply air plenum by diffuser manufacturer.

G. Provide return slot diffuser same as supply, except without the adjustable vane control. Provide return air plenum for ducted return where indicated on Drawings.

2.13 PLENUM SLOT SUPPLY AND RETURN DIFFUSERS

A. Supply or return plenum slot, 3/4-inch, with single extruded aluminum curved deflector blade to create a tight horizontal airflow pattern across the ceiling. Provide slot width, length, and number of slots as scheduled on the Drawings.

B. Diffusers shall discharge air horizontally through two outside sections and vertically through a center down-blow section.

C. Standard nominal lengths shall be 2, 3, 4, or 5 feet. Units shall be constructed of 24 gage steel. Maximum height of the unit's plenum shall be 7-inches. Inlets shall have a minimum of 1-1/2-inch depth for duct connection. The standard finish shall be black on the face of the diffuser and pattern deflectors.

D. Diffuser shall be similar to Titus N-1-R diffuser.

2.14 PERIMETER SLOT SUPPLY AND RETURN DIFFUSERS

A. High induction supply and return plenum slot, the supply is a 3/4-inch fixed slot width that produces a horizontal discharge pattern, and a return air slot with a maximum 1-1/2-inch slot width. Provide length as scheduled on the Drawings.

B. Standard nominal lengths shall be 2, 3, 4, or 5 feet. Units shall be constructed of 24 gage steel. Maximum height of the units shall be 7-inches. Inlets shall have a minimum of 1-1/2-inch depth for duct connection. The standard finish shall be black on the face of the diffuser and pattern deflectors.

C. Diffuser shall be similar to the Titus N-1-R diffuser.

2.15 CEILING LINEAR EXHAUST AND RETURN GRILLES

A. Streamlined blades with 90-degree one-way deflection, 1/8-inch x 3/4-inch on 1/4-inch centers.

B. Fabricate 1-inch margin frame with countersunk screw mounting.

C. Fabricate of steel with 22 gage minimum frames and 22 gage minimum blades, steel and aluminum with 20 gage minimum frame, or aluminum extrusions, with factory baked enamel finish.

D. Opposed blade damper with removable key operator, operable from face shall only be provided with the grille when it is scheduled on the Drawing.

2.16 WALL SUPPLY REGISTERS/GRILLES

A. Streamlined and individually adjustable curved blades to discharge air along face of grille with two-way deflection.

B. Fabricate 1-inch margin frame with countersunk screw, concealed mounting and gasket.

C. Fabricate of aluminum extrusions with factory clear anodized finish.

D. Provide multi-louvered equalizing grid where noted on Drawings.

2.17 WALL EXHAUST AND RETURN REGISTERS/GRILLES

A. Streamlined blades, depth of which exceeds ¾-inch spacing, with spring or other device to set blades, vertical or horizontal face as scheduled.

B. Fabricate one-inch margin frame with concealed mounting.

C. Fabricate of aluminum with 20 gage minimum frame, or aluminum extrusions, with factory baked enamel finish.

2.18 LINEAR BAR WALL DIFFUSERS

A. Streamlined blades with 0 to 15 degree deflection, as scheduled, 1/8-inch x 3/4-inch or 1/4-inch centers.

B. Fabricate of aluminum extrusions, with factory clear anodized finish.

C. Fabricate 1/2-inch margin frame with concealed mounting and gasket.

D. Provide concealed fastening, straightening grids and alignment bars.

E. Provide externally insulated plenums by diffuser manufacturer.

F. Provide return bar diffusers same as supply with return air plenum.

G. Silhouette finish.

2.19 LINEAR FLOOR SUPPLY REGISTERS/GRILLES

A. Streamlined blades with zero degree deflection, 7/32-inch x 3/4-inch on 1/2-inch centers.

B. Fabricate of high-grade aluminum extrusions with factory clear anodized finish.

C. Fabricate 3/16-inch margin heavy margin frame with concealed mounting and gasket and mounting frame. Frameless flange for floor installation. Silhouette finish.

D. Provide concealed fastening, straightening grids and alignment bars.

2.20 LABORATORY RADIAL AIR SUPPLY DIFFUSERS

A. High-volume, low velocity performance.

B. Diffuser shall provide non-aspirating radial air pattern and shall be configured with air supply plenums with inlet collars to assure uniform velocity over the diffuser face.

C. Furnish stainless steel back pan and stainless steel faced diffusers for animal holding rooms.

D. Furnish aluminum back pan and aluminum-faced diffusers for laboratories.

E. Performance face drops below ceiling, single-pane back pan and single piece lower chamber. Sectioned diffuser is not acceptable.

2.21 WALL EXHAUST AND RETURN REGISTERS/GRILLES – SEVERE DUTY

A. Streamlined 40-degree fixed blades, at 1/2-inch spacing, with horizontal front blades.

B. Fabricate 1-1/4-inch margin frame with vandal-proof screws.

C. Fabricate totally of steel with minimum 18 gage frames and minimum 14 gage blades with factory baked enamel finish.

2.22 DOOR GRILLES

A. V-shaped louvers of 20 gage steel, 1-inch deep on 1/2-inch centers.

B. Provide 20 gage steel frame with auxiliary frame to give finished appearance on both sides of door, with factory prime coat finish.

2.23 LOUVERS

A. Provide 6-inch deep louvers with blades on 45-degree slope with center baffle and return bend, heavy channel frame, bird screen on interior side with 1/2-inch square mesh for exhaust and 3/4-inch for intake.

B. Fabricate of 12 gage extruded aluminum, welded assembly, with factory prime coat finish.

C. Furnish with exterior angle flange for installation.

D. Fabricate louver penthouses with mitered corners and reinforce with structural angles.

E. Pass 750 feet per minute free velocity with less than 0.10 inches of water pressure drop, based in accordance with AMCA 500. Water penetration less than 0.025 ounce of water per foot of free area at 900 feet per minute. Provide a minimum of 45 percent free area.

2.24 ROOF HOODS

A. Fabricate air inlet or exhaust hoods in accordance with SMACNA 1035, 1-inch classification Duct Construction Standards.

B. Fabricate of galvanized steel, minimum 16 gage base and 20 gage hood, or aluminum, minimum 16 gage base and 18 gage hood; suitably reinforced; with removable hood; bird screen with 1/2-inch square mesh for exhaust and 3/4-inch for intake, and factory prime coat finish.

C. Roof curb shall be coordinated with Owner and roofing Contractor.

D. Hood outlet area shall be minimum two times the throat area.

2.25 GOOSENECKS

A. Fabricate in accordance with SMACNA 1035, 1-inch classification, of minimum 18 gage galvanized steel.

B. Roof curb shall be coordinated with Owner and roofing Contractor.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

B. All installation shall be in accordance with manufacturer's published recommendations.

C. Check location of air outlets and inlets and make necessary adjustments in position to conform to architectural features, reflected ceiling plans, symmetry, and lighting arrangement.

D. Install air outlets and inlets to ductwork with airtight connection.

E. Provide balancing dampers on duct take-off to diffusers, grilles and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly. The use of extractors or scoops at duct take-off to diffusers, grilles and registers is not allowed.

F. Paint ductwork visible behind air outlets and inlets matte black. Refer to Division 09.

G. Provide all specialties and frames for air distribution devices as required for proper installation in ceiling type as indicated on Architectural Drawings. Provide all cutting and patching of T-bars, gypsum board, and other ceiling systems as required for installation of air devices.

END OF SECTION 23 37 00

SECTION 26 51 00 – LIGHTING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, apply to this Section.

B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.

1.2 SUMMARY

A. This Section specifies requirements for indoor and outdoor lighting fixtures, exit signs, lamps and ballasts.

1.3 REFERENCE STANDARDS

A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.

B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.

C. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references:

1. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures.

2. NEMA WD1 - General-Purpose Wiring Devices.

3. ANSI C82.1 - Specification for Fluorescent Lamp Ballasts.

4. ANSI C82.4 - Specifications for High-Intensity-Discharge Lamp Ballasts (Multiple Supply Type).

5. NEMA LE - H-I-D Lighting System Noise Criterion (LS-NC) Ratings.

6. NFPA 90A – Standard for the Installation of Air-Conditioning and Ventilating Systems

7. ANSI/ASHRAE/IESNA Standard 90.1 – Energy Standard for Buildings Except Low-Rise Residential Buildings.

1.4 SUBMITTALS

A. Product Data:

1. Submit a 3-ring binder with manufacturer's data on lighting fixtures in booklet form, with a separate sheet for each fixture, assembled by luminaire "type" in alphabetical order, with the proposed fixture and accessories clearly labeled. Ballast and lamp product data shall accompany fixture submittals.

B. Record Documents:

1. Submit dimensioned drawings and performance data including coefficients of utilization, candela distribution, spacing to mounting height ratio, efficiency and visual comfort probability for each fixture, assembled by luminaire type in alphabetical order.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver lighting fixtures individually wrapped in factory-fabricated fiberboard type containers. Parabolic louvers shall be shipped in thermally sealed polyethylene wrapper.

B. Handle lighting fixtures carefully to prevent breakage, denting and scoring the fixture finish. Do not install damaged lighting fixtures.

C. Store product in a clean, dry space protected from weather.

1.6 EXTRA MATERIALS

A. Refer to Section 01 78 46 for Maintenance Material Requirements.

PART 2 - PRODUCTS

2.1 GENERAL

A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

B. Lighting fixtures and accessories shall comply with the design and functional requirements of the Project. Design characteristics shall be as noted in manufacturer's submittal data.

C. Provide lighting fixtures of the size, type and rating as scheduled, complete with, but not limited to, lamps, lamp holders, reflectors, ballasts, and wiring.

2.2 MANUFACTURERS

A. Emergency Exit Signs:

1. Lithonia.

2. Sure-lites.

3. Emergi-Lite.

B. Lamps:

1. Philips.

2. Osram Sylvania.

3. General Electric Company.

C. Ballasts:

1. Universal Lighting Technologies.

2. Advance.

3. Osram/Sylvania.

4. Lutron.

5. Robertson Transformer.

2.3 INTERIOR LIGHTING FIXTURES

A. Linear Fluorescent Fixtures:

1. Lenses shall be minimum 0.140-inch-thick virgin acrylic. Lens pattern shall be KSH 20 or approved substitution.

2. Parabolic louvers shall have a low iridescent diffuse silver finish, 3-inch deep, 6-cells per 4-foot lamp.

3. Frames shall be flush or regressed, aluminum, steel hinged and equipped with rotary-action cam latches. Spring latches are not acceptable. Frames shall be reversible and capable of latching either side.

B. Compact Fluorescent Fixtures:

1. Reflectors shall be clear, with integral white trim ring, unless noted otherwise.

2. Open reflectors shall be 7-inch minimum diameter.

3. Fixtures installed outdoors and over food handling areas shall be lensed.

4. Fixtures installed in shower locations shall be provided with flush type plastic reflector with opal lens.

C. Incandescent downlight fixtures shall be prewired equipped with integral thermal protection.

D. LED Fixtures

1. ETI, 2’ x 4’, 5000k, 42 watt, 122/277 volt, dimmable (or equivalent.)

E. Special Application and Function:

1. Teleconferencing areas shall have fixtures which match, and are compatible with existing facility installations, including lamp type, lamp color, fixture and lens type, controls, and minimum lighting levels for the vertical and horizontal planes. Coordination shall be with Owner’s Telehealth Services section of UTTV.

2. Low voltage fixtures utilizing MR16 lamps shall be lensed.

3. ‘Clean-room’ type fixtures for high purity areas and special laboratory functions shall be triple gasketed, with sealed cam latches.

4. Warning signs (In Use, Beam On, X-Ray In Use, etc.) shall be LED illuminated with housing and face color as specified.

5. Task lights shall be equipped with an integral rocker switch. Where two or more task lights are located in a room, a wall switch shall be installed at the entry door for control.

2.4 ENVIRONMENTAL ROOMS AND EXTERIOR LIGHTING FIXTURES

A. Enclosures shall be complete with gaskets to form weatherproof seal and UL approved for wet locations.

B. Provide low temperature ballasts with reliable starting to 0 degrees F.

C. In-ground or buried fixture and ballast systems are not approved for use.

D. Exterior fixtures shall match Owner's existing style and types, particularly bollard, pole-top, parking garage, soffit, roadway, perimeter area lights and landscaping types. Exterior fixtures shall be compatible with Texas Medical Center (TMC) standards as applicable.

2.5 RETURN AIR TROFFER

A. The return air troffer where indicated on Drawings, shall have white enamel finish, 0.140 inch clear prismatic acrylic lens, and shall be recessed in inverted "T" bar ceiling. Lens pattern KSH 20 or approved substitution.

B. The return air troffer shall have the capacity to handle 200 CFM of return air through the side slots of the nominal 4-foot long fixture (without return air attachment) with a total pressure drop from the rooms to the return air ceiling plenum not to exceed 0.05 inches w.g.

2.6 EMERGENCY EXIT SIGNS

A. Provide exit signs with red LED illumination.

B. Exit signs shall have covers that are composed of a black face and body, smooth red diffusion material, with 6 inch-high red letters on black background, directional arrows as indicated. Individual LED's shall not be visible through the diffusion material.

C. Fixtures shall have minimum five (5) year warranty.

D. Fixtures shall be UL924 and Energy Star compliant.

E. Exit signs shall be rated for dual voltage; 120/277.

2.7 LAMPS

A. Incandescent lamps shall be used only when specified in the Construction Documents and approved for use by Owner’s Representative.

B. Pin-based compact fluorescent lamps shall be quad or triple tube, 13, 18, 26 or 32 watt similar to NEMA lamp type CFQ13W/G24Q/835 or CFTR26W/GX24Q/835. ‘Long’ compact fluorescent lamps in nominal 39 and 40 watt sizes are acceptable. Compact fluorescent lamps shall be 3500K color temperature. Original equipment manufacturer lamps that are only available from a single manufacturer are not acceptable.

C. Linear fluorescent rapid or instant-start lamps shall be medium bi-pin equal to or better than Philips T-8 lamps, minimum CRI of 85. General use four foot lamps shall be equal to or better than Philips Energy Advantage F32T8/ADV841/XEW/ALTO. If different lamp manufacturers are submitted, no noticeable difference in color temperature shall be allowed and performance shall be equal to or better than the base lamp. T-8 fluorescent lamps shall have a color temperature of 4100 K and be specified in 2 foot, 3 foot and 4 foot lengths only. U-bent (6 inch, 3 inch and 1-5/8 inch) and circline lamps are not acceptable. Linear four foot lamps used in open fixtures in environments below 70 degrees F, or in operation rooms, shall be full wattage type.

D. Metal halide HID lamps shall be ceramic metal halide type, clear, unless noted otherwise, with mogul or medium bases. Acceptable medium base lamp sizes are 50, 100 and 150 watts. Double-ended lamps are not acceptable. Any base type other than medium or mogul shall be submitted for Owner review and approval in advance. Metal halide fixtures shall be lensed or utilize a lamp (PAR type) which does not require special arc tube protection.

E. Cold cathode, neon, T-5 and T-2 systems are not approved for use.

F. LED, induction and fiber optic lighting systems may be approved for special applications when submitted for Owner review and approval in advance.

G. Lamps, including linear fluorescent, compact fluorescent and high intensity discharge, shall be low mercury type and shall pass all federal TCLP (Toxicity Characteristic Leaching Procedure) test requirements at the time of manufacture.

2.8 BALLASTS FOR FLUORESCENT T-8 LAMPS

A. High frequency (20 kHz or greater) electronic type.

B. THD (total harmonic distortion) of less than 10 percent.

C. Power factor greater than or equal to 95 percent.

D. Ballasts shall operate with 265 MA lamps.

E. Unless noted otherwise (i.e. dual switching, etc.), provide one ballast per fixture.

F. All ballasts shall be rated for 277-volt operation except for under-counter, patient headwall, and patient room night light fixtures that shall be rated for 120-volt operation.

G. Ballasts shall be Class P thermally protected.

H. Ballasts shall include a 5-year manufacturer's warranty.

I. Ballasts shall meet FCC requirements governing electromagnetic and radio frequency interference.

2.9 BALLASTS FOR COMPACT FLUORESCENT LAMPS

A. All ballasts shall be of the high power factor type and be capable of independent switching if two ballasts are provided with a fixture.

B. Ballasts shall include a 5-year manufacturer’s warranty.

C. Dimming ballasts shall be electronic and compatible for line voltage or control wire dimming systems as specified on the Contract Documents.

D. Ballasts shall be magnetic for 2-pin lamp application. Electronic ballasts for other applications shall be submitted for Owner approval in advance.

2.10 BALLASTS FOR HID LAMPS

A. HID ballast shall be of the lead-peak autotransformer type for metal halide lamps. Ballast shall start and operate the lamp at ambient temperatures ranging from minus 20 degrees F to 105 degrees F. All ballasts shall have automatic thermal protection, and high power factor, minimum of 90 percent. Ballasts for interior applications shall be encased and potted, or be of the electronic type.

B. HID ballasts for M90, M110, M130, M139 and M140 rated lamps shall be electronic, and shall include a five (5) year manufacturer’s warranty.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

B. Install light fixtures in accordance with the manufacturer's written instructions, the applicable requirements of NEC and the National Electrical Contractors Association's "Standard of Installation".

C. If a fixture type designation is omitted, furnish fixture of the same type as shown for rooms of similar usage. Verify with Owner's Project Manager before purchase and installation.

D. Check the building electrical system requirements and architectural finishes. Regardless of the catalog number prefixes and suffixes shown, furnish fixtures with the proper trim, frames, supports, hangers, ballasts, voltage rating, and other miscellaneous appurtenances to properly coordinate with Project conditions. Verify with Owner's Project Manager prior to ordering.

E. Check the type of ceilings to be installed in each room and verify that the recessed light fixtures are proper for the type of ceiling to be installed before ordering fixtures. Provide a frame compatible with the type of ceiling in which the recessed lighting fixture is installed. Refer to the Architectural Room Finish Schedule for the specified ceiling type.

F. Fixtures shall be securely attached to the ceiling-framing members by mechanical means. Clips identified for use with the type of ceiling framing member(s) and fixture(s) shall also be permitted. Fasten lighting fixtures in areas where there is no ceiling securely to the structure.

G. Immediately before final observation, clean all fixtures, inside and out, including plastics and glassware, and adjust all trim to properly fit adjacent surface, replace broken or damaged parts, and lamp and test all fixtures for electrical as well as mechanical operation.

H. Protect installed fixtures from damage during the remainder of the construction period.

I. Wiring methods:

1. Lighting fixtures shall be connected to a typical metal conduit, junction box, and wire lighting grid system. MC (Metal-Clad Cable) and FMC (Flexible Metal Conduit), where are permitted to be used, shall be concealed to prevent physical damage. Exposed MC and FMC installations are not acceptable.

2. Modular cabling, flexible whip assemblies, feed through wiring, 'daisy-chain' feeds, tandem wiring and other similar wiring methods are not acceptable for the lighting circuit distribution and wiring system.

3.2 TESTING

A. Upon completion of installation of interior lighting fixtures, and after circuitry has been energized, apply electrical energy to demonstrate capability and compliance with requirements. When possible, correct malfunctioning units at the Project Site, then retest to demonstrate compliance; otherwise, remove and replace with new units, and proceed with retesting.

B. Incandescent lamps shall be new at time of Final Completion.

C. Fluorescent lamps may be used in the final finishing of the Project. Those that have exceeded more than 20 percent of their rated life (as established by Owner records) or that have darkened ends shall be replaced with new lamps before Final Completion.

D. HID lamps may be used in the final finishing of the Project. Those that have exceeded more than 20 percent of their rated life (as established by Owner records) shall be replaced with new lamps before Final Completion.

E. All existing fixtures in work area that are re-used or relocated shall be cleaned inside and out, broken or damaged parts replaced and new lamps installed.

3.3 LIGHTING FIXTURE SCHEDULE

A. Refer to Lighting Fixture Schedule on Drawings for list of specified manufacturers for each fixture proposed.

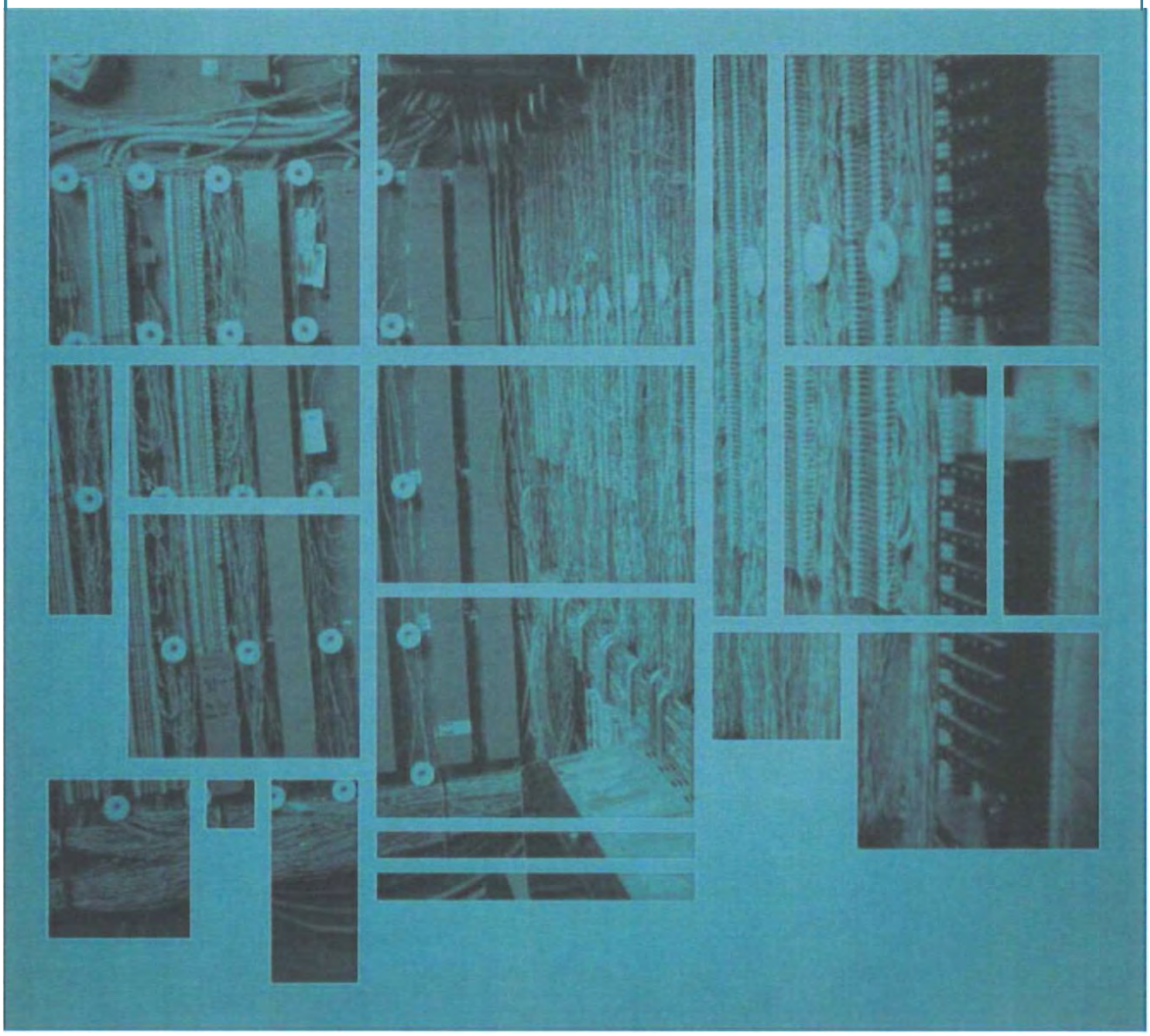
END OF SECTION 26 51 00

Appendix A

Lake County Data & Telecommunications
Cabling Specifications (Updated 7/17/15)

LAKE COUNTY DATA & TELECOM CABLING SPECIFICATIONS

(UPDATED 7/17/2015)



Lake County Board of County Commissioners
Cabling System Technical Specification
(Updated 7/17/2015)

No Unauthorized Substitutions

1.0 INTRODUCTION

1.1 PURPOSE

The intent of this document is to provide a standard specification that will be used for all Lake County facilities requiring cabling installation. This document provides the minimum performance criteria for the components and sub-systems comprising a complete cabling system that shall accommodate Lake County's requirements.
Product specifications, general design considerations, and installation guidelines are provided in this written document.
The successful contractor shall meet or exceed all requirements for the cabling system described in this document.
The Category 6 portion of the cabling system shall comply with the proposed link and channel performance requirements of TIA/EIA 568-C.2 "Performance Specifications for 4-pair 100 Ohm Category 6 Cabling".

The successful contractor must have a BICSI® certified RCDD review the drawings and meet with representatives from Facilities and the Office of Information Technology to discuss the project and to ensure that a structured cabling system is installed that provides a comprehensive telecommunications infrastructure.

1.2 SCOPE

This document defines the cabling system and subsystem components to include cable, termination hardware, supporting hardware, and miscellany to install a complete telecommunications system supporting voice and data. The intent of this document is to provide all pertinent information to allow the contractor to bid the materials, labor, supervision, tooling, and miscellaneous mounting hardware and consumables to install a complete system. However, it is the responsibility of the contractor to identify any and all items required for a complete system not identified in this specification.

1.3 APPLICABLE DOCUMENTS

The cabling system described in this specification is derived in part from the recommendations made in industry standard documents. The list of documents below are incorporated by reference:

1. This Technical Specification and Associated Drawings
2. © 2000 BICSI® *Telecommunications Distributions Methods Manual, latest edition.*
3. ANSI/TIA/EIA-568-C.1 *Commercial Building Telecommunications Cabling Standard 2012.*
4. ANSI/TIA/EIA-568-C.2 *Balanced Twisted-Pair Telecommunication Cabling and Components Standard 2014.*
5. ANSI/TIA/EIA-568-C.3 *Optical Fiber Cabling Components Standard 2011.*
6. ANSI/TIA/EIA-568-C.4 *Broadband Coaxial Cabling and Components Standard 2011.*
7. ANSI/TIA/EIA-569-B *Commercial Building Standard for Telecommunications Pathways and Spaces 2003.*
8. ANSI/TIA/EIA-606-A *Administration Standard for the Telecommunications Infrastructure of*
9. *Commercial Buildings 2002.*
10. ANSI/TIA/EIA-607-A *Commercial Building Grounding and Bonding Requirements for Telecommunications 2002.*

11. ISO/IEC 11801 *Generic Cabling for Customer Premises.*

Other standards that contain requirements pertaining to the safety of and access to private and public telecommunications networks include:

1. ANSI/NFPA 70 *The National Electrical Code@, current edition.*

2. EEE C2-2002 *National Electrical Safety Code (NESC@) current edition.*

3. FCC Part 68 Code of Federal Regulations, Title 47, *Telecommunications.*

4. UL 1459 Underwriters Laboratories *Standard for Safety-Telephone Equipment.*

5. UL 1863 Underwriters Laboratories *Standard for Safety-Communication Circuit Accessories.*

Specifications as provided by The Division of Information Systems, Telecommunications and Facilities groups and other special codes that may apply:
If this document and any of the documents listed above are in conflict, then the more stringent requirement shall apply. All documents listed are believed to be the most current releases of the documents; the contractor is responsible to determine and adhere to the most recent release when developing the proposal for installation.

1.4 CONTRACTOR REQUIREMENTS

The contractor installing the telecommunications facilities and equipment herein specified shall be an experienced TELECOMUNICATIONS CONTRACTOR. Experienced meaning that the contractor has been in this type of business for a minimum of two (2) years and have personnel that have been trained and certified in the installation of telecommunications facilities equipment. Additionally, the contractor will have successfully completed installation of similar equipment and size to that specified herein within the last year of the project.

Contractors must have a BICSI Registered/Certified Communications Distribution Designer (RCDD) on staff. A copy of the contractor's current registration must be furnished with the submittal of the proposal. The supervisor or lead technician on every project must have a current Registered BICSI RCDD and/or Registered BICSI Technician Certification.

1.5 EQUIPMENT COMPONENT REQUIREMENTS

The contractor bidding the telecommunications facilities and equipment herein specified shall submit a bill of materials including any manufacturer specifications for proposed components to County IT for approval before submitting a final bid on all telecommunications systems projects. County IT will evaluate the manufacturer specifications and may respond with requests to substitute a preferred name brand manufacturers for specific components. Preference will be given to all bids that conform to county recommended components and standards.

2.0 TELECOMMUNICATIONS SYSTEM REQUIREMENTS

2.1 FACILITIES DESCRIPTION

Lake County's facilities vary in function and size. Most buildings have individual offices for faculty and staff; in certain areas, personnel may be situated in modular office furniture with hard wall offices around the exterior of the floor. Generally, a ceiling distribution cabling system using cable trays and conduits is used. These specifications apply primarily to new buildings and major renovations, but should be followed as closely as possible for all telecommunications cabling installations.

2.2 TELECOMMUNICATIONS SYSTEM DESCRIPTION

Lake County's data distribution network is based on a star topology with a collapsed-backbone. The data cabling should be designed end to end to meet or exceed 1000BASE-T/1000BASE-TX standards. As a standard configuration each work area will consist of a communications outlet containing two Category 6 jack inserts and one Category 3 jack insert (1 Voice and 2 Data). All data jacks are terminated using Category 6 horizontal cables pulled and terminated on Category 6 insulation displacement connector patch panels in the telecommunications room. Patch cords/equipment cords are used to connect each jack to the appropriate service connector. All voice cables and all voice pairs are terminated on 66-M150 blocks on a backboard in the telecommunications room. Generally, high pair count Category 3 CMR or CMP backbone/riser cables are employed between the Entrance facilities or Main telecommunications room and each telecommunications room for voice connectivity. Category 6 cables and 50 micron multi-mode fiber optic cables are used as backbone/riser cables for data. All CATV cable runs under 300 meters shall be accompanied by a single Category 6 data cable run that will terminate on the same wall outlet.

3.0 HORIZONTAL DISTRIBUTION SYSTEM

3.2 TELECOMMUNICATIONS CABLING SYSTEM

The telecommunications contractor will be responsible for pulling and terminating the cables following all federal, state and local codes, accepted industry standards and the manufacturer's instructions. The telecommunications contractor must work closely with the electrical contractor to ensure that the pathways are installed correctly and that they will allow for proper installation of the cabling system. Visual inspections and upon completion of the project test results will be used to verify proper installation practices were followed.

The cabling system will consist of Lake County IT approved Category 6 components and cable. Each Category 6 data cable shall be terminated on an 8-position, 8-conductor Category 6 jack insert wired to the T568B color code in the work area and in the telecommunications room. Each Category 6 voice cable shall be terminated on a 6-position, 6-conductor jack insert at the work station and on 66-M150 blocks on a backboard in the telecommunications room. Voice and Data racks should be separate and located appropriately for their specific function. A single pull string should be left in the conduit at each outlet location.

3.2.1 WORK AREA TELECOMMUNICATIONS OUTLETS

Work area communications outlets should be placed one per 100 sq ft of useable floor space and sized to accommodate four Category 6 cables and connectors. Outlets should be within 3' of an electrical outlet and installed at the same height, unless otherwise specified. Outlets should be placed so that the work area or workstation cable does not exceed 5 meters (16ft) in length. This length is figured into the total horizontal cabling length and must not be exceeded.

Office Outlets

One 3-port flush 110 Connect faceplate. Faceplates shall be constructed of ABS molding compound and be 4.53" X 2.77" X .60" in size. Each outlet shall contain three cables terminated on two Category 6, 8-position, 8-conductor jack BLUE inserts and one Category 6 or Category 3, jack ALMOND insert for voice following manufacturer's instructions. Faceplates shall accommodate two labels and provide a clear polycarbonate cover for each. The upper jack will be designated as the voice jack and shall be colored light almond while the data jacks shall be colored blue and shall occupy the bottom two position(s) on the faceplate unless otherwise noted on the drawings. Faceplates shall be light almond in color unless otherwise noted. Faceplates shall be an approved brand and shall be mounted to in-wall single gang boxes.

CATV/VIDEO Outlets

One 2-port flush 110 Connect faceplate. Faceplates shall be constructed of ABS molding compound and be 4.53" X 2.77" X .60" in size. Each outlet shall contain one cable terminated on a Category 6, 8-position, 8-conductor jack for VIDEO and one on a 75 ohm coaxial cable insert for CATV following manufacturer's instructions. Faceplates shall accommodate two labels and provide a clear polycarbonate cover for each. The upper jack will be designated as the CATV jack and while the VIDEO jack shall be colored green and shall occupy the bottom position on the faceplate

unless otherwise noted on the drawings. Faceplates shall be light almond in color unless otherwise noted. Faceplates shall be an approved brand and shall be mounted to in-wall single gang boxes.

Modular Furniture Outlets
Use appropriate FLEX-MODE faceplate determined by modular furniture brand. FLEX-MODE faceplates shall be made of polycarbonate molding compound, black in color. The faceplate(s) shall be mounted in the appropriate knockout(s) in the furniture channel. Consult with a representative for specific instructions.

3.2.2 PRODUCT SPECIFICATIONS

Category 3 Cabling - Non-plenum
Horizontal data cabling shall be 24 AWG, solid copper, 4-pair UTP, UL/NEC CMR rated, with a white/gray/beige PVC jacket. Cable jacketing shall be lead-free. Cable shall meet standard Category 3 performance requirements. Cable shall be supplied on wooden reels or in reel-in-box. Cable shall be UL listed under file number E138034.

Category 3 Cabling- Plenum
Horizontal data cabling shall be 24 AWG, solid copper, 4-pair UTP, UL/NEC CMP rated, with a white/gray/beige plenum-rated PVC jacket. Individual conductors shall be FEP insulated. Cable jacketing shall be lead-free. Cable shall meet standard Category 3 performance requirements. Cable shall be supplied on wooden reels or in reel-in-box. Cable shall be UL listed under file number E138034.

Category 6 Cabling - Non-plenum
Horizontal data cabling shall be 23 AWG, solid copper, 4-pair UTP, UL/NEC CMR rated with a (blue PVC jacket for data) and a (green PVC jacket for voice). Cable jacketing shall be lead-free. Cable shall meet standard EIA/TIA-S68-C.2 Category 6 performance requirements and shall be rated up to SSO MHz. Cable shall be supplied on wooden reels or in reel-in-box. Cable shall be UL listed under file number E138034.

Category 6 Cabling - Plenum
Horizontal data cabling shall be 23 AWG, solid copper, 4-pair UTP, UL/NEC CMP rated with a (blue plenum-rated PVC jacket for data) and a (green plenum-rated PVC jacket for voice). Individual conductors shall be FEP insulated. Cable jacketing shall be lead-free. Cable shall meet standard EIA/TIA-S68-C.2 Category 6 performance requirements and shall be rated up to SSO MHz. Cable shall be supplied on wooden reels or in reel-in-box. Cable shall be UL listed under file number E138034.

Fiber Optic Cable and Termination Hardware
All multimode optical fiber must be S0/12Sum. All optical fiber must be manufactured by CORNING Cable Systems. CORNING Cable Systems LanScape® products will be used for all optical fiber splice and termination points. The types of cable, number of fiber strands and types of termination will vary for each project and must be stated in the project specifications.

Modular Jacks
All modular jacks shall be wired to the TS68B wiring pattern. Category 6 modular (data) jacks shall be keystone QuickPort 4-pair. Modular jacks shall be constructed with a housing of polyphenylene oxide, 94V-0 rated. Modular jacks shall be terminated using a 110-style pc board connector (made of 94V-0 rated polycarbonate), color-coded for both TS68A and TS68B wiring. The 110 connector shall terminate 22-24 AWG solid conductors with a maximum insulation diameter of .OSO inches. The modular jack contacts shall be plated with a minimum of SO micro-inches of gold in the contact area over a SO micro-inch minimum nickel under plate. Modular jacks shall be compatible with panel thicknesses of .OS8"- .063". Modular jacks shall snap into a .790" X .S82" opening and only approved inserts and face plates shall be used. Modular jacks shall be UL Listed under file number E819S6.

3.2.3 WORK AREA COMMUNICATIONS OUTLET INSTALLATION
All outlets shall be installed in the following manner:

- Cables shall be coiled in the in-wall or surface-mount boxes if adequate space is present to house the cable coil without exceeding the manufacturers bend radius. In hollow wall installations where box-eliminators are used,

excess wire can be stored in the wall. No more than *12"* of slack shall be stored in an in-wall box, modular furniture raceway, or insulated walls. Excess slack may be neatly coiled and stored in the ceiling above each drop location when there is not enough space present in the outlet box to store slack cable.

In addition, each cable type shall be terminated as indicated below:

- Cables shall be dressed and terminated in accordance with the recommendations made in the BICSI® Telecommunications Distributions Methods Manual, manufacturer/s recommendations and/or best industry practices.

- Pair untwist at the termination shall not exceed .25 inch for Category 6 connecting hardware.

- Bend radius of the cable in the termination area shall not be less than 4 times the outside diameter of the cable.

- The cable jacket shall be maintained as close as possible to the termination point.

3.3 HORIZONTAL DISTRIBUTION CABLE INSTALLATION

If the building is renovated or rewired, abandoned cable shall be removed from the building in accordance with National Electric Code, once it is no longer in service. Unused, un-terminated cable is only allowed if there is a planned purpose for the cable and it must be documented on the as-build drawings.

The following guidelines should be used when installing Horizontal distribution cable:

- All horizontal data distribution cable should be Category 6, 100 ohm, UTP of an approved vendor and shall not exceed a maximum distance of 295 feet.

- All horizontal voice distribution cable should be Category 3, 100 ohm, UTP of an approved vendor.

- Cable shall be installed in accordance with manufacturer's recommendations and best industry practices.

- Cable raceways shall not be filled greater than the NEC maximum fill for the particular raceway type.

- Cables shall be installed in continuous lengths from origin to destination (no splices).

- Unshielded twisted pair cable shall be installed so that there are no bends less than four times the cables outside diameter (4 X cable O.D.) at any point in the run.

- Pulling tension on 4-pair UTP cables shall not exceed 25-pounds for a single cable or cable bundle.

- If a J-hook or trapeze system is used to support cable bundles all horizontal cables shall be supported at a maximum of four-foot intervals. At no point shall cable(s) rest on acoustic ceiling grids or panels.

- Horizontal distribution cables shall be bundled in groups of not greater than 40 cables. Cable bundle quantities in excess of 40 cables may cause deformation of the bottom cables within the bundle.

- Cable shall be installed above fire-sprinkler and systems and shall not be attached to the system or any ancillary equipment or hardware. The cabling system and support hardware shall be installed so that it does not obscure any valves, fire alarm conduit, boxes, or other control devices.

- Cables shall not be attached to ceiling grid or lighting support wires. Where light support for drop cable legs are required, the contractor shall install clips to support the cabling.

- Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the contractor prior to final acceptance at no cost to Lake County BCC.

- Cables shall be identified by a self-adhesive label in accordance with the System Documentation Section of this specification. The cable label shall be applied to the cable behind the faceplate on a section of cable that can be accessed by removing the cover plate.

3.4 HORIZONTAL CABLE TERMINATION

All horizontal distribution runs shall work together to produce optimum efficiency and throughput. All cable and jack combinations must be tested by an independent laboratory to determine their performance when paired together. Two such independent tests are Anixter's "levels" program and Graybar's "VIP" program. It is the responsibility of the contractor to make sure that both jack and wire are of the same "category" rating.

3.4.1 HORIZONTAL DATA/VIDEO CABLE TERMINATION PATCH PANELS

All horizontal data cables will be terminated on Category 6 patch panels in the telecommunications room. The horizontal cables termination patch panels shall be colored black and contained in standard 19" x 7' rack(s), wall-mount racks or equipment cabinets as specified by the project drawings. All equipment racks shall be properly secured to the floor or wall and augmented with horizontal and vertical management hardware, both front and rear, to properly dress horizontal cables. Patch panels shall provide 24 or 48 modular jack ports, wired to T568B. The front of each module shall be capable of accepting 9mm to 12mm labels. Patch panels shall terminate the building cabling on 110-style insulation displacement connectors. Patch panels must be UL Listed under file number E81956. Patch panels shall be of an approved brand. Modular inserts for use in the patch panel should be of the same manufacturer as the jacks used at the work area station outlets. All video cables shall be terminated on a single independent patch panel.

3.4.2 HORIZONTAL VOICE CABLE TERMINATION BLOCKS

All horizontal voice cables will be terminated on 66-M150 blocks in the telecommunications room. The horizontal cables termination 66-M150 blocks shall be contained on a backboard as specified by the project drawings. All 4 pairs of each cable will be terminated on the 66-M150 blocks and labeled 1-XX, 2- XX, 3- XX, etc

3.4.3 HORIZONTAL CABLE SUPPORT

- a 12" ladder rack system shall be installed in the telecommunications room to support the cables. The ladder should encompass the room allowing the cables to be properly dressed and supported.

- secure the top of all freestanding equipment racks using 12" ladder racks to the wall or intersect with the ladder system encompassing the room.

4.0 BACKBONE CABLE

If the building is renovated or rewired, abandoned cable shall be removed from the building in accordance with National Electric Code, once it is no longer in service. Unused, un-terminated cable is only allowed if there is a planned purpose for the cable and it must be documented on the as-build drawings.

Data backbone cabling installed between the entrance facilities or main telecommunications room and each telecommunications room will consist of one or more of the following types of cable:

- Category 6 , 100 ohm, UTP as described in the horizontal distribution section for data distances up to 295'.

- High pair count TIA Category 3 CMR or CMP is adequate for voice backbone/riser cable.

- 50/125um multimode optical fiber (inside building) terminated with LC connectors.

- Single mode optical fiber (building to building) terminated with LC connectors.

- the minimum strand count for the single-mode fiber optic backbone entering the building is 96 strands of SM which should be terminated on a wall mounted fiber box or a rack mounted fiber patch panel in the Main Distribution Room. Connection into Lake County's existing fiber backbone should be included in all design drawings and bids. This should include splicing, termination, testing, conduit, vaults and boring necessary to provide full connectivity into Lake County's existing fiber backbone.

- the minimum strand count of fiber between telecommunications closets that exist on the same floor of a building shall be 12 strand of MM and 6 strand SM, preferably combined in a hybrid fiber cable. All fiber should be terminated on a wall mounted fiber box or in a rack mounted termination panel.

- the minimum strand count of fiber between a server room and the Main Distribution Room shall be 12 strand of MM and 6 strand SM, preferably combined in a hybrid fiber cable. All fiber should be terminated on a wall mounted fiber box or in a rack mounted termination panel.

- the minimum strand count of fiber from each telecommunications closet to the Main Distribution Room shall be 12 strand of MM and 6 strand SM, preferably combined in a hybrid fiber cable. All fiber should be terminated on a wall mounted fiber box or in a rack mounted termination panel.

- a minimum of 25' of excess fiber shall be provided at each fiber termination point. Such service loops should conform to specifications to include total length and bend radii.

The types and number of cables used for backbone systems will vary for each project and must be documented in the project specifications and documented on the drawings. Any termination or splice enclosures used for optical fiber will be listed in the specifications and documented on the drawings.
Voice backbone cabling will be 24 AWG, 100-pair UTP, UL/NEC CMR rated or CMP if required, with a white/gray/beige PVC jacket. Cable shall be third party verified to comply with TIA Category 3 requirements. Cable shall be supplied on 1000 ft. reels. A coupled bonding conductor will be installed within the riser bundle and bonded and grounded at each end.

4.1 BACKBONE CABLE INSTALLATION

All copper backbone cables shall be installed in the following manner:

- Backbone cables shall be installed separately from horizontal distribution cables.

- where cables are housed in conduits, the backbone and horizontal cables shall be installed in separate conduits or in separate inner duct within conduits.

- where cables are installed in an air return plenum, the cable shall be installed in conduit, or plenum cable shall be installed in a plenum inner duct to provide protection to the cable

- where backbone cables and distribution cables are installed in a cable tray or wire way, backbone cables shall be installed first and bundled separately from the horizontal distribution cables.

For optical fiber backbone cables:

- do not exceed the cable's minimum bend radius. Bending cable tighter than the minimum bend Radius may result in increased optical fiber attenuation or fiber breakage.

- the minimum bend radius for indoor backbone optical fiber cable is 10 times the cables outside diameter under no load conditions and 15 times the cables outside diameter when being pulled.

- do not exceed the cables maximum vertical rise and tensile rating.

- where cables are installed in an air return plenum, the cable shall be installed in conduit, or plenum cable shall be installed in a plenum inner duct to provide protection to the cable

- where backbone cables and distribution cables are installed in a cable tray or wire way, backbone cables shall be installed first and bundled separately from the horizontal distribution cables use inner duct whenever possible.

- all fiber should be from the same manufacture and preferably the same lot if possible. All lot numbers of fiber should be documented on drawings.

NOTE: Do not locate backbone cable pathways in elevator shafts. Do not over fill conduits, ducts or sleeves. Refer to the BICSI® *Telecommunications Distributions Methods Manual,* latest edition for more information.

4.2 FIBER LIGHTGUIDE INTERCONNECT UNIT (LIU)

Fiber LIUs shall be manufactured to fit in both 19 inch relay rack and 23 inch relay rack. The LIU shall be sized to accommodate the appropriate number of fiber connections and utilize the least amount of rack space. Even if the LIU is not fully populated with fiber connection, the LIU shall be completely populated with bulkhead panels to accommodate future use. On 72 and 144 port LIU's the termination and splice shelf must be used together due to fusion splicing on single mode and multimode fiber. The LIUs used by the contractor must be approved by Lake County IT.

4.3 FIBER CONNECTORS:

All single mode fiber shall be terminated using factory manufactured pigtails with LC type connectors. All multimode fiber shall be terminated using factory manufactured pigtails with LC type connectors. The pigtails used by the contractor must be approved by Lake County IT.

4.4 FIBER COUPLERS:

All single mode fiber LIU panels shall be equipped with LC to LC couplers. All multimode fiber LIU panels shall be equipped with LC to LC couplers. The couplers used by the contractor must be approved by Lake County IT and must be of the same manufacturer as the fiber connectors.

5.0 WORK AREA AND PATCH CORD CABLE ASSEMBLIES

The Division of Information Systems will provide the patch cords for the workstations unless they are specifically included as part of the project. Cables must not exceed 5 meters (16ft) in length and should be approved by Lake County BCC IT.

6.0 CABLING SYSTEM TESTING

All cables and termination hardware shall be 100% tested for defects in installation and to verify cable performance under installed conditions. The contractor prior to system acceptance shall verify all conductors of each installed cable useable. Any defect in the cabling system installation including but not limited to cable, connectors, feed through couplers, patch panels, and connector blocks shall be repaired or replaced in order to ensure 100% useable conductors in all cables installed. All cables shall be tested in accordance with this document, and best industry practices. If any of these are in conflict, the Contractor shall be responsible to bring any discrepancies to the attention of the project manager for clarification and/or resolution.

6.1 PERFORMANCE VERIFICATION

6.1.1 COPPER

Category 6 data cable shall be performance verified using an automated test set. Test results shall be automatically evaluated by the equipment, using the most up-to-date criteria from the TIA/EIA Standard currently ANSI/TIA/EIA-

568-C.2, and the result shown as pass/fail. Test results shall be printed directly from the test unit or from a download file using an application from the test equipment manufacturer. The printed test results shall include all tests performed, the expected test result and the actual test result achieved.

6.1.2 FIBER

All 50/125um multimode optical fiber and/or Single mode optical fiber must be manufactured by CORNING Cable Systems and it would be preferable that all fiber cable is from the same manufacturer lot number. After installation, it must be performance verified using an automated test set. Test results shall be automatically evaluated by the equipment, using the most up-to-date criteria from the TIA/EIA Standard currently ANSI/TIA/EIA-568-C.3, and the results shown as pass/fail. Test results shall be printed directly from the test unit or from a download file using an application from the test equipment manufacturer. The printed test results shall include all tests performed, the expected test result and the actual test result achieved.

6.1.3 COAXIAL

CATV cable shall be performance verified using an automated test set. Test results shall be automatically evaluated by the equipment, using the most up-to-date criteria from the TIA/EIA Standard currently ANSI/TIA/EIA-568-C.4, and the result shown as pass/fail along with the signal level at each catv outlet across the spectrum, ie +6db at 55mhz and +2db at 750mhz. Test results shall be printed directly from the test unit or from a download file using an application from the test equipment manufacturer. The printed test results shall include all tests performed, the expected test result and the actual test result achieved.

7.0 SAFETY/ ENVIRONMENTAL

7.1 FIRESTOP SYSTEMS

A fire stop system is comprised of: the item or items penetrating the fire rated structure; the opening in the structure and the materials and assembly of the materials used to seal the penetrated structure. Fire stop systems comprise an effective block for fire, heat, vapor and pressurized water stream.
All penetrations through fire rated building structures (walls and floors) shall be sealed with an appropriate fire stop system. This requirement applies to through penetrations (complete penetration) and membrane penetrations (through one side of a hollow fire rated structure). Any penetrating items i.e., riser slots and sleeves, cables, conduit, cable tray, and raceways, etc. shall be properly fire stopped.

7.1.1 PRODUCT SPECIFICATIONS

Fire stop systems shall be UL Classified to ASTM E814 (UL 1479) and shall be approved by the Lake County Fire Marshal. A drawing showing the proposed fire stopped system, shall be provided to Lake County's Technical Representative and Fire Marshall prior to installing the fire stop system(s).

7.1.2 FIRESTOP SYSTEM INSTALLATION

All fire stop systems shall be installed in accordance with the manufacturer's recommendations and shall be completely installed and available for inspection by the local inspection authorities prior to cabling system acceptance.

7.2 GROUNDING AND BONDING

The facility shall be equipped with a Telecommunications Bonding Backbone (TBB). This backbone shall be used to ground all telecommunications cable shields, equipment, racks, cabinets, raceways, and other associated hardware that has the potential for acting as a current carrying conductor. The TBB shall be installed independent of the buildings electrical and building ground and shall be designed in accordance with the recommendations contained in the TIA/EIA-607 Telecommunications Bonding and Grounding Standard.
The main entrance facility/equipment room in each building shall be equipped with a telecommunications main grounding bus bar (TMGB). Each telecommunications closet shall be provided with a telecommunications ground bus bar (TGB). The TMGB shall be connected to the building electrical entrance grounding facility. The intent of this system is to provide a grounding system that is equal in potential to the building electrical ground system. Therefore, ground loop current potential is minimized between telecommunications equipment and the electrical system to which it is attached.

7.2.1 PRODUCT SPECIFICATIONS

All racks, metallic backboards, cable sheaths, metallic strength members, splice cases, cable trays, etc. entering or residing in the TC or ER shall be grounded to the respective TGB or TMGB using a minimum #6 AWG stranded copper bonding conductor and compression connectors. Where metallic panels attached to the rack to not have sufficient metal to metal contact to provide an adequate path to ground, they shall be bonded to the rack using a minimum #14 AWG copper conductor. The copper conductor size shall be upgraded based on the largest power conductor feeding any rack mount equipment. The conductor shall be continuous; attaching all isolated components in a daisy chain fashion from top to bottom and bonded to the rack using an appropriate compression connector.
All wires used for telecommunications grounding purposes shall be identified with a green insulation. Non-insulated wires shall be identified at each termination point with a wrap of green tape. All cables, and bus bars shall be identified and labeled.

7.2.2 GROUND SYSTEM INSTALLATION

The TBB shall adhere to the recommendations of the TIA/EIA-607 standard, and shall be installed in accordance with best industry practices. Installation and termination of the main bonding conductor to the building service entrance ground, at a minimum, shall be performed by a licensed electrical contractor.

7.3 ENVIRONMENTAL CONSIDERATIONS

Environmental considerations need to be made for the telecommunications room where networking equipment will be in use. If possible air conditioning shall be installed on a separate zone so that the air can be run during the winter. If air conditioning cannot be afforded, heavy-duty airflow and exhaust fans should be used to keep the room below 90 degrees.

7.4 FIRE EXTINGUISHER

A fire extinguisher (C02 or type dependent on local fire codes) shall be hung inside all equipment rooms and telecommunications rooms.

7.5 SPRINKLER SYSTEM

Sprinkler systems heads should be rated for higher temperature to prevent them from going off inadvertently as the water can harm networking equipment. If needed, special hoods may be fabricated to prevent water from directly assessing computer equipment.

8.0 SYSTEM DOCUMENTATION

The following section describes the installation, administration, testing, and as-built documentation required to be produced and maintained by the contractor during the course of the installation.

8.1 CABLING SYSTEM LABELING

The contractor shall develop and submit for approval a labeling system for the cable installation. Lake County BCC will negotiate an appropriate labeling scheme with the successful contractor. At a minimum, the labeling system shall clearly identify all components of the system: racks, cables, panels and outlets. The labeling system shall designate the cables origin and destination and a unique identifier for the cable within the system. Racks and patch panels shall be labeled to identify the location within the cabling system infrastructure. All labeling information shall be recorded on the as-built drawings and all test documents shall reflect the appropriate labeling scheme. All label printing will be machine generated using indelible ink ribbons or cartridges. Self-laminating labels will be used on cable jackets, appropriately sized to the OD of the cable, and placed within view at the termination point on each end. Outlet labels will be the manufacturer's labels provided with the outlet assembly.

8.1.1 DEFAULT LABELING SCHEME

All cable outlets and termination panels/bays or blocks will be appropriately labeled to match the cable using the following default labeling scheme is an approved scheme has not been negotiated:

- Room number
- -(dash)
- D Device Code (0-outlet, P-Patch Panel, B-Biock)
- Device number (devices numbered 1-9 going around the room in a clockwise direction from the entrance)
- D or V (for data or voice)
- Outlet number on the plate, port number on the panel

8.2 AS-BUILT DRAWINGS

The installation contractor will be provided with 2 sets of D or E-size drawings at the start of the project. One set will be designated for as the central location to document all as-built information as it occurs throughout the project. The central set will be maintained by the Contractor's Foreman on a daily basis, and will be available to the Technical representative upon request during the course of the project. Anticipated variations from the build-to drawings may be for such things as cable routing and actual outlet placement. No variations will be allowed to the planned termination positions of horizontal and backbone cables, and grounding conductors unless approved in writing by Lake County BCC.

The Contractor shall provide the central drawing set to the Lake County BCC at the conclusion of the project. The marked up drawing set will accurately depict the as-built status of the system including termination locations, cable routing, and all administration labeling for the cabling system. In addition, a narrative will be provided that describes any areas of difficulty encountered during the installation that could potentially cause problems to the telecommunications system.

Requirements for As-built drawings

Backbone diagrams shall include:

- one line diagrams for UTP copper cabling with cable counts.
- one line diagrams for optical fiber cabling with cable counts (including lot number).

Floor Diagrams shall include:

- TR locations and room numbers.
- Work area outlets (WAO) and faceplate labels.
- TR wiring zones, which identify WAOs served.
- Horizontal cabling pathways including penetrations and fire stopping.

TR Diagrams shall include:

- TR room number.
- Rack locations.

- Power outlet locations.
- Conduit entrance locations.

8.3 TEST DOCUMENTATION

Test documentation shall be provided in a three ring binder(s) within three weeks after the completion of the project. The binder(s) shall be clearly marked on the outside front cover and spine with the words "Test Results", the project name, and the date of completion (month and year). The binder shall be divided by major heading tabs, Horizontal and Backbone. Each major heading shall be further sectioned by test type. Within the horizontal and backbone sections, and scanner test results (Category 6)(10GBase-T), shall be segregated by tab. Test data within each section shall be presented in the sequence listed in the administration records. The test equipment by name, manufacturer, model number and last calibration date will also be provided at the end of the document. Unless a more frequent calibration cycle is specified by the manufacturer, an annual calibration cycle is anticipated on all test equipment used for this installation. The test document shall detail the test method used and the specific settings of the equipment during the test. Scanner tests shall be printed on 8-1/2" x 11" paper.
When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be collocated in the binder.

9.0 WARRANTY AND SERVICES

9.1 CABLING SYSTEM WARRANTY

The telecommunications contractor shall facilitate a 5-Year extended System Performance Warranty between the manufacturer and Lake County BCC. The extended component warranty shall be provided which warrants functionality of all components used in the system for 5 years from the date of acceptance. The performance warranty shall warrant the installed 550 MHz horizontal copper, and if installed by the contractor both the horizontal and backbone optical fiber portions of the cabling system. Copper links shall be warranted against the link performance minimum expected results defined in TIA/EIA-568-C.2 (latest draft).

9.2 POST INSTALLATION MAINTENANCE

The contractor shall furnish an hourly rate with the proposal submittal, which shall be valid for a period of one year from the date of acceptance. This rate will be used when cabling support is required to affect moves, adds, and changes to the system (MACs). MACs shall not void the Contractor's nor manufacturer's warranty.

9.3 PROJECT MANAGEMENT / GENERAL

The contractor shall establish a point of contact with Lake County BCC who will be responsible for reporting progress and updating Lake County's Technical Representatives, (FMO Project Manager, LCIT Information Systems, LCIT Telecommunications) with issues that Lake County BCC must address to facilitate the cabling system installation. The contractor's POC shall provide daily written reports to Lake County's Technical Representatives detailing progress. Requests for access to limited access or restricted areas shall be made the day prior to the required access. Information critical to the completion of the task or project shall be communicated to the county's Technical Representatives, as the requirement becomes known. Casual information shall be passed during the scheduled progress report.
The contractor shall maintain Lake County's facility in a neat and orderly manner during the installation of the communications cabling system. Lake County's facilities shall be maintained in broom clean condition at the completion of work each day. At the completion of work in each area, the contractor will perform a final cleaning of debris prior to moving the installation crew to the next work area.

10.0 CABLING SYSTEM ACCEPTANCE

Lake County's Technical Representatives will make periodic inspection of the project in progress. One inspection will be performed at the conclusion of cable pulling, prior to closing of the false ceiling, to inspect the method of cable routing and support, and the fire stopping of penetrations. A second inspection will be performed at completion of cable termination to validate that cables were dressed and terminated in accordance with TIA/EIA specifications for

jacket removal and pair untwist, compliance with manufacturer's minimum bend radius, and that cable ends are dressed neatly and orderly.

10.1 FINAL INSPECTION

Upon completion of the project, Lake County's Technical Representatives will perform a final inspection of the installed cabling system with the Contractor's Project Foreman. The final inspection will be performed to validate that all horizontal and backbone cables were installed as defined in the drawing package, and that the installation meets the aesthetic expectations of Lake County BCC.

10.2 TEST VERIFICATION

Upon receipt of the test documentation, Lake County reserves the right to perform spot testing of a representative sample of the cabling system to validate test results provided in the test document. Lake County BCC testing will use the same method employed by the contractor, and minor variations will be allowed to account for differences in test equipment. If significant discrepancies are found the contractor will be notified for resolution.

10.3 SYSTEM PERFORMANCE

During the three-week period between final inspection and delivery of the test and as-built documentation, Lake County BCC will activate the cabling system. Lake County BCC will validate operation of the cabling system during this period.

10.4 FINAL ACCEPTANCE

Completion of: the installation; in-progress and final inspections; receipt of the test and as-built documentation; and successful performance of the system for a two week period will constitute acceptance of the system.

11.1 CATV or CCTV Cabling

When CATV or CCTV requirements are identified, either a 75-ohm broadband coaxial cable or single-mode fiber optic cable system should be installed. Refer to the paragraphs related to fiber optic cable in this standard for more information.

When a coaxial system is installed, care must be taken to ensure the correct cable is used. The designer must coordinate with the cable service provider where franchised agreements are in place. Plenum cables must be provided in accordance with NFPA 70, or when directed by the BCC project team. The table below lists cable types with corresponding distance limitation. This table is derived from vendor specifications (Anixter) for coaxial cable. RG-59 will not be acceptable for CATV or CCTV projects. RG-6 quad shield cabling should be used to outlet locations and RG-11 for feeder and trunk cables for distances up to 400 feet and 625 series for lengths over 400'.

Cable	Distance (Feet)	Distance (Meters)
RG-6 Quad Shield	<=200	<=61
RG-11	>=201 and <=400	>61 and <=122
625 Series	>400	>122

Community Antenna Television (CATV) Systems

Community Antenna Television Systems are generally referred to as Cable TV. CATV systems must be designed in accordance with the following: Where required, provide a complete system to be owned and maintained by the government including backbone consisting of backboards/cabinets and wire and conduit with outlets and jacks in all offices, and other locations as required by the user. System must be designed in accordance with applicable TIA/EIA, BICSI, and NFPA 70 standards, and must be coordinated with the local CATV service provider. System must include headend amplifier when required by the local provider, amplifiers, splitters, combiners, line taps, cables, outlets, tilt compensators and all other parts, components, and equipment necessary to provide a complete and usable system. System must provide a high quality signal to all outlets with a return path for interactive television and cable modem access. The system must be designed to operate within the 5 to 1000 MHz bandwidth using 1000 MHz passive devices and a minimum of 750 MHz active devices. Each outlet must have a minimum signal level of 0 decibel millivolts (dBmV) (1000 microvolts) and a maximum of 15 dBmV at 55 and 750 MHz.

Distribution system must be star topology with each outlet connected via home run to a communications closet with a feeder cable or a drop cable and each communications closet connected to the head end equipment with a trunk cable.

Provide cable installed in conduit as follows:

- Trunk Cable, RG-11 or 625 series
- Feeder cable, RG-11
- Drop Cable, RG-6

APPENDIX A - Lake County Network Cabling Check List For Contractors

Lake County Network Cabling Check List For Contractors

Complete details can be found in the Lake County Telecommunications Specs and the Design Standards for Communication Wiring Systems Documents

- ./ Cable contractor must have a BICSI Registered/Certified Communications Distribution Designer (RCDD) on staff
- ./ Cable installer must be an experienced telecommunications contractor with a minimum of two years experience and must be certified in the system(s) being installing
- ./ Lake County IT shall receive a set of As-Built drawings (section 8.2 County telecommunications specs)
- ./ Contractor shall develop and submit to Lake County IT for approval a labeling system for cable installation (section 8.1 County telecommunications specs)
- ./ Lake County IT shall receive all cable tests documented and presented in a three ring binder(s) within three weeks after completion of the project.
- ./ All backbone fiber installation shall be done by a Corning certified vendor and all test results must be submitted to Corning as to comply with the Corning 25 year manufacturer warranty program
- ./ Contractor shall provide cabling warranty and services as specified in section 9.0 of County telecommunications specs
- ./ Proper grounding of all telecommunications equipment must meet best practices and County telecommunication specs section 7.0
- ./ All backbone fiber shall be manufactured by Corning cable systems, other fiber shall be manufactured by Corning cable systems unless approved by Lake County IT
- ./ All multimode fiber shall be 50/125um and shall be terminated with LC connectors
- ./ All single mode fiber shall be terminated with LC connectors
- ./ All fiber shall be terminated by the contractor on a wall mounted LIU panel or rack mounted LIU whichever is most appropriate and the LIU shall be equipped with LC to LC couplers
- ./ The minimum strand count for single mode backbone fiber running from building to building shall be 96 strand
- ./ The minimum strand count from each telecommunications closet to the Main Distribution Room shall be 12 strand of multimode and 6 strand of single mode, preferably provided with a single hybrid fiber cable
- ./ If a floor contains multiple telecommunications closets then a minimum strand count of 12 strand multimode and 6 strand single mode shall be run between each closet, preferably provided with a single a hybrid fiber cable
- ./ The minimum strand count from each server room to the Main Distribution Room shall be 12 strand of multimode and 6 strand of single mode, preferably provided with a single hybrid fiber cable
- ./ All data cables shall be blue colored Category 6, 100 ohm UTP and manufactured by an approved vendor
- ./ All data and voice cables shall be terminated on approved category 6 patch panels in the telecommunications closet. Voice cables should be terminated on an independent patch panel and labeled as such.
- ./ All data and voice cables shall be terminated at the work area using category 6 modular data jacks. Data cables and inserts are colored blue while voice cables and inserts are green.
- ./ Work area telecommunications outlets shall be placed one per 100 sq ft and should be within 3' of an electrical outlet and at the same height
- ./ Each work area outlet shall consist of two blue colored data jacks and two ivory colored voice jacks with a ivory colored four port flush faceplate
- ./ Each work area outlet will consist of two blue jacks terminated with data cables, one ivory jack terminated with a voice cable and one un-terminated ivory jack
- ./ Each CATV outlet shall consist of a 75 ohm coaxial connector as well as a single CAT6 green co n where the video run is greater than lOOm then a single mode fiber LC connection should be s c
- ./ A single pull string should be left in the conduit at each outlet position.

- %" Plywood covering as much wall, floor to ceiling, as possible not to be any smaller than 4' x 8' for the PBX equipment

Picture below is provided as an example of the backboard just for the telephone termination equipment

Appendix B

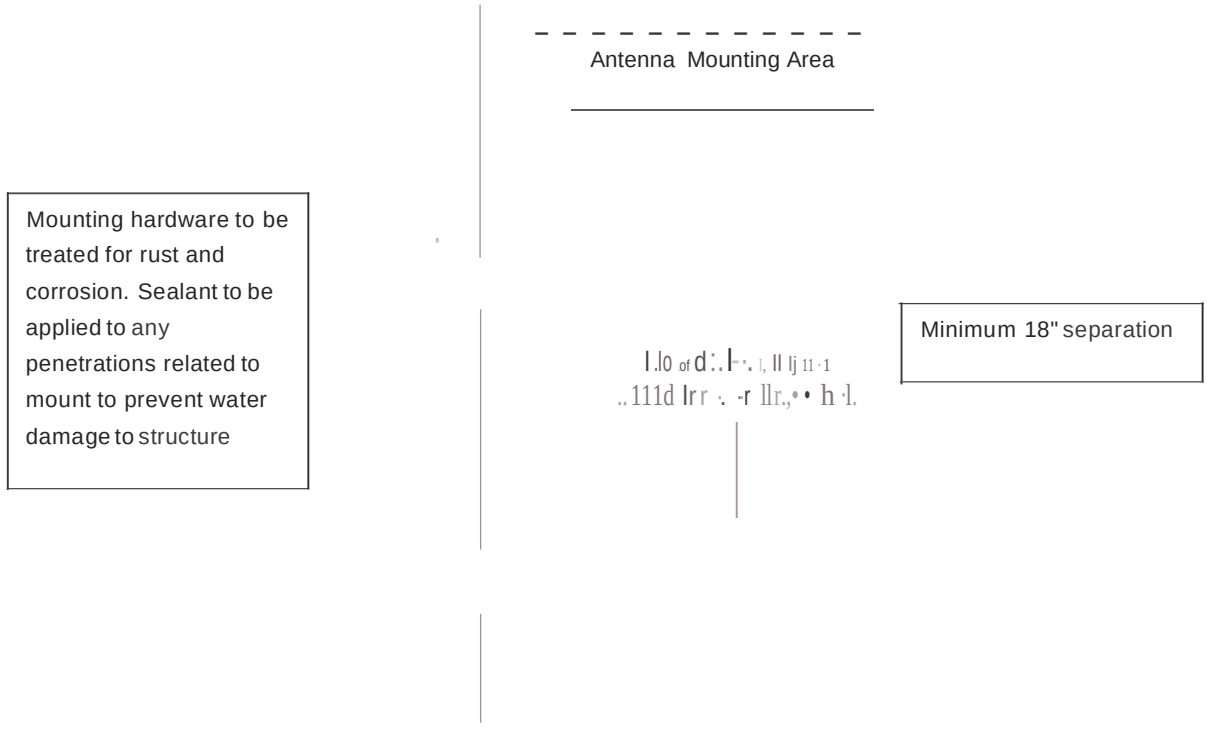
Lake County Public Safety
Fire Station Low Voltage Specifications

9/20/2016

Lake County Public Safety
fire Station Low Voltage Specs
(in addition to IT specs)

Requirement:

- Antenna mount support 2" diameter SCH 40 pipe mounted at peak of exterior roof above the structure with full360 degree line of sight. Must be galvanized or coated to prevent rust.
- A 1" non-conductive, contiguous conduit pathway with pull string from the intended location of the VHF and 800MHz control stations (internal Equipment room) to the peak of the exterior roof line at the rear of the station for access to the Antenna mount.
- A stranded green #6 ground wire should be homerun from the desired antenna mounting location to the main electrical panel ground or primary ground bonding bar for transient voltage mitigation.
  Antenna mount, installation of the mount, and related components will be the contractor's responsibility and should be installed according to Lake County Facilities best practices and recommendations.
- Example:



Appendix C

Lake County Public Safety
General Low Voltage Specifications for Outside

Lake County Public Safety

General Low Voltage Specs for Outside Plant

- Due to the Public Service Commission Tariff requirements Centurylink requires their own pathway from the right of way where their plant exists to the data facility at the fire station
- The following is required:
- Two-2" conduits (minimum) with pull strings from the entrance facility to the road right of way
    - If there is an external entrance facility(outside closet), a minimum of two 2" conduit pathways to the interior data facility
- Exterior conduit runs in excess of 200' should have 12"x18"x30" or larger pull box installed at the 200' marl<. Any pull boxes, hand holes, or vaults should have a bolt down lid, be traffic rated where required, and have a minimum of 4" of pea gravel in the bottom of the box.

  A white stranded 1112 trace wire should be placed in the trench with the low voltage conduits as a trace wire. Any splices in the trace wire must utilize a weather proof splice housing to prevent corrosion.

  Above ground conduit markers placed at the start and finish of the conduit run and at any pull box and any change of direction 90 degree or more. Trace wires are to be attached to the fiber markers following industry best practices for ease of access with locating equipment.
- Exterior grounding attachment point must be easily accessible above ground at the meter panel or H frame for the external entry surge protection equipment provided by the CATV, Telco, and Fiber providers.
- Interior grounding bonding buss bar must be installed in the interior data facility for equalizing transient voltage potentials across all metallic components. Also identified in County IT standards for telecommunications
- A $Y."$ fire rated plywood backboard lined wall mounting space in the Equipment Room (ER) for Public Address (PA) system hardware, fiber termination enclosure, CATV and Telco termination panels as well as any IT related infrastructure is a must. Coordination will be required to determine the actual space needed but at a minimum 100 sq. feet of useable space. This space should be free of water and humidity (i.e. mop sinks, hot water heaters, etc.)

Appendix D

Lake County Public Safety
PA Systems Specifications

Lal<e County Public Safety

9/20/2016

PA System Specs

•A shielded 18 Gauge 2 conductor feed/homerun is required from the desired amp location to each volume control location.

• A shielded 18 Gauge 2 conductor feed is required from each volume control location to each speaker being controlled by that volume control.

• A shielded 18 Gauge 4 conductor feed/homerun is required from the intended location of the VHF and 800MHz control stations to the amplifier.

*All wiring to be shielded 18 Gauge wire with minimum two conductors and a drain wire. All drain wires should be tied together at each volume control and at the amp.

*Minimum of 6' of slack should be provided at each speaker, volume control and the amp to allow removal for testing and troubleshooting.

*All above ceiling wire to be supported every 5' at a minimum per BICSI/NEC standards.

• All home runs for volume controls to be labeled on each end with room number

•All designated speaker locations to have a minimum of 12" clearance in all directions from obstructions (incl but not limited to duct work, sprinkler and related piping, electrical conduits, etc)

*Minimum of one speaker for every numbered room in the building, minimum of 1speaker in the bay area and outdoor patio, porch, etc. Indoor common areas minimum of one speaker for every 200 sq feet.

*Amplifier should be sized appropriately for the number of speakers and provide for audio at least 10db above ambient noise level

*PA system should be a 70V system

• Fire station interior lighting system should include a dry contact closure to turn on ingress/egress lights throughout the station when the station is alerted for a call. Dry contact closure should be wired with shielded 18 Gauge 2 conductor wire from the location of the 2 way radios (control stations) to the AC contactor for the lights and labeled as such on each end. The duration of the lighting during call activation is to be decided by LCFR staff at the time of acceptance (In the past the duration has typically been 3 minutes).

•A provision should be made in the station electrical system to turn off the stove if it's operational during an emergency call. This capability should have either an auto-reset or manual push button in the kitchen to reset the shunt. *Let it be noted that the radio system can provide a dry contact closure to trigger the shunt device.

Notes and other comments:

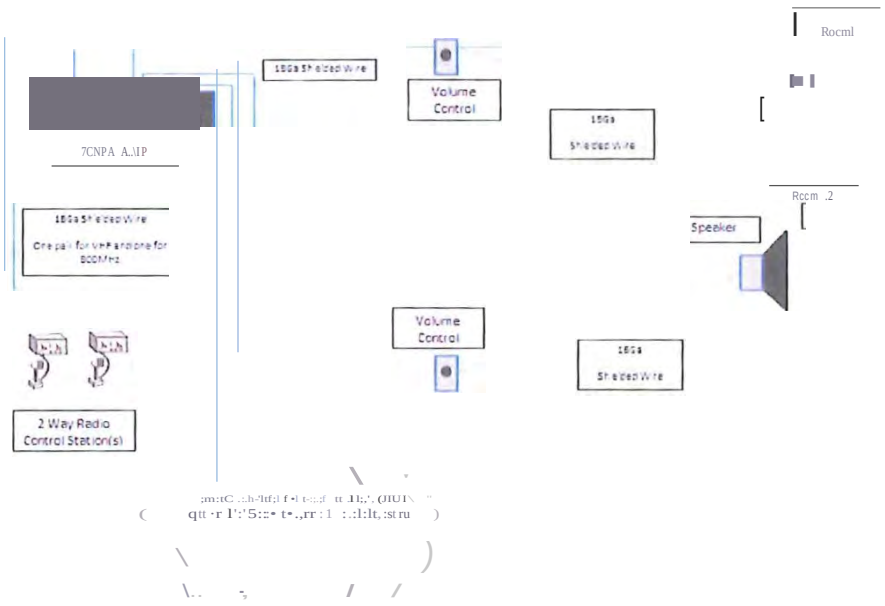
All LCFR stations currently utilize Bogen Power Vector series amplifiers and Bogen speakers.

Typical interior speakers are HFCSILP, A2T, CSD2X2U depending on the design of the station (drop ceiling or drywall, etc)

Belden 5300FE Shielded 2 conductor cable is currently being utilized at all

lake County Public Safety

PA System Specs (cont)



Sample drawing for reference