VOLUME 4 OF 6

RAMONA-ALESSANDRO ELEMENTARY SCHOOL
SAN BERNARDINO CITY UNIFIED SCHOOL DISTRICT
SAN BERNARDINO, CALIFORNIA

March 15, 2004
HMC # 3137117

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SCANNED

PROJECT MANUAL

TABLE OF CONTENTS

SPECIFICATIONS

DIVISION 1 GENERAL REQUIREMENTS

REFER TO VOLUME 1 OF 6

DIVISION 2 SITE CONSTRUCTION

Section	02222	Selective Demolition
	02223	Flooring Removal
	02224	Disposal Services – Lamps and Ballasts
	02226	Coring and Sawing of Concrete
	02740	Asphaltic Concrete Paving
	02750	Sitework Concrete
	02760	Pavement Marking
	02821	Fences and Gates

DIVISION 3 CONCRETE

NOT USED

DIVISION 4 MASONRY

NOT USED

DIVISION 5 METALS

Section	05500	Metal Fabrications
	05520	Handrails and Railings

DIVISION 6 WOOD AND PLASTICS

Section	06100	Rough Carpentry
	06200	Finish Carpentry
	06410	Casework

DIVISION 7 THERMAL AND MOISTURE PROTECTION

Section	07840	Firestopping
	07900	Joint Sealers

DIVISION 8 DOORS AND WINDOWS

Section	08110	Hollow Metal Doors/Frames
	08210	Wood Doors
	08710	Door Hardware
	08800	Glazing

DIVISION 9		FINISHES
Section	09050	Colors and Materials – Finish Schedule
	09130	Acoustical Suspension Systems
	09260	Gypsum Board
	09310	Ceramic Tile
	09511	Acoustical Ceilings - Lay-In
	09651	Resilient Tile Flooring
	09653	Top-Set Resilient Base
	09680	Sheet Carpet
	09900	Painting

DIVISION 10		SPECIALTIES
Section	10115	Markerboards
	10165	Toilet Compartments
	10430	Parking Area Signs
	10440	Signs - Restrooms
	10441	Identification Signs
	10442	Self-Illuminating Exit Signage
	10443	Exit Signage
	10475	Miscellaneous Specialties
	10520	Fire Extinguishers and Cabinets
	10800	Toilet and Bath Accessories

DIVISION 11	EQUIPMENT

NOT USED

DIVISION 12	FURNISHINGS

NOT USED

DIVISION 13	SPECIAL CONSTRUCTION

NOT USED

DIVISION 14		CONVEYING SYSTEMS
Section	14420	Wheelchair Lifts

DIVISION 15		MECHANICAL
Section	15400	Plumbing
	15800	Heating, Ventilating and Air Conditioning

DIVISION 16		ELECTRICAL

Section	16010	Basic Electrical Requirements
	16111	Conduit
	16117	Manhole
	16123	Building Wire and Cable
	16130	Boxes
	16141	Wiring Devices
	16160	Cabinets and Enclosures
	16170	Grounding and Bonding
	16180	Equipment Wiring Systems
	16190	Supporting Devices
	16195	Electrical Identification
	16461	Dry Type Transformers
	16470	Panelboards
	16510	Interior Luminaires
	16721	Fire Alarm System
	16760	Integrated Communication System
		ALS (Assisted Listening System)

SECTION 02222

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Remove designated building equipment, fixtures, components and utilities to permit installation of new construction.

B. Include Work required to demolish and remove elements of existing construction including partitions, ceilings, flooring, walls, paving, doors and similar elements of existing building construction, all as noted on Drawings or as required to permit installation of new construction. Refer to Cutting and Patching in Division 1, General Requirements for differentiation between "demolition" and "cutting".

1.02 REFERENCES

A. AQMD - South Coast Air Quality Management District, Local Regulations.

B. Title 24, Part 9, California Fire Code, Article 87, Fire Safety During Construction/Demolition.

C. CCR - Title 8, Subchapter 4, California Code of Regulations, Construction Safety Orders.

D. DSA IR M-3 - Division of the State Architect Interpretation of Regulations, Revised June 2003.

E. Chapter 19A, 2001 California Building Code.

1.03 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of capped utilities.

1.04 HAZARDOUS MATERIALS

A. Conform strictly to AQMD, Local Regulation. Copies of document are available at Architect's office.

B. As required by Rule 1403, Contractor shall file written notification with South Coast Air Quality Management District at least 10 days prior to commencing Work of this Section. Certification of required notifications shall be submitted to Architect under provisions of Division 1, General Requirements.

C. Demolition and removal of hazardous materials or systems is part of this Contract.

1. General Applicability of Codes and Regulations: Except to extent that more explicit or more stringent requirements are written directly into Contract Documents, applicable codes and regulations have same force and effect (and are made a part of Contract Documents by reference) as if copied directly into Contract Documents, or as if published copies are bound herewith; in event of conflict, more stringent requirements shall apply.
2. Contractor Responsibility: Contractor shall assume full responsibility and liability for compliance with applicable Federal, state, and local codes and regulations pertaining to asbestos abatement work, including but not limited to, permits, engineering controls, work practices, hauling, disposal, and protection of employees and visitors at Site, and persons occupying areas adjacent to Site. Contractor is responsible for providing training and medical examinations and maintaining training and medical records of personnel as required by applicable federal, state, and local regulations.
3. Federal Requirements: Requirements governing asbestos abatement work or hauling and disposal of asbestos waste materials include, but are not limited to following:
   a. OSHA: U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), including but not limited to:
      1) Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite; Final Rules Title 29, Part 1910, Section 1001 and Part 1926, Section 58 of Code of Federal Regulations.
      2) Title 29, Part 1910, Section 134 of Code of Regulations.
      3) Title 29, Part 1926, of Code of Federal Regulations.
      4) Title 29, Part 1910, Section 2 of Code of Federal Regulations.
      5) Title 29, Part 1910, Section 1200 of Code of Federal Regulations.
      6) Title 29, Part 1910, Section 145 of Code of Federal Regulations.
      7) Title 29, Part 1910, Section 1101 of Code of Federal Regulations.
      8) Title 29, Part 1910, Section 132 of Code of Federal Regulations.
      9) Title 29, Part 1910, Section 133 of Code of Federal Regulations.
   b. DOT: U.S. Department of Transportation, including but not limited to:
      1) Title 29, Parts 171 and 172 of Code of Federal Regulations.
   c. EPA: U.S. Environmental Protection Agency (EPA), including but not limited to:
      1) National Emission Standard for Hazardous Air Pollutants (NESHAPS).
      2) Title 40, Part 61, Sub-part A and Sub-part M (Revised Sub-part B) of the Code of Federal Regulations.
      3) Title 40, Part 61, Section 152 of Code of Federal Regulations.
4. State Requirement: Which govern asbestos abatement work or hauling and disposal of asbestos waste materials include, but are not limited to following:
   a. CAL/OSHA: California Division of Occupational Safety and Health (DOSH), including but not limited to:
      1) Title 8, Section 5208 of California Code of Regulations (CCR).
      2) Title 8, Section 1529 of California Code of Regulation (CCR).
      3) Title 8, Section 5208.1 of California Code of Regulations (CCR).
      4) Title 8, Section 5144 of California Code of Regulations (CCR).
   b. DHS: Department of Health Services (DHS), including but not limited to:

1) Title 22, Division 4, Chapter 30 of California Code of Regulations (CCR).

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

3.01 PREPARATION

A. Disconnect, remove and cap designated utility services within demolition areas. Notify Owner 48 hours in advance of any utility shut-down.

B. Protection:
1. Protect existing items which are not indicated to be altered.
2. Adequately protect staff and public from harm and accident during demolition operations by the erection of proper barricades, signs, lighting, guard rails or other safety precautions. Conform to Title 8, Subchapter 4, CCR and NFPA 241.
3. Protective Devices: Install substantial enclosures, weatherproof and dust-proof shields, protective covers, screens and similar devices. Erect and move when necessary to permit use of existing rooms, areas or facilities. Remove entirely when their use is no longer essential. Patch or repair all areas where devices have been removed.

3.02 TEMPORARY MEASURES - LIFE SAFETY

A. Emergency Exits: No enclosure, shield or protective covering shall interfere with use of emergency exits in existing facilities at any time.

B. Maintain fully charged fire extinguishers and water hoses readily available during demolition operations. Test electrical conductors for disconnection prior to removing.

C. Provide temporary, but equivalent, fire alarm, detection or suppression systems when any system is impaired by Work of this Section. Temporary systems shall be inspected and tested monthly or at other more frequent intervals as required by Owner.

D. Maintain free and unobstructed access to emergency services when required by Owner.

E. Post NO SMOKING signs in English and Spanish, in number and location as approved by Architect.

F. Reduce flammable and combustible fire load to minimum by daily removal of debris.

G. Instruct construction personnel in fire safety and fire drill policies appropriate for areas where demolition operations occur.

H. Deployment, disposition, administration and implementation of any and all safety measures shall be sole responsibility of Contractor.

3.03 EXECUTION

A. Demolish in orderly and careful manner. Maintain protected egress and access at all times.

B. Except where noted otherwise, immediately remove demolished materials from site and dispose legally. Do not utilize Owner's disposal system.

C. Remove materials to be re-installed or retained in manner to prevent damage. Store and protect until re-installation.

D. Do not burn or bury materials on site.

E. Upon completion of Work, leave areas of Work in clean condition.

3.04 REPAIR AND ALTERATIONS WORK

A. New and existing Work that is cut into, altered, damaged, relocated or reinstalled shall be restored to original conditions. Workmanship and materials to conform to applicable provisions of other applicable Sections of Specifications.

B. Cutting Equipment: Jack-hammers and vibratory cutting equipment may be utilized under following conditions:
   1. Time of day, and duration of Work on each given day shall be coordinated with Project Inspector and Owner. Minimum of 24 hours advance notice required.
   2. Compressors shall be well muffled.
   3. Every consideration shall be exercised toward comfort of staff and public. Excessive noise or vibrations will constitute just cause for immediate stoppage of Work.

C. Cutting:
   1. Conform to Provisions of Division 1, General Requirements.
   2. Concrete: Cut with saws or other approved method, but do not overcut openings. Reinforcing bars, except where bonded into new concrete, shall be cut off and ends painted with bituminous paint before being enclosed.
   3. Structural Members: Cut only when authorized by Architect and approved by DGS/DSA. Agency approvals shall be obtained by Architect, not by Contractor.

D. Removal of Existing Floor Finishes:
   1. Remove existing floor covering materials in areas indicated. See Section 02223 for additional requirements for removing resilient floor covering.
   2. Sandblast concrete floor surfaces (or submit alternate method to Architect for approval) to remove remaining adhesive, mortar, paint and similar materials which will affect bond of new floor coverings.
   3. Patch voids with non-shrink grout.

4. Grind high spots and fill low spots to provide an even surfaced substrate for specified new floor covering materials. Leveling materials shall be compatible with mortars and adhesives required to install finish floors. Floors shall not vary more than 1/4 inch in 10 feet as determined with straightedge.

E. Patching, Repairing and Finishing:
   1. Unless otherwise approved concrete shall be minimum 2,500 psi concrete for patching slabs on grade. Strength of concrete for patching structural members or deck fill shall be determined by Architect. Where cut edges are to remain exposed, finish edges with cement mortar at least 3/4 inch thick, applied over epoxy adhesive and finished to match adjoining surfaces.
   2. Plaster: Dampen edges of existing plaster. Plaster patching shall be of type, thickness and finish to match existing Work.

F. Acoustical Ceilings: Existing acoustical ceiling which will be partially removed or will require patching, shall be repaired (or extended) with materials and suspension system identical to existing materials and suspension system. In no case shall components added be less in standard as defined in DSA IR M-3.

G. Painting: Areas to be repainted or patched shall be prepared and finished as specified in Section 09900, Painting. Where painting of existing surfaces is scheduled, paint manufacturer's standard specification for interior or exterior maintenance painting may be utilized, when approved by Architect for each surface application.

H. Holes required through existing stud wall, concrete or masonry construction to accommodate new electrical conduits and piping and ductwork shall be provided as specified in Divisions 15 and 16. Provide proposed routing of utilities as required in Coordinated Drawing, Division 1, General Requirements.

I. Holes required through concrete or masonry Work required for structural purposes shall be neatly drilled as required to accommodate specific items. Coring shall be performed with approval of Architect and in accordance with details on Drawings.
   1. Approval of details by DGS/DSA is required. Agency approvals shall be obtained by Architect, not by Contractor.

J. Work shall be fully coordinated to ensure proper sequence, limits, methods and time of performance. Arrange Work so as to impose a minimum of hardship on present operation of facilities.

K. Remove such existing ceilings, floors, walls, finish materials or equipment as required to complete Work. Restore such surfaces to their original condition after Work is completed.

L. Provide adequate ventilation during all operations to prevent accumulation of dust, fumes, vapors or gases.

M. Miscellaneous Work: Items not specifically mentioned shall be repaired, patched or finished like new Work or to match existing adjoining surfaces as approved. Surfaces damaged shall be restored to original condition.

3.05 SALVAGE AND DISPOSAL

A. Disposal: Removed material other than items to be salvaged or reused shall become Contractor's property and shall be removed from site. Debris shall be cleaned up and disposed of by Contractor promptly and continuously as Work progresses, and not allowed to accumulate. Sprinkle the debris to prevent dust nuisance. Secure and pay for required hauling permits and pay dumping fees and charges.

END OF SECTION

SECTION 02223

FLOORING REMOVAL

PART 1 GENERAL

1.01 WORK INCLUDED

A. Remove designated flooring materials.

B. Temporary partitions to allow building occupancy.

1.02 REFERENCES

A. RFCI - Resilient Floor Covering Institute - Recommended Work Practices for the Removal of Resilient Floor Coverings: 1990.

B. Southern California Air Quality Management District Local Regulations.

C. NFPA 241 - National Fire Protective Association - Safeguarding Construction, Alteration and Demolition Operations.

D. CCR - California Code of Regulations, Title 8, Subchapter 4, Construction Safety Orders.

1.03 REGULATORY REQUIREMENTS

A. Conform to AQMD Local Regulations, when hazardous or vermin infested materials are encountered. Copies of document are available at Architect's Office.

B. Conform to Requirements of RFCI. Copies of document are available at the Architect's Office.

1.04 QUALIFICATIONS

A. Applicator: Company specializing in removal of flooring materials with minimum 3 years experience.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 PREPARATION

A. Protect existing building components which are not indicated to be altered.

B. Adequately protect staff and public from harm and accident during demolition operations by the erection of proper barricades, signs, lighting, guard rails or other safety precautions. Conform to CCR and NFPA 241.

C. Protective Devices: Install substantial enclosures, weatherproof and dust-proof shields, protective covers, screens and similar devices. Erect and move when necessary to permit use of existing rooms, areas or facilities. Remove entirely when their use is no longer essential. Patch or repair all areas where devices have been removed.

3.02 TEMPORARY MEASURES - LIFE SAFETY

A. Emergency Exits: No enclosure, shield or protective covering shall interfere with the use of emergency exits in existing facilities at any time.

B. Provide temporary, but equivalent, fire alarm, detection or suppression systems when any system is impaired by the work of this Section. Temporary systems shall be inspected and tested monthly or at such other intervals approved by the Owner.

C. Maintain free and unobstructed access to emergency services when required by Owner.

D. Reduce flammable and combustible fire load to minimum by daily removal of debris.

E. Instruct construction personnel in fire safety and fire drill policies appropriate for the areas where demolition operations occur.

F. Require workmen to wear safety glasses.

G. The deployment, disposition, administration and implementation of any and all safety measures shall be the sole responsibility of the Contractor.

3.03 EXECUTION

A. Move all appliances and furniture from the Work area.

B. Remove binding strips or other restrictive moldings, applied base or cove base.

C. Utilize mixture of detergent and warm water, spray applied, to abate dust particles during materials removal.

D. Wet/Dry vacuum entire surface utilizing a high efficiency particulate air filter machine with disposable dust bag and metal floor tool.

E. Remove flooring in strips 4 to 8 inches wide, parallel to any wall. Make cuts through material to concrete, in straight line.

F. Systematically pull wear layer from backing by rolling on to a cylinder.

G. Constantly spray detergent mixture into area of separation.

H. When resilient material is homogeneous, pull entire layer loose from substrate.

I. Do not permit felt backing to be compressed by walking on surface.

J. Immediately dispose of rolls of removed materials.

K. Remove backing and other residue remaining on slab by scrape process. Keep surfaces constantly wet to prevent dust. Avoid excess wetting or standing water.

L. Sanding or dry scraping is not permitted. Sweeping or brashing not permitted.

M. Wet/Dry vacuum entire Work area.

N. After area has dried sufficiently, vacuum entire Work area with HEPA filtration system with metal floor attachment.

3.04 MATERIALS DISPOSAL

A. Place removed materials in tightly sealed, impermeable trash bags or closed container. Include vacuumed materials.

B. Identify bags with appropriate labels and warning tags.

C. Dispose legally in appropriate disposal facility, on a daily basis as work progresses.

D. Secure and pay for all required hauling permits and dumping fees.

E. Do not utilize Owner's disposal system or any other Property Owner's disposal system.

3.05 PROTECTION OF FINISHED WORK

A. Do not permit traffic over cleaned surfaces.

END OF SECTION

SECTION 02224

DISPOSAL SERVICES - LAMPS AND BALLASTS

PART 1 - GENERAL

1.01 PROJECT DESCRIPTION

A. Contractor shall provide all labor, materials, equipment, transportation, documentation and services necessary for destruction of ballasts, fluorescent lamps or HID lamps specified herein.

B. Contractor shall provide waste reduction, recycling, refining and disposal of lighting retrofit waste defined as specific material classification (i.e. non-leaking PCB ballasts, leaking PCB ballasts, non PCB ballasts, fluorescent lamps or HID lamps).

C. Owner's Option: Owner can contract to local PCB recycling facility for 25 or less PCB Small Capacitors for recycling. Twenty Five or less PCB Small capacitors are not regulated under Section 761.60(b)(2). The said facility will issue a Certificate for proper documentation.

D. Ballasts and lamps shall be placed in Department of Transportation (DOT) approved, POPS containers, or other packaging suitable for lamp transport provided by Contractor and transported to federal or state approved processing facility.

E. PCB containing portions of ballasts shall be separated from non-PCB portions. All PCB containing material shall be disposed of by TSCA approved incinerator. Non-PCB portions shall be processed to reclaim recyclable components such as iron, steel, copper and aluminum. Landfill of any PCB waste, including capacitors, potting compound and process debris is prohibited under terms of this Contract.

F. Fluorescent lamps or HID lamps shall be processed to reclaim recyclable components such as glass and aluminum end caps at facility approved in accordance with 40 Code of Federal Regulations (CFR) 264.1. Phosphor powder and mercury shall be retorted by federal or state approved processing facility in accordance with 40 CFR 268.42.

G. Contractor to field verify number of ballasts and lamps to be processed under terms of this Contract. Price for disposal of these ballasts and bulbs shall be included as a part of this Work.

1.02 APPLICABLE REGULATIONS

A. Applicable sections, latest editions and addenda of following government regulations, codes, industry standards and recommended practices form part of this Specification. Nothing in these Specifications is to be construed as permitting Work not conforming with these regulations.
   1. DOT Title 49, CFR, Parts 172 & 173, Subpart J.

2. United States Environmental Protection Agency (USEPA) Title 40, CFR, Parts 261, 262, 263, 264, 761 and any other section which may be applicable to this bid.
3. Federal Occupational Safety and Health Administration (OSHA) Title 29, CFR, Part 1910.
4. State Occupational Safety and Health Administration.
5. National Electric Code (NEC).
6. All applicable county and city codes, ordinances and regulations.

B. Contractor is cautioned that he/she is responsible for ascertaining extent to which these regulations affect operations resulting from solicitation and comply therewith.

1.03 CONTRACTOR

A. Contractor shall provide written evidence that, as major part of their business, Contractor has been engaged in PCB disposal activities and/or hazardous waste disposal activities (as it may apply to fluorescent and HID lamps). Including processing and destruction of PCB ballasts and/or fluorescent and HID lamps. Related activities shall include transportation, USEPA required documentation, servicing and storage of high and low concentrations of PCB fluids and solids, and destruction of PCB carcasses. Evidence is to take form of commercial storage and incineration or alternative disposal approvals in accordance with 40 CFR 761.60, 761.65 or 761.70 and/or USEPA and/or state approvals, in accordance with RCRA standards and guidelines presented in 40 CFR 264 and 265.

B. Contractor shall submit a reference list of representative projects they have successfully contracted with for PCB disposal services and mercury lamp disposal. Customers' names, addresses, telephone numbers and company contracts shall be provided with Bid.

C. Contractor shall provide evidence that reclaimed aluminum, copper, iron steel and/or glass are packaged to buyer's specifications and sold for purpose of re-manufacturing, Contractor shall provide copy of most recent shipping document to verify sale of reclaimed materials.

D. Contractor shall provide blank copies of following procedural documents:
1. Invoice packet to include:
   a. Invoice
   b. Letter of material receipt
   c. Copy of inbound shipping manifest
2. Recycling and disposal packet to include:
   a. Copy of outbound shipping manifest
   b. Certificate of recycling
   c. Certificate of disposal

E. Contractor shall supply statement of qualifications which provides details as follows:
1. PCB ballast and lamp disposal services:
   a. Regulatory assistance and compliance
   b. Transportation capabilities
   c. Waste storage, processing and disposal capabilities

1) Applicable facility siting and specifications (40 CFR 761.65 (b) or 264.18.
2) Applicable facility engineering documents (SPCC, SPPP, contingency plan, etc.)

d. Metals recycling and trade experience
e. Personnel resources
f. Auxiliary resources

2. Key support capabilities
   a. Project management experience
   b. Waste analysis/materials testing
      1) On-site lab
         a) Laboratory Quality Assurance/Quality Control (QA/QC) plan
         b) State Certification
      2) Off-site lab
         a) State certification
         b) QA/QC plan
         c) Copy of contract with facility
   c. QA/QC
      1) Verification of laboratory services for monitoring of resale materials
         a) Verify ballast reclaimables < 2 ppm PCB
         b) Verify lamp reclaimables < 0.2 mg/L mercury per TCLP testing
   d. Occupational health and safety plan
   e. Training programs
   f. Waste tracking systems
   g. Facility-specific information
      1) Resumes of management and key personnel
      2) Management organizational chart
      3) Copy of permit to operate a fluorescent lamp storage and recycling facility
      4) Closure plan and corresponding financial assurance
      5) USEPA's approval to operate as a commercial store of PCB waste, per 40 CFR 761.65.
      6) Copy of EPA's letter of approval and authorization of contractor's "alternate disposal technology" in accordance with 40 CFR 761.60(e). For purposes of recycling PCB and non-PCB ballast waste, proof of USEPA approval of recycling methods and processes is mandatory.

1.04 USE OF SUBCONTRACTORS

A. When any portion of Contract is to be performed or handled by other than Contractor specifically referenced herein, Contractor shall identify in submission of its bid, name, address, and phone number of any and all subcontractor, etc., and shall identify exactly what each subcontractor will be doing.

B. Subcontractors must meet approval of Owner, subcontractor must comply with all terms and conditions as specified herein and must have insurance coverage applicable to Work performed and described herein.

C. Any changes in subcontractor, disposal sites and incineration facilities utilized by Contractor during term of Contract must be approved by Owner prior to onset of any Work being performed by Contractor. Requests for approval must be made in writing and must be directed to Owner.

1.05 CONTAINERIZING AND MARKING

A. PCB ballasts and hazardous materials generated from project activities and cleanup operations shall be placed in USEPA specified containers. Only approved drums, conforming to USEPA specifications (DOT 17C or POPS) shall be used to contain leaking and non-leaking ballasts.

B. Containers used shall be properly sealed, marked, labeled and dated.

C. Ballasts which are visibly leaking shall be packaged separately from those ballasts which do not show visible signs of leakage.

D. Contractor shall include pricing for DOT 17C or POPS equivalent containers and/or lamp boxes of fiber drums.

1.06 TRANSPORTATION TO DESTRUCTION/SERVING FACILITIES

A. Ballasts shall be transported to TSCA permitted processing/destruction facility.

B. PCB containing capacitors, components, debris and potting compound shall be transported to a TSCA permitted incineration facility for ultimate destruction.

C. For disposal of leaking PCB ballasts and associated waste, Contractor and/or subcontractor and vehicles must be licensed for transportation and hauling of regulated materials/hazardous waste. Drivers of these vehicles shall be trained in laws, rules and regulations governing transportation of PCB materials. Vehicles must be plainly marked as specified by DOT, USEPA, State Department of Health Services, State Police and State Department of Transportation.

D. Lamps shall be transported to federally permitted TSDF or state permitted hazardous waste storage and recycling facility.

E. Recovered lamp components must be certified as non-hazardous through TCLP analysis.

F. Non-recoverable lamp components must meet 40 CFR 268.42 standards prior to disposal.

1.07 INSURANCE

A. Owner's Option: 25 or less PCB Small Capacitors can be directed to local PCB recycling facility with minimal cost.

B. Disposal Contractor shall possess and maintain for duration of this Contract following minimum insurance coverage.

1. Environmental impairment (pollution) liability insurance required of PCB incineration facility is to be $5,000,000 per occurrence and $5,000,000 aggregate. Transportation company responsible for transport of PCB material is to be insured for $1,000,000 per occurrence and $1,000,000 aggregate, with $9,000,000 umbrella (or another combination of $10,000,000 total coverage). These insurances shall cover all necessary or reasonable costs or expenses of removing, nullifying, cleaning up, or rendering ineffective any spillage, or other PCB contamination associated with this Contract.
2. Environmental impairment (pollution) liability insurance required of ballast processing facility: $5,000,000 per occurrence and $10,000,000 aggregate for covering all necessary or reasonable costs or expenses of removing, nullifying, cleaning up, or rendering ineffective any spillage or other PCB contamination associated with this Contract.
3. Commercial general liability: $1,000,000 per occurrence and $1,000,000 aggregate with $9,000,000 umbrella (or another combination of $10,000,000 total coverage). This policy must cover all vehicles to be used for this Contract, whether owned or non-owned.
4. Commercial automobile liability: $1,000,000 per occurrence and $1,000,000 aggregate with a $9,000,000 umbrella (or another combination of $10,000,000 total coverage). This policy must cover all vehicles to be used for this Contract, whether owned or non-owned.
5. Upon Contract award, original certificates of Insurance must be submitted to Owner, indicating all required coverage and endorsements described above.

1.08 DOCUMENTATION

A. Contractor shall coordinate all activities under this Section with Owner's Representative. Provide information as to number of ballasts loading per ballasts on fluorescent tubes per same service. Contractor shall provide Owner with comprehensive information on all firms to be involved in PCB and lamp related Work activities as part of this Contract prior to commencement of Project. Such information shall include minimum of:
   1. Name, address, telephone number, USEPA ID number, state transporter's ID number and hauler registration number of the firm(s) responsible for transportation of PCB solids and fluids, ballast containers and/or lamps which maybe delivered as hazardous waste.
   2. Name, address, telephone number and USEPA ID number of firm(s) responsible for ultimate final destruction of ballasts and reclamation of recyclable components, and for firms responsible for lamp retorting.

B. Contractor shall provide Owner with comprehensive documentation of work activities upon completion of Work and prior to final payment. Such documentation shall include minimum of:
   1. Type and size of containers, contents, weight or unit of measure, date transported and name, address, telephone number, USEPA ID number, and copy permit letter of processing and/or disposal facility.
   2. Written certification i.e. uniform hazardous waste manifest demonstrating receipt of material at disposal/incineration facility. Such certification shall be signed by person authorized by disposal/incineration facility to accept PCB items for disposal.

3. Certificates of destruction for PCB liquids, solids and ballast carcasses, and Certificates of Retort for phosphor powder.

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Contractor shall remove and legally dispose of lamps and ballasts indicated to be removed from project site.

END OF SECTION

SECTION 02226

CORING AND SAWING OF CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Coring and sawing of existing concrete walls and slabs for penetrating of mechanical systems.

1.02 CODES AND STANDARDS

A. Reference Standards and Specifications: Comply with the provisions of the following specifications and standards, except as otherwise noted or specified.
   1. Safety and Health Standards Digest - Construction Industry (OSHA-2202) "Occupational Safety and Health Administration"

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 PREPARATION

A. Before coring, the Contractor shall determine the following:
   1. Location and size of steel-rebar in the walls and slabs.
   2. Location of utility lines in the concrete.

B. Notify Architect of any structural coring per Section 02222.

3.02 CORING REQUIREMENTS

A. All holes over 1" in diameter must be drilled with a non-impact rotary tool in order to minimize spalling at the hole exit.

B. Supply non-impact rotary tool with diamond core drills of proper size. Supply equipment in accordance with OSHA standards.

C. The hole should have 1/2 inch clearance of the largest portion of the pipe or conduit passing through the hole. This prevents dust or foreign matter from entering or leaving the area. If patching or packing is required around the pipe or conduit it is recommended that a minimum of one inch clearance be allowed to accommodate such patching or packing.

D. The rotary machine and tools used to drill the holes or openings must operate below OSHA noise standards and a lubricant, water or other chemical coolant, must be used to maintain a dust-free operation.

E. Slurry or tailings generated from the drilling operation must be vacuumed or washed from the Work area.

F. Equipment in drilling operations must meet all OSHA standards and specifications as to plugs, noise and fume pollution, wiring and maintenance.

3.03 SAWING REQUIREMENTS

A. Provide sawing equipment adequate in units and power to complete sawing operation.

B. The Contractor shall be responsible for reference points to properly chalk line his proposed saw cuts.

C. Pilot holes and cored holes at corners shall be provided prior to sawcutting.

D. Sawing Method - The sawing method shall consist of cutting a groove in the concrete with a power-driven concrete saw to the required depth and width as designated.

3.04 PROTECTION OF EXISTING PROPERTY

A. Damages to utilities or other objects within the concrete slab are the responsibility of the Contractor.

B. Prior to starting the sawing operation, the Contractor shall protect against damage to the property caused by water travelling through the cracks in the concrete.

C. Adequate protection against water or other damage caused by the drilling or sawing above, adjacent to or below the critical or occupied areas shall be provided.

3.05 CLEAN-UP

A. Do not allow debris to accumulate. Clean up all concrete and cement materials, equipment, and debris upon completion of each portion of the concrete Work. Remove demolished materials from the site as Work progresses. Upon completion of Work, leave areas in clean condition.

END OF SECTION

SECTION 02740

ASPHALTIC CONCRETE PAVING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Asphaltic concrete paving and surface sealer.
   1. Slurry Sealing.

1.02 REFERENCES

A. SSPWC - Standard Specifications for Public Works Construction, Latest Edition.

B. AQMD Air Quality Management District, Local Regulations, Cutback Asphalt.

C. CSS - Caltrans Standard Specifications, 1997 Edition.

D. ASTM D977 - Standard Specification for Emulsified Asphalt.

E. ASTM D3381 - Standard for Viscosity-Graded Asphalt Cement in Pavement Construction.

F. ISSA - International Slurry Seal Association – Recommended Performance Guidelines for Emulsified Asphalt Slurry Seal, A105.

G. ASTM D3910 - Design, Testing, and Construction of Slurry Seal.

1.03 QUALITY ASSURANCE

A. Perform Work in accordance with Section 302, SSPWC.

B. Obtain materials from same source throughout, using batch plant method for proportioning and mixing.

1.04 SUBMITTALS

A Submit per Section 1300 Administrative Requirements.

1.05 ENVIRONMENTAL REQUIREMENTS

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

B. Conform to AQMD, Local Regulations.

PART 2 PRODUCTS

2.01 ACCESSORIES

A. Primer: Cutback type, slow curing, Grade SC 70 or Grade SC 250.

B. Tack Coat: ASTM D2397 for CQS-1H, slurry Seal.

C. Seal Coat: Conform to Section 203-9, SSPWC.
1. GUARD TOP by Industrial Asphalt, Inc., Irwindale, CA.
2. SATIN SEAL by Blue Diamond Co., Long Beach, CA.
3. Or equal, as approved in accordance with Division 1, General Requirements for Substitutions.

2.02 ASPHALT PAVING MIX

A. Slurry Mix Design: ISSA Type II (General) 1/4" thick.

PART 3 EXECUTION

3.01 PREPARATION - PRIMER AND TACK COATS

A. Apply primer coat on base course surfaces in conformance with Section 302-5.3, SSPWC, at rate of .10 to .25 gallons per sq. yd. Allow to cure prior to application of asphalt course.

B. Apply tack coat to contact surfaces of curbs, gutters and adjacent materials except where expansion joints occur, and over existing asphalt surfaces in conformance with Section 302-5.4, SSPWC.

C. Coat surfaces of catch basin frames with oil to prevent bond with asphalt pavement. Do not tack coat these surfaces.

3.02 SEAL COAT

A. Apply seal coat 28 days or more after surface course application, in accordance with manufacturer's recommendations.

B. Apply seal coat to surface course in accordance with Section 302-8.2, SSPWC.

C. Add water to specified seal coat material. When air temperatures of 90 degrees F or more are encountered during application, consult manufacturer for recommendations.

D. If pavement surface exhibits imperfections noted in Paragraph 3.05.F. above, as determined by the Architect, the addition of sand aggregate to seal coat, and amounts thereof, shall be as recommended by the manufacturer.

E. A second application shall be made after first coat has dried to the touch. When sand is added to the first seal coat, two additional coats without extra sand shall be applied.

F. Allow seal coat to dry before permitting traffic or striping.

3.03 SLURRY SEALING

A. Prior to slurry application, repair areas and major depressions, wide cracks filled, remove dust, dirt and other foreign material from the surface.

B. Apply a tack coat of diluted emulsified asphalt of same type and grade specified for the slurry.

C. Apply slurry in accordance with [ASTM D-3910], the Asphalt Institute Standards and the International Slurry Seal Association. Minimum thickness of 1/4".

3.04 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.

B. Scheduled Compacted Thickness: Within 1/4 inch.

C. Variation From True Elevation: Within 1/2 inch.

3.05 PROTECTION

A. Immediately after placement, protect pavement from mechanical injury.

END OF SECTION

SECTION 02750

SITEWORK CONCRETE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Cast-In-Place concrete pedestrian paving.

B. Concrete stairs, ramps and landings.

C. Utility concrete pads.

D. Detectable Warnings.

1.02 REFERENCES

A. ASTM A185 - Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.

B. ASTM A615 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

C. ASTM C33 - Concrete Aggregates.

D. ASTM C94 - Ready-Mixed Concrete.

E. ASTM C150 - Portland Cement.

F. ASTM C171 - Sheet Materials for Curing Concrete.

G. ASTM C1107 - Packaged Dry, Hydraulic - Cement Grout (Non-Shrink).

H. ASTM D1751 - Preformed Expansion Joint Fillers for Concrete, Paving and Structural Construction.

I. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.

J. Chapter 19A, 2001 California Building Code.

1.03 SUBMITTALS

A. Placement Schedule for approval: Provide details or sketches showing location of each placement of concrete Work. Do not deviate from location of expansion joints or scorelines.

B. Product data on joint filler, sealants, curing compounds and reinforcing.

C. Project Record Documents
   1. Accurately record actual locations of embedded sleeves, utilities and components that are concealed from view.

1.04 QUALITY ASSURANCE

A. Maintain one copy of all records on site.

B. Acquire cement and aggregate from same source for all Work.

C. Conform to Section 1905A.13, California Building Code, when placing concrete during hot weather.

D. Conform to Section 1905A.12, California Building Code, when placing concrete during cold weather. No placement of concrete permitted below 50 degrees Fahrenheit.

E. Mock-up
   1. Install minimum 5 feet by 5 feet mock-up of concrete sidewalk for each color specified.
   2. Install mock-up one month prior to installation.
   3. Locate as approved by the Architect.
   4. Use identical forming system, sub-grade type, reinforcing, expansion joints, score joints, finishing and edge trim as specified for installation.
   5. Architect approval required.
   6. Mock-up may not be used in final installation.
   7. Remove mock-up materials from site and dispose legally.

1.05 WARRANTY (DETECTABLE WARNINGS [AND DIRECTIONAL] TEXTURE)

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of detectable warnings surface products that fail in materials or workmanship within specified warranty period. Warranty shall indicate compliance with architectural standards as published in current edition of California Building Code.
   1. Failures include, but are not limited to, the following:
      a. Shape, color fastness, confirmation, sound-on-cane acoustic quality, resilience, and attachment will not degrade significantly.
      b. Degrade significantly means that product maintains at least 90 percent of its approved design characteristics, as determined by the authority having jurisdiction.
   2. Warranty Period: Five years from date of Final Completion.

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

A. Cement: ASTM C150 - Type I - Normal or Type II - Moderate, Portland Cement type, from one manufacturing plant only.

B. Aggregates: ASTM C33, single source for all materials.

C. Non-Shrink Grout: ASTM C1107, premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 5,000 psi in 24 hours and 8,000 psi in 7 days; of consistency suitable for application and a 30 minute working time.

2.02 ACCESSORIES

A. Expansion Joints:
   1. Expansion Joint Filler - ASTM D1751: Close cell bituminous saturated fiberboard, 1/2 inch thick maximum, FIBER EXPANSION JOINT manufactured by American Highway Technology, Kankakee, IL, or approved equal.
   2. Joint Devices: Integral extruded polystyrene plastic; 1/2 inch thick maximum, with removable top strip exposing sealant trough; JOINT CAPS.
   3. Sealant: Polyurethane two-component type, self-leveling, for level surface application, UREXPAN NR-200 or DYNATRED for sloped surfaces, manufactured by Pecora Corp., Harleysville PA, or equal. Color shall be selected by Architect from manufacturer's standard list of colors.
   4. Primer: As recommended by sealant manufacturer.
   5. Joint Backing: Round, closed cell polyethylene or butyl rubber backer rod; oversized 30 to 50 percent larger than joint width.

B. Safety Stair Nosings: Style B-41A, 4 inches wide manufactured by Barrycraft Pattern and Foundry, Inc., Birmingham, AL, or equal as approved in accordance with Division 01, General Requirements for Substitutions. Provide contrasting color at all treads.
   1. Install 2 inches contrasting color (70 percent recommended) warning stripe 1 inch maximum from edge of nosing of each exterior stairs.
   2. Install at in fresh concrete, cast in place.

2.03 CONCRETE MIX

A. Mix and deliver concrete in accordance with Section 1905A, California Building Code. Deliver concrete in transit mixers only. Mix concrete for 10 minutes minimum at a peripheral drum speed of approximately 200 feet per minute. Mix at jobsite minimum 3 minutes. Discharge loads in less than 1-1/2 hours or under 300 revolutions of the drum, whichever comes first, after water is first added.
   1. Design Mix: Conform to Method A, Section 1905A.2.3 and Table 19A-A-7, California Building Code. Ingredients and proportions for design mix selected by a DSA -approved Testing Laboratory and certified by a registered civil engineer licensed in California.
   2. Quantities of Materials: Weighmaster's records not required for sitework concrete.
   3. Required Strength: Minimum 2,500 psi for sitework concrete.

2.04 REINFORCEMENT

A. Reinforcing Steel: ASTM A615; 40 ksi yield grade; deformed billet steel bars, uncoated finish.

B. Welded Steel Wire Fabric: Plain type, ASTM A185; in flat sheets; uncoated finish, 6 x 6 inch, No. 10 gage.

C. Tie Wire: Annealed steel, minimum 16 gage size.

D. Dowels: ASTM A615; 40 ksi yield grade, plain steel, uncoated finish.

2.05 CURING MATERIALS

A. Polyethylene Film ASTM C171; 10 mil thick, clear, manufactured from virgin resin with no scrap or additives, manufactured by Burke By Edoco, Long Beach, CA, or equal as approved in accordance with Division 1, General Requirements for Substitutions.

B. Water: Potable and not detrimental to concrete.

C. Curing Compound: ASTM C309; wax resin base, WHITE PIGMENTED CURING COMPOUND, by Burke By Edoco, Long Beach, CA, or equal as approved in accordance with Division 1, General Requirements for Substitutions. Curing materials and procedures for colored concrete in accordance with coloring material manufacturer's recommendations.

2.06 DETECTABLE WARNINGS TEXTURE

A. Division of the State Architect (DSA/Access Compliance) approved products shall be used, compliance with CBC Sections 1133B.8.3 1133B.8.4 through 1133B.8.5 and 12 inches ADA-3, California Accessibility Reference Manual.
   1. Provide raised Detectable Warnings (truncated domes) with diameter of 0.9 inch at base tapering to 0.45 inch at top, height of 0.2 inch, with center-to-center spacing of 1.67 inches, and corner domes spaced at 0.896 inch from the corner edges of paver. Provide raised truncated domes in an in-line pattern, rather than off-set pattern.
   2. Detectable Warnings shall contrast visually with adjoining surfaces, light-on-dark or dark-on-light. Material used to provide contrast shall be integral part of walking surface. Warning surface shall differ from adjoining surface in resiliency or sound to cane contact.
   3. Truncated Dome Products:
      a. Plastics/Composites: Armor Tile, by Engineered Plastics Inc., Williamsville, NY. , ADA Solutions, Inc., North Billerica, MA. or equal.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify site conditions.

B. Verify requirements for concrete cover over reinforcement.

C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely and will not cause hardship in placing concrete.

3.02 PREPARATION

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

B. In locations where new concrete is doweled to existing Work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

3.03 PLACING CONCRETE (GENERAL)

A. Convey and deposit concrete in accordance with Section 1905A, California Building Code. Remove loose dirt from excavations.

B. Notify Job Inspector minimum 24 hours prior to commencement of operations.

C. Ensure reinforcement, inserts, embedded parts, formed joint fillers, joint devices and accessories are not disturbed during concrete placement.

D. Ensure sub-base or base materials have been compacted or otherwise treated.

E. Install joint fillers, primer and sealant in accordance with manufacturer's instructions.

F. Place concrete continuously between predetermined expansion joints.

G. Do not interrupt successive placement; do not permit cold joints to occur. Avoid segregation of materials. Perform tamping and vibrating so as to produce a dense, smooth application free of rock pockets and voids. Do not use vibrators to move concrete horizontally.

H. Do not allow concrete to fall free from any height which will cause materials to segregate. Maximum height of free fall permitted in any case: 5 feet.

I. Defective Installation: Repair and clean at Contractor's expense all concrete damaged or discolored during construction. Where concrete requires repair before acceptance, the repair shall be made by removing and replacing entire section between joints and not by refinishing the damaged portion.

J. Proper curing of concrete surfaces is the responsibility of the Contractor. Concrete failing to meet specified strength shall be removed and replaced.

3.04 ON-SITE CONCRETE SIDEWALKS, PEDESTRIAN PAVED AREAS AND RAMPS

A. Forms, Wood: Free from warp, with smooth and straight upper edges, surfaced one side, minimum thickness 1-1/2 inches adequate to resist springing or deflection from placing concrete.

B. Forms, Metal: Gage sufficient to provide rigidity and strength equivalent to wood.

C. Reinforcement: Provide welded steel wire fabric, 6 inches by 6 inches, No. 10 gage at middle of slab for sidewalks and ramps. Interrupt reinforcement at expansion joints.

D. Concrete Placement: Dampen subgrade to retain moisture in concrete mix. Tamp and spade to consolidate concrete for entire length of pour. Strike off upper surface to specified grades.

E. Isolation/Expansion Joints: Locate joint filler at maximum 20 feet centers, where slabs join vertical surfaces and as patterned on drawings. Install vertically, full depth of concrete leaving plastic cap at 1/2 inch depth at top for sealant application.
   1. Monolithic Curb and Gutter: No expansion joints required between gutter and curb face.
   2. Provide 1/2 inch diameter smooth steel dowels 14 inches long at expansion joints with one end of dowel lubricated and set in capped sleeve to allow for longitudinal movement. Spacing: 24 inches on center maximum, 6 inches from edges.

F. Contraction/Control Joints: At 8 feet each way at concrete paved areas, and 5 feet at sidewalks, tool joint with 1/2 inch radius, depth, one fourth the thickness of slab but not less than 1 inch deep. See drawings for design patterns.

G. Curb Ramps: Form grooves, flush to finished surfaces, 12" wide border. Grooves at 1/4" deep, 1/4" wide and at 3/4" o.c. at 3 sides on level surface of the sidewalk. Provide patterns as indicated in drawings.
   1. Detectable Warnings – Truncated Domes
      a. Install per manufacturer's instructions and in accordance with CBC.

H. Finish:
   1. Screed concrete to required grade, float to a smooth, flat, uniform surface. Edge all headers to 1/2 inch radius. Edge expansion joints to 1/4 inch radius. Steel trowel to hard surface.
   2. Grades less than 6 percent: shall conform to Section 1133B.7.1.1. After final troweling, apply a medium broom finish transverse to centerline or direction of traffic.
   3. Grades exceeding 6 percent: shall conform to Section 1133B.7.1.2. After final troweling, apply a heavy broom finish transverse to centerline or direction of traffic
   4. Walkway grades in excess of 5 percent shall conform to Section 1133B.7.3, California Building Code.

I. Curing: Cure surfaces utilizing one of the following methods:
   1. Spraying: Spray water over slab areas and maintain wet for 7 days.
   2. Spread polyethylene film over slab areas, lapping edges and sides, minimum 6 inches and sealing with pressure sensitive tape; cover with plywood or otherwise protect film from damage; maintain in place for 7 days.
   3. Apply liquid curing compound at rate of 200 sf per gallon, using power sprayer equipped with agitator. Do not apply liquid curing compound to surfaces scheduled to receive paving units of any kind.

J. Remove plastic caps. Prime both sides of joint and apply self-leveling sealant. Provide smooth concave surface.

K. Detectable Warnings Truncated Domes. Comply with CBC Sections 1133B8.3, 1133B.8.4.and 1133B.8.5.
   1. Install per manufacturer's instructions and in accordance with CBC.

3.05 FORMED CONCRETE STAIRS AND LANDINGS

A. Forms: Suitable material and type, size, shape, quality and strength to ensure construction as designed, true to line and sufficiently rigid to resist deflection during placing of concrete. Clean forms of all dirt, mortar and foreign matter before use.

B. Reinforcement: Place accurately and hold in position, using metal chairs, spacers, metal hangers, supporting wires and other devices of sufficient strength to resist crushing under full load. Clean reinforcing steel of mortar, oil, dirt, loose mill scale, loose or thick rust and coatings.

C. Install specified metal safety nosings flush to finished surfaces.

D. Slip Resistant Finish: Apply in accordance with manufacturer's instructions on surfaces at a minimum rate of 50 pounds. per 100 feet.
   1. Owner's Option: Medium Broom Finish.

E. Finish: Hard steel trowel at monolithic risers. Steel trowel surfaces treated with abrasive material sufficiently to allow particles to extend slightly above finish surface.

F. Curing: Cure surfaces utilizing one of the following methods:
   1. Spraying: Spray water over slab areas and maintain wet for 7 days.
   2. Contractor's Option
      a. Spread polyethylene film over slab areas, lapping edges and sides, minimum 6 inches and sealing with pressure sensitive tape; cover with plywood or otherwise protect film from damage; maintain in place for 7 days.
      b. Apply liquid curing compound at rate of 200 square feet per gallon, using power sprayer equipped with agitator.

3.06 TOLERANCES

A. Maximum deviation of 1/8 inch in 10 feet non-cummulative.

END OF SECTION

SECTION 02760

PAVEMENT MARKING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Parking-stall line and curb painting.

B. Accessibility signage.

1.02 REFERENCES

A. SSPWC - Standard Specifications for Public Works Construction, 2000 Edition.

B. AQMD - Air Quality Management District.

C. Fed. Std 595B - Colors Listed in Government Procurement.

D. CAS/CAR - California Accessibility Statutes and California Accessibility Regulations, January 2003 and 2001 California Building Code.

1.03 SUBMITTALS

A. Product data.

B. Shop drawing layout of complete parking lot, indicating stalls, lettering, safety zones, directional arrows, widths of lines and colors.

1.04 QUALITY ASSURANCE

A. Product Manufacturer: Company specializing in manufacturing quality traffic line paint products with ten years experience.

B. Applicator: Company specializing in commercial pavement painting with five years experience.

C. Regulatory Requirements
   1. Conform to Federal Regulations concerning lead content of paints.
   2. Conform to AQMD, Local Regulations. Copy of regulation is on file at Architect's office.

D. Field Samples
   1. Provide field sample in form of one parking lot stall, illustrating coating color, width of stroke, thickness of application and dimensioning.
   2. Locate where approved.
   3. Accepted sample may remain as part of Work.
   4. Do not proceed with pavement marking until sample panel has been approved.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site in sealed and labeled containers.

B. Container labeling to include manufacturer's name, type of paint, brand name, brand code, coverage, surface preparation, drying time, cleanup, color designation and instructions for mixing and reducing.

C. Store paint materials at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, unless otherwise recommended by manufacturer.

1.06 EXTRA STOCK

A. Provide one gallon unopened container of each color to Owner.

B. Label each container with color in addition to manufacturer's label.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products of following manufacturers form basis for design and quality intended.
   1. Dunn-Edwards Corporation, Los Angeles, CA.
   2. ICI/Sinclair Paint, Commerce, CA.
   3. Frazee Paint and Wallcovering, Inc., Anaheim, CA.

B. Or equal as approved in accordance with Division 1, General Requirements for Substitutions.

2.02 MATERIALS

A. Traffic Line Paint:
   1. Dunn-Edwards: VIN-L-STRIPE TRAFFIC PAINT, VINYL EPOXY EMULSION, W801.
   2. ICI/Sinclair: NO. 160 VINYL TRAFFIC PAINT.
   3. Frazee: No. 506 TRAFFIC LINE PAINT.

2.03 COLORS

A. Accessible Stalls and Signage: Blue, conforming to No. 15090 Fed. Std 595B.

B. Parking stalls, lettering, arrows, passenger loading zones and traffic signage: White.
   1. Parking spaces for disabled persons: Mark according to CBC Section 1129B.5.
   2. Tactile warning lines: According to CBC Section 1133B.8.3 and 1133B.8.4.

C. Stalls: Single line, 4 inches wide unless otherwise noted.

PART 3 - EXECUTION

3.01 INSPECTION

A. Verify that surfaces are ready to receive Work as instructed by product manufacturer.

3.02 APPLICATION

A. Surfaces to be painted shall be clean and free of dust, dirt, grease, oil, water or other contaminates.
   1. Existing lines to be removed shall be sandblasted clean.

B. Traffic paint shall not be applied until seal coat has been in place minimum of 10 days.

C. Apply material by machine spray, airless sprayer, roller or brush to provide a minimum thickness of 12 mils average. Precise edges required, no overspray allowed.

D. Perform Work in accordance with approved Shop Drawings. Conform to Section 310-5.6.8, SSPWC and CAS/CAR.

E. Mark parking spaces for disabled according to CBC Section 1129B.5. Tactile warning lines according to CBC Section 1133B.8.3 and 1133B.8.4. and specified in Section 02750.

F. Painted lines and markings on pavement shall be 4 inches minimum wide and blue In color equal to color No. 15090 per Federal Standard 595B.

3.03 DEFECTIVE WORK

A. Remove any paint that demonstrates evidence of checking, cracking, peeling, discoloration, lack of bonding or poor coverage. Misplaced lines shall be completely removed by paint remover or wet sandblasting, Conform to Section 310.5.6.3, SSPWC. Painting over misplaced lines will not be permitted.

END OF SECTION

SECTION 02821

CHAIN LINK GATES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Framework, fabric and accessories.

B. Swing gates, signs and related hardware.
   1. Manual

1.02 REFERENCES

A. ASTM A53 - Pipe, Steel, Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless.

B. ASTM A392 - Zinc-Coated Steel Chain-Link Fence Fabric.

C. ASTM F1083- Pipe, steel, hot-dipped zinc coated (galvanized), welded, for fence structures.

D. SSPWC - Standard Specifications for Public Works Construction, Latest Edition.

E. CLFM - Chain Link Fence Manufacturer's Institute

F. Chapters 10 and 19A, 2001 California Building Code.

1.03 QUALITY ASSURANCE

A. Manufacturer: Company specializing in commercial quality chain link fencing with five years experience.

1.04 SUBMITTALS

A. Shop drawings including plan layout, grid, spacing of components, accessories, fittings, hardware, anchorages and schedule of components.

B. Product data.

C. Manufacturer's installation instructions.

D. Three samples illustrating each fence fabric finish.

1.05 WARRANTY

A. Provide two-year warranty to insure materials against rusting or breakdown of finish. Provide adjustments as needed to assure continued smooth operation of gates.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Acceptable Manufacturers
   1. Master-Halco/Anchor Fence Inc., Baltimore, MD
   2. Boundary Fence and Railing Co., Richmond, NY.
   3. Reeves Southeastern Wire Corp., Tampa, FL.
   4. Or equal in accordance with Division 01, General Requirements for substitutions.

B. Fabric: Type II ASTM A817, Class 2 ASTM A392, galvanized after weaving, 2-inch mesh, 9 gage, interwoven, top and bottom knuckled selvage. Single width fabric.

2.02 COMPONENTS

A. Nominal pipe weight (Class 1) in pounds per lineal foot:

	NPS	Pounds/LF
1.	1-1/4:	2.27
2.	1-1/2:	2.72
3.	2:	3.65
4.	2-1/2:	5.79
5.	3:	7.58
6.	3-1/2:	9.11
7.	6:	18.97
8.	8:	24.58

B. Swing gate posts, single leaf; opening widths in feet:
   1. Up to 6 wide 2" diameter
   2. 6-13 wide 3-1/2" diameter

C. Swing Gate Frames: 1-1/2 inches diameter

D. Stiffeners for swing gates: 1-1/4 inches diameter

E. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings: Galvanized Steel.

F. Posts for fencing:

	Fence Height in Feet	Outside diameter in Inches
1.	Less than 6 feet	2.375
2.	6 to 7.9	2.375
3.	8 to 11.9	3.5
4.	12 to 16	4.0

G. Top Rail and Braces: 1-5/8, plain end, sleeve coupled.

PART 3 - EXECUTION

3.01 SWING GATES

A. Gate Frames: 1-1/2 inch diameter steel pipe, welded corners, hot dip galvanized after fabrication.

B. Sizes: As indicated on the Drawings, minimum widths of gates shall not be less than 36" (clearance of gate width shall not be less than 32 inches).

C. Hardware: Heavy-duty, galvanized ferrous metal industrial quality as manufactured by Master-Halco/Anchor Fence Inc., Baltimore, MD. or equal as approved in accordance with Division 1, General Requirements for substitutions.
   1. Hinges: Structurally capable of supporting gate leaf and allow opening and closing without binding. Non-lift-off type hinge design shall permit gate to swing 180 degrees inward. Steel Gate Hinges, Series 15600, industrial malleable, three each leaf.
   2. Latch: ADA required fork type capable of retaining gate in closed position. Malleable, Series 16600.
   3. Exit Device at Exit Gates:
      a. Lock Assembly and Paddle: 36-43-16-8804/8810xCPCxLESS TRIMxLC 630 SGT, Refer to Section 08710 at single gates, devices in exit pathways, attach to gate post. Exit Device (panic hardware) shall be mounted to provide 36" clear minimum below the device.
   4. Locking: Provide padlock capability.
   5. Gate Hardware: Mount at 40 inches above finish floor and according to CBC Sections 1007.3.11, 1003.3.2 and 1133B1.1.1.4.
      a. Provide strike strap.
      b. Bolt keeper.
   6. Install 1/8 in. thick aluminum plate 24 in. high behind panic device centered at 40 in. above finish floor. Secure to gate frame with #8 stainless steel screws at 6 in on center.
   7. Install 1/8 in. thick aluminum plate 10 inches kickplate (For larger gates, install at both sides), 3 inches from paving. Secure with # 8 stainless steel screws 4 places.
   8. Panic Hardware: Panic hardware shall comply with UBC Standard 10-4 and shall be mounted 36" to 44" above the finished floor surface. The unlatching force shall not exceed 15 lbs applied in the direction of travel. Panic hardware shall comply with CBC Section 1003.3.1.9.

3.02 TESTING

A. At Architect's option, Contractor shall be required to cut any pipe column after installation to confirm requirements of this Specification. If conformance is confirmed, replacement members shall be installed at Owner's cost. Components not meeting required standards shall be replaced.

END OF SECTION

SECTION 05500

METAL FABRICATIONS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated ferrous metal items, galvanized and prime painted.

1.02 REFERENCES

A. ASTM A36 - Carbon Structural Steel.

B. ASTM A53 - Pipe, Steel, Black and Hot-Dipped, Zinc-coated Welded and Seamless.

C. ASTM A123 - Zinc (Hot-Dip Galvanized) on Coatings on Iron and Steel Products.

D. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

E. ASTM A283/A283M - Low and Intermediate Tensile Strength Carbon Steel Plates.

F. ASTM A307 - Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.

G. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.

H. ASTM C1107 - Packaged Dry Hydraulic - Cement Grout (Non-Shrink).

I. AWS A2.4 - Standard Symbols for Welding, Brazing and Non Destructive Examination.

J. AWS D1.1 - Structural Welding Code - Steel.

K. AWS A5.1 - Carbon Steel Covered Arc-Welding Electrodes.

L. SSPC SP-2 - Steel Structures Painting Council, Steel Preparation.

M. ASTM B 633 - Electrodeposited Coatings of Zinc on Iron and Steel.

N. ASTM A 563 - Carbon and Alloy Steel Nuts.

O. ASTM F1554 - Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strenght.

P. ASME B18 – The American Society of Mechanical Engineers - Fasteners.

1.03 SUBMITTALS

A. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners and accessories. Include erection drawings, elevations and details where applicable. Indicate welded connections using standard AWS A2.4 Welding Symbols. Indicate net weld lengths.

B. Welder Certifications.

C. Written Welding Procedure Specification (WPS).

1.04 FIELD MEASUREMENTS

A. Verify field measurements.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Steel Sections: ASTM A572, Grade 50. ASTM A992 for W-Shape sections and ASTM A36 for all other members.

B. Steel Structural Tubing: ASTM A500, Grade B, Schedule 40.

C. Plates: ASTM A283; Milled Steel.

D. Pipe: ASTM A53, Grade B, Type E or S.

E. Fasteners:
1. General: Provide Type 304 or 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, where built into exterior walls. Select fasteners for type, grade, and class required.
2. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
3. Anchor Bolts: ASTM F 1554, Grade 36.
4. Machine Screws: ASME B18.6.3.
5. Lag Bolts: ASME B18.2.1.
6. Wood Screws: Flat head, carbon steel, ASME B18.6.1.
7. Plain Washers: Round, carbon steel, ASME B18.22.1.
8. Lock Washers: Helical, spring type, carbon steel, ASME B18.21.1.

F. Shop and Touch-Up Primer: Series P10-99 modified alkyd primer, red color, air dried, by Tnemec or equal as approved in accordance with Division 1, General Requirements for substitutions.

G. Touch-Up Primer for Galvanized Surfaces: Ready mixed Zinc rich galvanizing compound, Devcon Z by Devcon Corp., Danvers, MA, GALVICON, by Southern Coatings, Sumter, SC, or equal as approved in accordance with Division 1, General Requirements for substitutions.

H. Welding Materials: AWS A5.1, E70XX, type and procedures required by electrode manufacturer for materials being welded.

I. Grout: ASTM C1107, Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 8,000 psi at 7 days; of consistency suitable for application and a 30 minute working time.

J. Solder Alloy for Repair: Welco Gal-Viz self-fluxing solder alloy.

K. Safety Stair Nosings: Cast-in-Place, Style B-41A, 4 inches wide manufactured by Barrycraft Pattern and Foundry, Inc., Birmingham, AL, or equal as approved in accordance with Division 1, General Requirements for substitutions. Provide 2 inch contrasting colors (70 percent recommended) warning strip 1 inch maximum from edge of nosing at all treads.

2.02 FABRICATION

A. Fit and shop assemble in largest practical sections for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Continuously seal joined members by continuous welds.

D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush and hairline. Ease exposed edges to small uniform radius.

E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 FINISHES

A. Clean surfaces of rust, scale, grease and foreign matter prior to finishing. Prepare in accordance with SSPC SP-2.

B. Do not prime surfaces in direct contact with concrete or where field welding is required.

C. Prime items with two coats in accordance with requirements of primer specified herein.

D. Finish: Special Coatings in accordance with Section 09900 Painting.

E. Galvanize steel items to zinc coating thickness in accordance with ASTM A123. Surfaces shall be free of icicles, spangles and puddling. Provide venting holes at all enclosed sections, "V" notch and drilled holes are acceptable. Locate to prevent rainwater from entering section at exterior galvanized items. See drawings and schedules for extent of steel items to be provided with galvanized finish.

PART 3 - EXECUTION

3.01 EXAMINATION

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

B. Beginning of installation means erector accepts existing conditions.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply items required to be cast into concrete or embedded in masonry with setting templates to appropriate sections.

3.03 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Allow for erection loads and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Field weld components indicated on shop drawings.
   1. Weld joints using shielded electric arc method. Use coated welded rods, not fluxed, or type recommended by manufacturer for use with parent metal. Use only certified welders for structural construction.
   2. Grinding: Grind welds on surfaces subject to traffic or contact to smooth flush joints.
   3. Peening: Remove flux and weld spatter as necessary to eliminate unsightly conditions and grind off sharp projections.
   4. Permanently Concealed Welds: No treatment required other than preparation for painting or galvanizing.

D. Perform field welding in accordance with AWS D1.1.

E. Obtain Architect approval prior to site cutting or making adjustments not scheduled.

F. After erection, prime welds, abrasions and surfaces not shop primed except surfaces to be in contact with concrete.

G. Repair of Galvanized Surfaces: No flux is required. Apply Gal-Viz while metal is still hot. Tin surface with Gal-Viz with wire brush. Do not direct flame on alloy.

3.04 ERECTION TOLERANCE

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

3.05 SCHEDULE

A. Schedule is list of principal items only. Refer to Drawing details for items not specifically scheduled.

B. Fasteners: Provide fasteners and connectors of approved types, whether indicated or not.

C. Steel Backing Plates: 1/4 inch thick x widths and lengths required to support plumbing fixture hanger and equipment. Cope studs and weld plates flush to surface with continuous welds.

D. Grates and Frames: Provide all gratings, covers and frames for catch basins, trench and storm drains. All Work shall be galvanized cast iron. Provide heavy-duty traffic trench type gratings, covers and frames in all traffic areas; manufactured by Alhambra Foundry Co., Alhambra, CA, McKinley Iron Works, Fort Worth, TX, or Neenah Foundry Co., Neenah, WI, or equal as approved in accordance with Division 1, General Requirements for substitutions.
   1. Gratings in traffic areas shall be narrow slot type, with openings not greater than 1/2 inch with direction of slots placed perpendicular to direction of traffic.
   2. Covers shall be provided with recessed bolt attachment to frame.

E. Miscellaneous Framing and Supports.
   1. Provide steel framing and panels and supports as indicated in Drawings and as necessary to complete Work.
   2. Fabricate units from structural-steel shapes, plates, sheet metal and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.
      a. Hinges: Heavy-duty weld-on type. Minimum 3, rated at 1000 lbs. each.

F. Door Frames for Overhead Door Openings and Wall Openings: Channel sections; galvanized finish.

G. Railings and Handrails: Refer to Section 05520.

END OF SECTION

SECTION 05520

HANDRAILS AND RAILINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Steel tubing railings, handrails, balusters and posts.

B. Brackets and fittings.

1.02 REFERENCES

A. CAS/CAR - California Accessibility Statutes and California Accessibility Regulation, January 2003 and 2001 CBC.

B. ASTM A 53 - Pipe, Steel, Black and Hot Dipped, Zinc-Coated, Welded and Seamless.

C. ASTM A 153 - Zinc coating (Hot-Dip) on Iron and Steel Hardware.

D. ASTM A 500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

E. ASTM A 123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

F. ASTM C 1107 - Packaged Dry, Hydraulic - Cement Grout (Non-Shrink).

G. AWS D1.1 – American Welding Society, Structural Welding Code - Steel.

H. Chapters 10 and 11B, 2001 California Building Code.

I. ASTM A 780 - Repair of Damage and Uncoated Areas of Hot-Dip Galvanized Coatings.

1.03 DESIGN REQUIREMENTS

A. Railing assembly, wall rails and attachments to resist a load of 50 pounds per lineal foot and 200 pounds applied in any direction at any point on the rail, without damage or permanent set, in accordance with CAS/CAR and California Building Code.

1.04 SUBMITTALS

A. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners and accessories.

B. Samples: Submit three samples of handrail and each component.

1.05 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

PART 2 - PRODUCTS

2.01 STEEL RAILING SYSTEM

A. Fasteners, Brackets, Flanges and Bases: Manufactured by Craneveyor Corp., South El Monte, CA., R & B Wagner Inc./McNichols Co. South Gate, CA., or equal as approved in accordance with Division 1, General Requirements for Substitutions.

B. Railings, Handrails, Guardrails, Balusters, Posts, Brackets, Flanges and Bases:
   1. Round Structural Tubing, ASTM A500, 1-1/4 inch nominal size (shown on drawings as 1-1/2 inch nominal), Pipe Size ERW, Standard Weight (posts spaced more than 48 inches o.c. use Extra Heavy), 1.660 inch outside diameter, wall thickness of 0.1400 inches, Grade C (62,000 psi), welded joints. Refer to details for other sizes of posts, guardrails and spacing of balusters.

C. Fittings: Elbows, T-shapes, wall brackets, escutcheons: Cast steel. Brackets: Round top to accept tube rail, size to allow 1-1/2 inch clearance from rail to wall.

D. Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing.

E. Nonshrink Grout: ASTM C 1107, premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 5,000 psi in 24 hours and 8,000 psi in 7 days; of consistency for application and a 30 minute working time. 1107 Advantage Grout by Dayton Superior, Miamisburg, OH. Sonogrout 10K by Sonneborn, Shakopee, MN. Super Por-Rok Anchoring Cement by Novex Systems International, Clifton NJ, or equal.

F. Touch-Up Primer for Galvanized Surfaces: Ready mixed Zinc rich cold galvanizing compound, DEVCON Z, by Devcon Corp., Danvers, MA, GALVICON by Southern Coatings, Sumter, SC, or equal as approved in accordance with Division 1, General Requirements for Substitutions.

G. Structural Plates, shapes and bars: ASTM A36.

2.02 FABRICATION

A. Fabricate handrails of specified pipe or tubing only in conformance with requirements of CAS/CAR and Chapters 10 and 11B CBC.

B. Fabricate handrails and railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

C. Assemble handrails and railings in shop to greatest extent possible to minimize field splicing and assembly.

D. Fabricate components with joints tightly fitted and secured.

E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

G. Seal joined pieces by continuous welds in accordance with AWS D1.1.

H. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush and hairline. Ease exposed edges to small uniform radius.

I. Accurately form components to each other and to building structure.

J. Hot-dip Galvanized
   1. In accordance with ASTM A 123 Grade 75, minimum 1.7 oz. per square foot for steel and iron products; ASTM A 153 for steel and iron hardware.
   2. One piece in greatest extent possible for fabricated assemblies in accordance with ASTM A 123. Field welding of galvanized main components not permitted.
   3. Surfaces shall be free of icicles, spangles and puddling. Provide venting holes at all enclosed sections, "V" notch and drilled holes are acceptable. Locate to prevent rainwater from entering section at exterior galvanized items. See drawings and schedules for extent of steel items to be provided with a galvanized finish.

K. Finish
   1. Galvanized coating thickness in accordance with ASTM A 123.
   2. Final Exposed Finish: Gloss Polyurethane Special Coatings as specified in Section 09900 Painting.

PART 3 - EXECUTION

3.01 EXAMINATION

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

B. Beginning of installation means erector accepts existing conditions.

3.02 PREPARATION

A. Clean and strip steel items to bare metal where site welding is required.

3.03 INSTALLATION

A. Set vertical supports in sleeves with the specified non-shrink grout. Slope to drain at each post.

B. Install components plumb and level, accurately fitted, free from distortion or defects.

C. Provide anchors, plates or angles required for connecting railings to structure. Anchor railing to structure. Mount railings 1-1/2 inches clearance from side walls or columns.

D. Field weld anchors as indicated on shop drawings. Grind welds smooth.

E. Conceal bolts and screws. Where not concealed, use flush countersunk fastenings.

F. Touch up welds and chipped surfaces with specified galvanizing compound prior to painting, minimum thickness 5 mils.

G. Repair of galvanized surfaces: No flux is required. Repair surfaces in conformance with ASTM A 780-A1. Apply Gal-Viz while metal is still hot. Tin surface with Gal-Viz with wire brush. Do not flame on alloy. Minimum thickness 5 mils.

3.04 ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch in 10 feet.

3.05 SCHEDULE

A. As detailed and located in drawings.

B. Rails at drinking fountains.

END OF SECTION

SECTION 06100

ROUGH CARPENTRY

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Rough carpentry.

1.02 REFERENCES

A. ASTM D4601 - Asphalt-Coated Glass Fiber Base Sheet Used in Roofing.

B. Chapters 7 and 23A, 2001CBC.

C. PS 1-95 U. S. Product Standard for Construction and Industrial Plywood

D. WWPA - Western Lumber Grading Rules 88, Latest Edition, by Western Wood Products Association.

E. APA - American Plywood Association Design/Construction Guide.

F. AQMD - Local Air Quality Management District Regulations.

G. AWPA C1, C3, C9, C20, C27 - American Wood Preservers Association - Manual of Recommended Practice, C-1.

H. WCLIB - West Coast Lumber Inspection Bureau Standard Grading Rules No. 17.

I. ASTM E84 - Surface Burning Characteristics of Building Materials.

J. Title 8 – California Code of Regulations, Construction Safety Orders.

1.03 QUALITY ASSURANCE

A. Rough Carpentry Lumber: Visible grade stamp on all products required.

B. Grade Stamp: Association under whose rules it was graded, or official grade mark of other recognized grading agencies using grading rules, equivalent to WWPA or WCLIB.

C. Association performing grading and grade marking of lumber shall be approved by Architect and Division of the State Architect.

D. Nailing guns and nail operators shall be approved in accordance with Title 8 Construction Safety Orders.

1.04 SUBMITTALS

A. Product data and current ICBO Evaluation Reports for framing anchors.

1.05 DELIVERY, STORAGE AND HANDLING

A. Do not deliver rough carpentry items until site conditions are adequate to receive the Work. Protect items from weather while in transit.

B. Store lumber and plywood at the site under cover or otherwise protected against exposure to weather, raise above ground and out of contact with damp or wet surfaces. Stack lumber and plywood and provide for air circulation within and around stacks and under temporary covers. For pressure treated lumber and plywood, provide spacers between courses to permit air circulation.

1.06 PROJECT CONDITIONS

A. Cooperate with other trades in coordinating their Work with the Work of this Section. Provide wood grounds, blocking and nailer where indicated or as required for Work of other trades.

B. High Wind Area: Ensure carpeting secured in place and protected.

PART 2 - PRODUCTS

2.01 ROUGH CARPENTRY MATERIALS

A. Lumber: Graded in accordance with WWPA or WCLIB; maximum moisture content of 19 percent at time of loading. Provide Douglas Fir Larch for structural and framing lumber, surfaced four sides to standards of the grading association unless otherwise indicated on Drawings, use the following grades:
   1. Joists, rafters, beams, lintels, horizontal framing, posts, studs and vertical framing: No. 1 unless otherwise indicated or noted on drawings.
   2. Non-bearing studs and plates, non-structural furring, concealed blocking, stripping and miscellaneous nailers and backing: No. 2.
   3. Structural Drawings take precedence for lumber grades.
   4. All lumber in contact with concrete shall be pressure treated.

B. Douglas Fir Plywood Sheathing: Section 2312A, CBC, PS 1-95, APA structural I rated sheathing, Exposure 1, thickness as indicated, span rating sized for spacing.

C. Nails, Spikes and Staples: Sections 2304A.3 and 2318A.3.4, CBC Galvanized for exterior applications, high humidity locations and treated wood; plain finish for other interior locations; size and type to suit application. Comply with Table 23A-II-B-1, CBC. Use common nails only.

D. Bolts, Nuts, Washers, Lags, Pins and Screws: Sections 2304A.3 and 2318A.6, CBC, sized to suit application, galvanized for exterior locations, high humidity locations and treated wood, plain finish for other interior locations.

E. Fasteners: Expansion type or powder actuated type for anchorage to solid masonry or concrete. Refer to Division 1, General Requirements for acceptable types and required testing.

F. Stock Framing Connectors: Section 2318A.4, CBC types indicated on Drawings, galvanized, with nails fully driven in all holes in each face of connector.
   1. Manufacturers: Simpson Strong Tie Co., Inc., San Leandro, CA, equal products by Harlen Metal Products, Compton, CA, Silver Metal Products, Livermore, CA, Teco Co., Germantown, MD, or K.C. Metals, Riverside, CA, may be submitted for approval or equal as approved in accordance with Division 1, General Requirements for Substitutions.

G. Non-Stock Framing Connectors: Conform to details.

H. Preservative (Pressure) Treated Lumber: Section 2303A, CBC Conform to AWPA manual of recommended practice. Use preservative complying with AWPA C-2 lumber and C-9 plywood. Conform to AQMD, Local Regulations.
   1. Douglas Fir Larch, used as required by Section 2303A.1, CBC, shall conform to the following:
      a. Lumber shall be WWPA or WCLIB grade stamped.
      b. Lumber shall be No. 1 grade or better unless indicated otherwise on Drawings.

I. Waterproof Membrane: ASTM D4601; Type II, asphalt saturated glass felt.

J. Parapet Wall, Fire-Retardant Lumber: Chemically treated and pressure impregnated, as defined in Section 703 CBC. Lumber shall be grade stamped by an approved agency at the factory, and shall bear identification indicating the fire performance rating thereof. Lumber: AWPA C20 and C27 for plywood.

K. Nonshrink Grout: ASTM C1107, premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 5,000 psi in 24 hours and 8,000 psi in 7 days; of consistency for application and a 30 minute working time. Acceptable Manufacturers: Dayton Superior, Miamisburg, OH; Sonneborn, Shakopee, MN; Novex Systems International, Clifton NJ, or equal.

PART 3 - EXECUTION

3.01 FRAMING, FURRING AND STRIPPING

A. Erect wood framing, furring, stripping and nailing members true to lines and levels. Do not deviate from true alignment more than 1/4 inch in 10 feet, non-cumulative.

B. Construct members of continuous pieces of longest possible lengths.

C. Construct and erect required headers and lintels.

D. Double wall framing members at openings over 100 square inches. Space short members above and below openings in same manner as for walls.

E. Provide double joist headers at joist ends and around openings unless otherwise indicated on Drawings. Bridge joists and rafters to conform with Section 2316A.2.4.4.1.4 and 2320A.8.4 CBC and as noted on plans. For pre-manufactured joists, provide bridging in accordance with manufacturer's recommendations.

F. Construct walls with studs of size and spacing indicated. Install single sill member at bottom and double plate at top. Stagger upper and lower members of double plate with joints not less that 4 feet o.c. or as indicated on Drawings. Where sill or any wood member contacts concrete or masonry, install preservative-treated lumber.

G. Provide one row of solid blocking not less than 2 inch nominal thickness and same width of stud at ceiling and floor lines and at spacing not to exceed 8 feet on center vertically. Fit snugly and attach with not less than two 16d nails.

H. Install 3 studs at corners.

I. Conform to Section 2320A.11.7, CBC, where pipes penetrate sills or plates.

J. Cutting and Notching: Conform to Section 2320A.11.9, CBC.

K. Bored Holes: Conform to Section 2320A.11.10, CBC.

L. Conform to Section 708, California Building Code for fire blocks and draft stops.

3.02 PLYWOOD SHEATHING

A. Thickness as indicated on the Drawings, minimum thickness 1/2 inch.

B. Boundary Nailing: Not less than 3/8 inch from edge, spaced not more than 6 inches on center, unless noted otherwise on Drawings.

C. Blocking: Panel edges shall bear on framing members or solid blocking.

D. Minimum Size Vertical Panel: 16 inches wide.

E. Minimum Size Horizontal Panel: 24 inches wide.

F. Oriented Strand Board not permitted.

3.03 HORIZONTAL FRAMING

A. Bearing: 1-1/2 inch minimum on wood or metal, 3 inches on masonry. Lay framing members with crown up. Members with knots at bottom not permitted.

B. Lateral Support: Use solid blocking, cross bridging or other approved means.

C. Lap joists a minimum of 3 inches when framed from opposite sides of a beam. Do not run joists continuous beyond one span unless indicated otherwise on Drawings.

D. Openings: Double joists required for trimmer and headers for openings 4 ft. or larger unless indicated otherwise on Drawings.

E. Provide ties, purlins and blocking in conformance with Section 2316A, CBC.

3.04 BACKING

A. Provide backing as indicated on Drawings to support electrical fixtures, fixed equipment, cabinets, grab bars, door stops and plates. Fasten securely to framing.

END OF SECTION

SECTION 06200

FINISH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Installation of wood doors.

B. Installation of door hardware and attachment accessories.

C. Wood blocking backing and nailers.

D. Related Sections:
   1. Section 08110, Hollow Metal Doors/Frames
   2. Section 08210, Wood Doors
   3. Section 08710, Door Hardware
   4. Section 09900, Painting

1.02 REFERENCES

A. CAS/CAR - California Accessibility Statutes and California Accessibility Regulations, January 2003 and 2001 CBC.

B. BHMA A156.1 through 24 - Builders Hardware Manufacturers Association Standards.

C. APA - American Plywood Association Design and Construction Guide.

D. NFPA 80 - Fire Doors and Windows.

E. PS 1-95 - U.S. Product Standard, Construction and Industrial Plywood.

F. SDI-107 – Hardware on Steel Doors.

G. SDI-109 - Hardware for Standard Steel Doors and Frames.

H. SDI-122 – Installation for Standard Steel Doors and Frames.

I. Uniform Building Code - UBC Standard 7-2.

1.03 DELIVERY, STORAGE AND HANDLING

A. Store materials in ventilated, interior locations.

PART 2 PRODUCTS

2.01 DOOR MATERIALS

A. Steel Doors: As specified in Section 08110.

B. Wood Doors: As specified in Section 08210.

C. Door Hardware: As specified in Section 08710.

2.02 LUMBER MATERIALS

A. Softwood Lumber: Maximum moisture content of 12 percent, Douglas Fir, Hemlock, Ponderosa Pine or Sugar Pine species with vertical or mixed grain of quality capable of transparent finish.

2.03 SHEET MATERIALS

A. Softwood Plywood: PS1-83, sanded or touch sanded, APA A-D Group 1, Exposure 1, thickness: As indicated on Drawings.

2.04 ACCESSORIES

A. Nails: Size and type to suit application, plain finish.

B. Bolts, Nuts, Washers, Blind Fasteners, Lags, and Screws: Size and type to suit application; plain finish, galvanized when exposed to weather.

C. Lumber for Shimming, Blocking and Backing: Softwood lumber of species listed herein.

D. Primer: Alkyd type.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that openings are ready to receive Work and field measurements are as indicated on shop drawings.

B. Verify mechanical, electrical and building items affecting Work of this Section are placed and ready to receive this Work.

C. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION OF WOOD DOORS

A. Door shall have a clearance of 1/8 inch at the sides and top and shall have a bottom clearance of 1/4 inch over thresholds and 1/2 inch at other locations unless otherwise indicated. The lock edge or both edges of door shall be beveled at the rate of 1/8 inch in 2 inches. Cuts made on the job shall be sealed immediately after cutting, using a clear varnish or sealer.

B. Installation of Fire Rated Doors: Installation, hardware and operational characteristics shall conform to NFPA 80 and CBC and shall be in conformance with the manufacturer's printed instructions. Properly sized pilot holes shall be drilled for screws in door edges. Factory applied permanent metal labels shall remain intact where installed. Labeled edge of door shall not be trimmed.

C. Machine cut relief for hinges.

D. Pilot drill screw and bolt holes.

E. Prepare doors to receive finish hardware in accordance with applicable BHMA Standards requirements. Seal tops, bottoms and cutouts for hardware and accessories per Section 09900.

F. Conform to applicable BHMA requirements for fit tolerances.

3.03 INSTALLATION OF STEEL DOORS

A. Install doors in accordance with SDI 122 recommendations.

B. Coordinate installation of glass or louvers where indicated.

3.04 INSTALLATION OF HARDWARE

A. Install hardware in accordance with manufacturer's instructions.

B. Use the templates and fasteners provided by hardware item manufacturer.

C. Mounting heights for hardware:
   1. Locksets: 40-5/16 inches from floor to centerline of lever handle, hand operated opener or exit hardware, unless noted otherwise.
   2. Butts: 5 inches from head of opening to top of top butt; 10 inches from finish floor to bottom of bottom butt; intermediate butt spaced equidistant between top and bottom butts.

D. Conform to CAS/CAR for positioning requirements for accessibility.

E. After fitting hardware to doors which are scheduled for field painting and sealing of cutouts, remove all finish hardware, carefully replace in properly marked boxes, and place in storage until painting and finishing is completed. After painting and finishing is completed, permanently install finish hardware.

F. Secure finish hardware with suitable fasteners of the same material and finish as the item being attached. Refer to Section 08710.

G. Provide expansion anchors for attaching hardware items to concrete or masonry.

H. Mount exit devices and closers with closed head sex bolts.

I. Cutouts for hardware in wood doors having a fire rating of 45 minutes or more shall be accomplished at the factory before labels are affixed. As an alternative, said fire rated doors may be machined at the jobsite by a Warnock-Hersey authorized representative, when authorized in writing by the Architect and when such doors are affixed with an identification sticker at the factory stating the door is eligible to receive the designated fire rating.

J. Conform to SDI-107 and SDI-109 for hardware on steel doors.

K. Fire doors and their frames shall be installed in accordance with their listing, NFPA No. 80 and the manufacturer's instructions.

3.05 INSTALLATION TOLERANCES

A. Maximum Diagonal Distortion: 1/16 inch measured with straight edge corner to corner, or as required to meet door warranty.

3.06 FIELD QUALITY CONTROL

A. Provide testing certification of fire-rated door assemblies in accordance with CBC Section 713.5 and UBC Standard 7-2.

B. Provide manufacturer's installation instructions for each listed assemblies for review by the Inspection Authority.

3.07 ADJUSTING AND CLEANING

A. Adjust for smooth and balanced door movement.

END OF SECTION

SECTION 06410

CASEWORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Fabricated base cabinet units.

B. Fabricated wall units.

C. Fabricated countertops.

D. Refurbishing of Casework.

1.02 REFERENCES

A. NEMA LD-3 - High Pressure Decorative Laminates.

B. PS 1 - 95 Construction and Industrial Plywood.

C. PS 20 - American Softwood Lumber Standard.

D. HPVA HP-1 - Hardwood and Decorative Plywood.

E. WIC - Woodwork Institute of California, Manual of Millwork, Latest Edition.

F. Chapters 11 and 16A, 2001 California Building Code.

G. AQMD - Local Air Quality Management District Regulations.

1.03 SUBMITTALS

A. Shop drawings including materials, component profiles, fastening methods, assembly methods, joint details, accessory listings and schedule of finishes.

B. Product data.

C. One hardware sample board identified with the project name, cabinet manufacturer's name and address and one item of each type of hardware specified for installation.

D. Complete line of plastic laminate chips, in wood grains and solid colors, identified with the manufacturer's name and chip number.

E. Submit WIC Certified Compliance Certificate.

1.04 QUALITY ASSURANCE

A. Cabinets and countertops shall be manufactured in accordance with Sections 15, 16 of the latest edition of the Manual of Millwork of the Woodwork Institute of California for Grade specified herein or to higher standards as specified herein.

B. Before delivery to the jobsite, the casework supplier shall submit a WIC Certified Compliance Certificate indicating the products furnished for this job, and certifying that they will fully meet all the requirements of the grade or grades specified.

C. First page of shop drawings shall bear the WIC Certified Compliance Label. Shop drawings not conforming to this requirement will be rejected.

D. Statement shall appear prominently on the shop drawings certifying that all casework construction complies to the structural requirements of Table 16A-0, California Building Code for required horizontal force factor for anchorage of non-structural components.

E. One (1) copy of the latest issue of the WIC Manual of Millwork shall be made available for reference at the jobsite throughout the installation period.

F. Inspections by Authorized WIC inspectors shall be made in accordance with the following schedule:
   1. Shop inspection at place of manufacturer, prior to initial shipment of cabinet components to site.
   2. Site inspection immediately following installation of first cabinet components.
   3. Site inspection immediately following final installation of all cabinet Work.
   4. Additional site inspections may be required at the option of the Architect and at no cost to the Owner when certified WIC inspection reports indicate unsatisfactory conformance with specified requirements.

G. Written confirmation of all WIC inspections shall be submitted, including a WIC Certified Compliance Certificate for installation.

H. WIC Certification costs shall be included.

I. Mock-up
   1. Provide full size base cabinet with countertop and upper cabinet of each casework type indicated, in specified finish with hardware installed. Include pairs of doors for both base and upper cabinet and at least one drawer.
   2. Units will establish a minimum standard of quality for this Work.
   3. Approved units may be used as part of the Work.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver all materials only when the project is ready for installation and a clean storage has been provided in accordance with the WIC Manual of Millwork.

1.06 PROJECT CONDITIONS

A. Existing casework to be refurbished. Locations and casework units as described in the Drawings.

PART 2 - PRODUCTS

2.01 GRADES

A. Provide plastic covered casework in accordance with WIC Manual of Millwork, Section 15 for Custom grade.

B. Construction Style: Style A frameless.

C. Construction Type: Type I multiple self-supporting units rigidly joined together.

D. Door and Drawer Front Style: Flush overlay

E. Banding: No PVC banding permitted. Plastic Laminate at all countertop and drawer edging.

2.02 MANUFACTURERS

A. Products of the following manufacturers form the basis for design and quality intended.
   1. Formica Corporation, Cincinnati, OH.
   2. Ralph Wilson Plastics Co., Temple, TX.
   3. Nevamar Corporation, Odenton, MD.
   4. Pionite Decorative Laminates, Maumee, IL.
   5. Laminart, Elk Grove Village, IL.

B. Or equal as approved in accordance with Division 1, General Requirements for Substitutions.

2.03 CASEWORK UNITS

A. Casework indicated on drawings shall conform to model Series described below:
   1. Base Cabinets: WIC, 100 Series.
   2. Drawer Base Cabinets: WIC, 200 Series.
      a. File drawers with built-in steel rail system for hanging folders.
   3. Wall Hung Cabinets: WIC, 300 Series.
   4. Tall Storage Cabinets: WIC, 400 Series.

2.04 LAMINATE MATERIALS

A. Plastic Laminate Cabinet Surfaces: NEMA LD-3, High Pressure Decorative Laminate, general purpose type, 0.028 inch thick at vertical surfaces (VGS), 0.050 inch thick at horizontal surfaces (HGL) and 0.039 inch thick for post-formed work (HGP). Colors as selected in wood grains, patterns or solids. Architect shall have option of selecting up to 6 colors. Conform to Section 15, WIC Manual of Millwork.

B. Plastic Laminate Countertops: NEMA LD-3, High Pressure Decorative Laminate, general purpose type, 0.048 inch thick when flat (HGS), 0.039 inch thick when post-formed (HGP). Colors as selected in wood grains, patterns or solids. Conform to Section 16, WIC Manual of Millwork.

C. Laminate Backing Sheet: NEMA LD-3 BKV Backing grade, undecorated plastic laminate with face material of 0.028 inches or BKH with face material of .048 inches.

D. Semi-exposed Areas of Cabinets: Low Pressure melamine overlay, except as specified herein.
   1. Apply decorative High Pressure Laminate to all surfaces visible from a seated or standing position, including interior surfaces of open casework, shelving, and casework with glass doors, to sloped tops and to tops up to 72 inches above floor or visible from an upper level.

E. Apply High Pressure Decorative Laminate (HGS) to shelving and all surfaces behind markerboards and at all Teaching Wall Units.

F. Colors: Refer to Section 09050, Colors and Materials.

2.05 WOOD MATERIALS

A. Softwood Lumber: PS 20; Graded in accordance with WIC Custom Grade, Douglas Fir, Hemlock, Ponderosa Pine or Sugar Pine.

2.06 SHEET MATERIALS

A. Core:
   1. Wood Particleboard: ANSI A208.1, Table A, Grade M-2, 47 lbs/cu.ft. medium density made with water-resistant binder no added urea formaldehyde.

2.07 ACCESSORIES

A. Adhesives: Phenol resin with catalytic agent set under a pressure of not less than 30 lbs/sq/in or any contact adhesive that has been tested in accordance with the PS 1 for Type II Adhesive and Heat Resistance Test set forth in the WI Manual of Millwork and specifically approved by WI for the area in which the Project is located.
   1. Adhesives applied on site shall comply with VOC content limits defined by SCAQMD Rule 1168.

B. Fasteners: Size and type to suit application.

C. Bolts, Nuts, Washers, Lags, Pins and Screws: Of size and type to suit application.

D. Doorstop Blocks: Nylon type, 1 inch x 1 inch x 2 inches long.

E. Cable Grommets: Molded-plastic grommets 3 inch diameter and matching plastic caps with slot for wire passage, Hafele 429.99. Color: black.

2.08

2.09 HARDWARE

A. Conform to Supplement No. 1 to Section 14 and 15, WIC Manual of Millwork and CBC Sections 1117B.6 and 1125B.4. Any hardware listed therein may be installed, except where these standards are exceeded as described below:
   1. Drawer Slides: Minimum 100 lb. capacity all drawers. Full extension ball bearing type only, Accuride 3832.
   2. Wall Shelf Standards: Knape and Vogt #87-ANO Heavy duty type. Bracket KV#187-ANO, front and back rests.
   3. Cabinet Shelf Standard: Flush type KV #255 steel. Clip: 256R-BR. For open shelves provide clips 243 and 248L/R.
   4. Pin-Type shelf Seismic Restraint Clip at all open overhead shelves-metal: Hettich # 1005767.
   5. Hinges: Grade 1, heavy-duty wrap-around, tight pin butts only, powder coated, RPC Inc., Rockford, IL, or equal.
   6. Wire Pulls: "U" shaped, Trimco/BBW No. 562-4, 4 inch c. to c. stainless steel.
   7. Locks: Minimum 5-pin keyway, Olympus 100DR all doors, 200DW all drawers, National Keyway, Part # 100-26D78-915/200-26D78-915.Key to match building keying system. Each room: keyed differently.
   8. Elbow Catches: EPCO 1018 Chrome at inactive cabinet door leaf.
   9. Magnetic Catches: EPCO 591, all cabinet doors, 5 pound holding strength.
   10. Coat Hooks: wall mounted, single: Ives 581, double: Ives 580.
   11. Sliding Door Pulls: Trimco 562-4
   12. Keyboard and pencil Slide: 75 lb. Accuride 2009.
   13. Teaching Wall Cabinet sliding hardware: Per Section 10115.

B. Finish: US-26D, Satin Chromium Plated.

2.010 FABRICATION

A. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.

B. When necessary to cut and fit on site, provide materials with ample allowance for cutting.

C. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Make corners and joints hairline. Locate counter butt joints minimum 2 feet from sink cutouts.

D. Install one door stop block screwed on the inside bottom of the inactive leaf to prevent the door from being pushed down to gain entry at all double doors base cabinets. Secure with 2 screws 1-1/2 long at each block.

E. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and other fixtures and fittings. Verify locations of cutouts from on-site dimensions. Seal contact surfaces of cut edges.

F. Backsplash: Coved.

G. Edge: Rolled for typical units. No-drip bullnose where sinks occur.

H. Shelf Loading: 50 lbs. per square foot or 50 lbs. per cubic foot of total volume of cabinet whichever is less. In no case shall unsupported shelf exceed 36" wide without mid support. Conform to Table 16A-B, California Building Code.

I. Shelf Thickness: 1 inch. All shelf edges to be finished with plastic laminate.

PART 3 - EXECUTION

3.01 PREPARATION

A. Verify adequacy of backing and support framing.

3.02 INSTALLATION

A. Set and secure casework in strict accordance with the WIC Manual of Millwork.

B. Casework shall be anchored to walls or floors or both. Conform to Table 16A-0, California Building Code anchorage requirements.

3.03 ADJUSTING AND CLEANING

A. Adjust doors, drawers, hardware, fixtures and other moving or operating parts to function smoothly and correctly.

B. Clean casework, counters, shelves, hardware, fittings and fixtures.

3.04 REFURBISH EXISTING CABINETS AND COUNTERTOPS - ONLY AS SPECIFICALLY NOTED ON DRAWINGS.

A. Existing surfaces exposed to view shall require the following:
   1. Clean entire surface with soap and water.
   2. Use mild polish to remove scuffs.
   3. Fill scratches, chips and other impressions with plastic filler, color to match adjacent surface.
   4. Fill areas smooth.

B. Existing plastic laminate countertops to be repaired as follows and as indicated on Drawings:
   1. Clean with soap and water.
   2. Fill scratches, chips, and other impressions with plastic filler of same color.
   3. Fill areas smooth.
   4. Clean entire top with normal cleaners.

C. Refurbish all drawer and door pulls as follows:
   1. Remove from cabinet.
   2. Remove corrosion with fine wire brush.
   3. Treat with vinegar or bleach solution to obtain bright finish.
   4. Reinstall.

D. Repair edges of existing plastic laminate chemical-resistant countertops as follows:
   1. Remove plastic laminate edges.
   2. Apply chemical resistant black plastic laminate to exposed edge.
   3. Route laminate edges.

E. Epoxy Painted Countertops: All existing epoxy-painted chemical-resistant counters shall be repaired as follows:
   1. Clean with soap and water.
   2. Fill scratches chips and other impressions with wood filler. Sand smooth.
   3. Touch-up filled areas and areas where black surface is worn to the wood core with black epoxy chemical resistant paint, apply 2 coats.
   4. Polish and buff entire top with normal high gloss paste wax.

F. Epoxy Painted Edges: Expose wood-core edges of countertops at damaged edges and perform the following:
   1. Sand smooth.
   2. Fill scratches chips and other impressions with wood filler. Sand smooth.
   3. Apply 2 coats of black epoxy chemical resistant paint.

G. At replaced countertops, replace with new where indicated on the Drawings.
   1. Remove countertops without causing damage to base cabinets.
   2. Ascertain backing and blocking requirements are in place. Install new blocking and anchorage backing at no additional cost to Owner.
   3. Install new countertops as specified in this Section.

END OF SECTION

SECTION 07840

FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Firestopping systems, products, materials and accessories.

B. Through-penetration firestopping systems.

C. Firestopping at intersections of fire-rated partitions and horizontal assemblies.

D. Safing Insulation.

1.02 REFERENCES

A. ASTM E84 - Surface Burning Characteristics of Building Materials.

B. ASTM E814 - Fire Tests of Through-Penetration Firestops.

C. ASTM E119 - Fire Tests of Building Construction and Materials.

D. ANSI/UL 2079-98 - Tests for Fire Resistance of Building Joint Systems.

E. ASTM E1966-98 - Standard Test Method for Fire-Resistive Joint Systems.

F. UL Fire Resistance Directory, 2000 Edition.

G. Chapter 7, 2001 California Building Code.

H. WHI Certification Listings, 1997 Edition.

1.03 SUBMITTALS

A. Submit Product Data: Provide data on product characteristics, performance and limitation criteria.

B. Submit Manufacturer's Installation Instructions: Indicate preparation and installation instructions.

C. Submit UL or WHI approval numbers for all firestopping materials, devices and systems.

D. Submit State approvals for all firestopping materials and devices and systems.

1.04 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacture of products specified in this Section, with minimum five years experience.

B. Applicator: Company specializing in performing the Work of this Section, with minimum three years experience.

1.05 REGULATORY REQUIREMENTS

A. Conform to Sections 706, 709 and 710 CBC for fire resistance standards and requirements for penetrations and joint systems in walls, partitions, floor-ceilings and roof-ceilings.

B. Through-penetration firestopping systems shall conform to ASTM E814 for F & T ratings.

C. Maintain one copy of current UL Fire Resistance Directory and WHI Certification Listings, on jobsite at all times.

D. Firestopping systems shall meet temperature limitations as described in ASTM E119 and hose stream exposure as described in ASTM E814.

E. Firestopping insulation, sealants, fill materials and devices shall have a flame spread of 0, smoke density of 0, ASTM E84.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Do not apply materials when temperature of substrate material and ambient air is below manufacturer's minimum recommendations.

B. Maintain ambient air temperature above this minimum temperature before, during and for 3 days after installation of materials.

C. Provide ventilation in areas to receive solvent cured materials.

1.07 SEQUENCING

A. Sequence Work to permit firestopping materials to be installed during or after adjacent and surrounding Work is complete.

PART 2 PRODUCTS

2.01 APPROVED THROUGH-PENETRATION FIRESTOPPING SYSTEMS

A. Manufacturers, products and systems as listed in the UL Fire Resistance Directory, are approved for use under this Section:
   1. Through-Penetration Firestop Devices (XHCR), Factory-Built Systems: Any manufacturer listed therein.
   2. Through-Penetration Firestop Systems, (XHEZ) Field-Erected Type: Any approved systems listed therein.

3. Fill, Void, Cavity Materials (XHHW), Installed at Jobsite: Any manufacturers listed therein.
4. Firestop Devices (XHJI), Factory Built Systems: Any manufacturers listed therein.
5. Forming Materials (XHKU) Jobsite Applied: Any manufacturers listed therein.
6. Through-Penetrating Products (XHLY) Cable, Conduit, Pipe and Tubing: Any manufacturers listed therein.
7. Joint Systems (XHBN) Showing Class II and Class III movement capabilities. Any manufacturers listed therein.

B. Manufacturers, products and systems as listed in the WHI Certification Listings, are approved for use under this Section:
1. Through-Penetration Firestop Systems: Any manufacturer and system listed in "Firestop Systems" Section.

C. Manufacturers of Systems or Devices not listed in the UL Directory or WHI Certification Listings, but which can supply certification of approval since the 2000 or most recent publication date are similarly approved for use under this Section.

D. Materials and devices utilized in the above referenced systems shall be used only in those systems in which they were tested. Substitutions are not permitted.

2.02 APPROVED FLUTED THROUGH-PENETRATION FIRESTOPPING SYSTEMS

A. Rectorseal Corp., Houston, TX.
1. Insulation Backer: Fiberglass.
2. Sealant: METACAULK 1100, sprayed, 1/8 inch thick, from metal deck to gypsum board, both sides.
3. Approval: WHI TRC/PV 60-04, T & F rating 60 minutes, WHI TRC/PV 120-14, T & F rating 120 minutes.

B. ALBI Manufacturing Co., East Berlin, CN.
1. Insulation Backer: Mineral wool.
2. Retaining Clips: 16 or 18 gage, 3/4 flute depth, 1/2 flute width, both sides.
3. Sealant: ALBI CLAD 161, caulked, 5/8 inch thick, around full perimeter of insulation, both sides.
4. Install one or two 4 inch wide sections, 5/8 inch thick fire-rated gypsum board adjacent to top edge of gypsum board wall covering, both sides.
5. Fill 1/2 inch deflection space with sealant, full depth, both sides.

C. FIRETRAK CORP., KIMBALL, MN.
1. Insulation Backer: Mineral wool.
2. Sealant: FS-90 STA-SMOOTH, by Goldbond.
3. Install one or two 5/8 inch thick sections of fire-rated gypsum board, 9 inches wide at deck flutes, both sides, custom fitted to within 1/8 to 3/8 inch of decking profile. Fill space with sealant, full depth, both sides.
4. FIRETRAK SHADOW LINE RUNNER shall be attached to bottom flute of decking as recommended by manufacturer.
5. Approval: WHI FT/PV 60-01, T & F rating 60 minutes, WHI FT/PV 120-01, T & F rating 120 minutes.

D. METAL-LITE INC. , ANAHEIM, CA.
   1. Insulation: Fire Safing.
   2. Install one 8 inch tall continuous strip of Type X Gypsum Board each side of wall fastened with 2 #6x1-5/8 inch drywall screws at each stud. Leave 3/4 inch L shaped void for continuous strip safing.
   3. The System, slotted slip top track with bend tab to hold fire safing in flute.
   4. Approval: UL System No. HW-D0027 and HW-D-0051, 2 hour cycle test (Class II and III), fire endurance test and hose stream test. UL system No. HW-D-0028 and HW-D-0052, 1 hour cycle test (Class II and III), fire endurance test and hose stream test.

E. METAL-LITE, INC., ANAHEIM, CA.
   1. Insulation: Cafco 300 or Cafco Blazeshield sprayed in deck flute and inside angles to top of slots.
   2. Install 1 or 2 pieces Type X Gypsum board each side of wall 1 inch below angle.
   3. The Angle System, 2-1/2 by 3-1/2 inch slotted angle track shall be attached to the bottom of flute decking as recommended by manufacturer.
   4. Approval: UL System No. HW-D-0141 and HW-D-001421 and 2 hour cycle test (Class II and III), fire endurance test and hose stream test.

2.03 FIRESTOPPING AT ELECTRICAL BOXES AND UTILITY OUTLETS

A. Steel electrical outlet boxes on opposite sides of walls requiring protected openings shall be separated by a horizontal distance of 24 inches.

B. Steel electrical outlet boxes which occur in combination with outlet boxes of any size such that the aggregate area of unprotected outlet boxes exceeds 100 square inches in any 100 square feet of wall area shall be protected by an approved material or detail to decrease the aggregate area of unprotected utility boxes to less than 100 square inches in any 100 square feet of wall.

C. Steel electrical outlet boxes which do not exceed 16 square inches in area shall be protected by an approved firestop material:
   1. MPP-4S MOLDABLE PUTTY PADS, by 3M Contractor Products, Minneapolis, MN.
   2. FSP FIRESTOP PUTTY PADS, by Hevi-Duty Nelson Products, Tulsa, OK.
   3. SPECSEAL PUTTY PADS, By Specified Technologies, Inc., Somerville NJ.
   4. Or equal as approved in accordance with Division 1, General Requirements for Substitutions.

D. Utility and electrical outlets or boxes shall be securely fastened to the stud or framing of the wall, or ceiling assembly. The opening in the gypsum board facing shall be cut so that the clearance between the box and the gypsum board does not exceed 1/8 inch.
   1. In smoke walls the 1/8 inch clearance shall be filled with an approved fire-rated sealant.

2.04 SAFING INSULATION – PERIMETER FIRE CONTAINMENT SYSTEM

A. Safing insulation shall be as manufactured by USG Interiors, Chicago, IL, or approved equal as approved in accordance with Division 1, General Requirements for substitutions.
   1. Fire Hazard Classification Flame spread 15, shall meet Federal Specifications HH-1-521E, Type I, Class A/HH-1-521E, Form A, Classes 1 and 2, THERMAFIBER SAFING INSULATION, 4 lb. per CF density, ICBO No. 2331.
   2. Any Perimeter Fire Containment System per UL XHDG.

B. Spandrel Panels shall meet requirements for two (2) hours fire rating.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify site conditions.

B. Verify that openings are ready to receive the Work of this Section.

3.02 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material or other matter which may affect bond of firestopping material.

B. Remove incompatible materials which affect bond.

C. Install backing materials to arrest liquid material leakage.

3.03 APPLICATION

A. Apply primer, firestop sealant or other firestop materials in accordance with manufacturer's recommendations and as approved by regulatory agencies.

B. Apply firestopping material in sufficient thickness or configuration to achieve designated fire rating.

C. Install firestopping material in locations where the designated fire rating must be maintained, including, but not limited to the following:
   1. Voids or annular openings around sleeves, piping, ductwork or electrical/communications conduits which penetrate fire rated walls, partitions, floors, ceilings or assemblies.
   2. Intersections of fire-rated vertical and horizontal assemblies.

D. Remove dam material after firestopping material has cured.

3.04 CLEANING

A. Clean adjacent surfaces of firestopping materials.

3.05 PROTECTION OF FINISHED WORK

A. Protect finished Work.

B. Protect adjacent surfaces from damage by material installation.

3.06 INSPECTION

A. Notify Inspector before Work is covered. Approval of Inspector shall be received before any Work is concealed in a manner which will make inspection difficult. Work which has been covered prior to inspection and approval shall be uncovered, inspected and re-covered.

END OF SECTION

SECTION 07900

JOINT SEALERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preparing substrate surfaces.

B. Sealant and joint backing.

1.02 REFERENCE

A. ASTM C790 - Use of Latex Sealing Compounds.

B. ASTM C804 - Use of Solvent Release Type Sealants.

C. ASTM C834 - Latex Sealing Compounds.

D. ASTM C919 - Use of Sealants in Acoustical Applications.

E. ASTM C920 - Elastomeric Joint Sealants.

F. ASTM D1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.

G. ASTM D1565 - Flexible Cellular Materials - Vinyl Chloride Polymers and Copolymers (Open-Cell Foam).

H. SWRI (Sealant, Waterproofing and Restoration Institute) - Sealant and Caulking Guide Specification.

1.03 SUBMITTALS

A. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.

B. Manufacturer's installation Instructions: Indicate special procedures, surface preparation, and perimeter conditions requiring special attention.

1.04 QUALITY ASSURANCE

A. Perform Work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform acoustical sealant application work in accordance with ASTM C919.

C. Prepare sample joints in the construction to demonstrate to the Architect the quality of the Work to be performed. Accepted sample joints will be used to judge the quality of the Work.

1.05 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this Section with minimum three years experience.

B. Applicator:
   1. Prequalified applicator specializing in performing the Work of this Section with minimum three years experience and approved by manufacturer.
   2. This applicator shall be a licensed joint sealing specialty Contractor.
   3. Submit a list of completed local projects of similar sealant applications.

1.06 ENVIRONMENTAL REQUIREMENTS

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

1.07 COORDINATION

A. Coordinate the Work with all Sections referencing this Section.

1.08 WARRANTY

A. Provide five year warranty under provisions of Division 1, General Requirements.

B. Warranty: Include coverage for installed sealants and accessories which fail to achieve air tight seal, water tight seal, exhibit loss of adhesion or cohesion, or do not cure.

C. Upon written notification of failure due to defective materials or application, repair or replace failure to the approval of the Architect and at no cost to Owner.

PART 2 PRODUCTS

2.01 SEALANT AND MATERIAL MANUFACTURERS

A. Following is a list of acceptable manufacturers of sealants and sealant materials. Inclusion in this list is not intended to imply that all manufacturers make all products. Products made by listed manufacturers must comply with all specified requirements.
   1. Tremco/Vulkem.
   2. Bostik Construction Products.
   3. Dow Corning Corporation.
   4. General Electric Company.
   5. W.R. Meadows, Inc.
   6. Pecora Corporation.
   7. Mameco International.

B. Substitutions: Under provisions of Division 1, General Requirements.

2.02 SEALANT TYPES

A. Single-Component Polysulfide (Non-Sag): ASTM C 920, Type S, Grade NS, Class 25, Use NT, G, A, M.

B. Multi-Component Polysulfide (Non-Sag): ASTM C 920, Type M, Grade NS, Class 25, Use NT, A, M.

C. Multi-Component Polysulfide (Self-Leveling): ASTM C 920, Type M, Grade P, Class 12.5 Use T, A, M.

D. Multi-Component Polysulfide (Water-Immersible): ASTM C 920, Type M, Grade NS, Class 12.5, Use NT, A, M.

E. Single-Component Urethane: ASTM C 920, Type S, Grade NS, Class 25, Use NT, A, M; USDA and FDA status.

F. Single-Component Urethane (Self-Leveling): ASTM C 920, Type S, Grade P, Class 25, Use T, A, M.

G. Multi-Component Urethane (Gun-Grade): ASTM C 920, Type M, Grade NS, Class 25, Use NT, A, M.

H. Multi-Component Urethane (Self-Leveling): ASTM C 920, Type M, Grade NS, Class 25, Use T, A, M.

I. Single-Component Silicone (Non-Acid Cure): ASTM C 920, Type S, Grade NS, Class 25, Use NT, G, A, M; USDA and FDA status.

J. Single-Component Silicone (Acid Cure): ASTM C 920, Type S, Grade NS, Class 25, Use NT, G, A, M; USDA and FDA status.

K. Acrylic-Latex Caulk: ASTM C 834.

L. Butyl Rubber: Federal Specification TT-S-001657.

M. Bedding Compound: For installation of thresholds and similar items indicated to be bedded in sealant, use a preformed butyl-polyisobutylene sealant tape. Size of tape as required for the specific application.

2.03 JOINT AND SURFACE TYPES

A. Pedestrian and Vehicle Traffic Joints - Provide one of the following for each joint type:
   1. Multi-component urethane (self-leveling)
   2. Single-component urethane (self-leveling)

B. Non-Traffic Deck Joints - Provide one of the following for each joint type:
   1. Multi-component urethane (gun-grade)
   2. Single-component urethane

C. Vertical Joints - Provide one of the following for each joint type:
   1. Single-component polysulfide (non-sag)
   2. Multi-component polysulfide (non-sag)
   3. Multi-component urethane (gun-grade)

D. Expansion, Control, and Perimeter Joints - Provide one of the following for each joint type:
   1. Multi-component urethane (self-leveling)
   2. Single-component urethane; use only where dynamic movement will not exceed 50 percent of joint width - above or below grade
   3. Single-component urethane (self-leveling)

E. Curtainwalls and Related Assemblies - Provide one of the following for each joint type:
   1. Single-component silicone (natural cure)
   2. Single-component silicone (acid cure)

F. Non-Moving Joints, Interior and Exterior: Butyl rubber.

G. Water-Immersion Areas - Provide one of the following for each joint type:
   1. Multi-component polysulfide (self-leveling)
   2. Multi-component polysulfide (non-sag)

H. Glazing - Provide one of the following for each joint type:
   1. Single-component silicone (natural cure)
   2. Single-component silicone (acid cure)

I. Wood Window Glazing - Acrylic-latex calk.

J. Acoustical Sealant - Provide one of the following for each joint type:
   1. Acrylic-latex caulk
   2. Butyl rubber

K. Kitchen Areas: Sealant complying with FDA requirements for use in food areas - Provide one of the following for each joint type:
   1. Single-component urethane
   2. Single-component silicone (non-acid cure)
   3. Single-component silicone (acid cure)

L. Toilet and Bath Areas: Sealant containing a fungicide for mildew resistance - Provide one of the following for each joint type:
   1. Single-component silicone (non-acid cure)
   2. Single-component silicone (acid cure)

M. Exterior Doors and Windows: Sealant used for exterior joints or butyl rubber.

N. Interior Doors and Windows - Provide one of the following for each joint type:
   1. Acrylic-latex caulk
   2. Butyl rubber

O. Built-In Cabinet Work: In kitchen, toilet, and bath areas, as specified for those areas. In other areas, single-component silicone (acid or non-acid cure) or acrylic-latex caulk.

P. Rated Walls: Fire-rated Sealant, UL Systems in accordance with Section 07840.

2.04 SEALANT COLORS

A. Provide materials matching colors indicated or if no color as indicated, matching the color samples selected from those submitted to the Architect.

2.05 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backing: Round, closed cell polyethylene or butyl rubber backer rod; oversized 30 to 50 percent larger than joint width.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

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

B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

A. Remove loose materials and foreign matter which might impair adhesion of sealant.

B. Clean and prime joints in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions.

D. Protect elements surrounding the Work of this Section from damage or disfiguration.

3.03 INSTALLATION

A. Do not proceed with sealant Work until the sample joints specified in Part 1 of this Section have been prepared and accepted by the Architect.

B. Install sealant in accordance with manufacturer's instructions.

C. Measure joint dimensions and size materials to achieve required 2:1 width/depth ratios.

D. Install joint backing to achieve a neck dimension no greater than 1/3 of the joint width.

E. Install bond breaker where joint backing is not used.

F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

H. Tool joints concave unless detailed otherwise.

3.04 CLEANING

A. Clean adjacent soiled surfaces.

3.05 PROTECTION OF FINISHED WORK

A. Protect finished installation under provisions of Division 1, General Requirements.

B. Protect sealants until cured.

END OF SECTION

SECTION 08110

HOLLOW METAL DOORS/FRAMES

PART 1 GENERAL

1.01 WORK under this section comprises of furnishing and installing hollow metal frames for doors, windows and hollow metal doors and panels.

1.02 RELATED DOCUMENTS, drawings and general provisions of contract, including General and Supplementary conditions and Division 1 specification sections apply to this section.

1.03 RELATED WORK SECTIONS

A. Section 08710 Finish Hardware

B. Section 08210 Wood Doors

C. Section 08800 Glass and Glazing

D. Section 09900 Painting

1.04 REFERENCES SPECIFIED

A. ISO 9001 – Quality System.

B. UL 10B - Fire Tests of Door Assemblies.

C. UL 10C – Standard for Positive Pressure Fire Tests of Door Assemblies, UBC 7-2, Fire Tests of Door Assemblies.

D. ASTM-E152 – Standard Methods of Fire Tests for Door Assemblies.

E. ASTM-A366 - 95A Specification for Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.

F. ASTM-A568 – General Requirements for Steel, Carbon and High Strength Low Alloy Hot Rolled Strip, and Cold Rolled Sheet.

G. ASTM-A924 -General Requirements for Steel Sheet, Metallic Coated by the Hot-Dip Process.

H. ANSI A250.8/SDI-100 - Recommended Specifications for Standard Steel Doors

and Frames.

I. SDI -105 - Recommended Erection Instructions for Steel Frames.

J. SDI-107 - Hardware on Steel Doors (Reinforcement Application).

K. NFPA-80 - Standard for Fire Doors and Windows.

L. NFPA-101 - Life Safety Code.

M. ANSI-A250.4 and ANSI-A250.5 -Test Procedure and Acceptance Criteria for Physical Endurance, Steel Doors and Frames.

N. ANSI-A224.1 - Test Procedure and Acceptance Criteria for Painted Steel Surfaces for Steel Doors and Frames.

O. ADA-The Americans with Disabilities Act - Title III - Public Accommodations.

P. ANSI-A117.1 - American National Standards Institute - Accessible and Usable Buildings and Facilities.

Q. U. L. - Underwriter's Laboratories.

R. ITS - Intertek Testing Service [Warnock Hersey].

S. CBC - California Building Code and Local Codes Including Authority Having Jurisdiction.

T. N.F.P.A. 105 - Smoke and draft control assemblies.

U. U.L. - 1784 Air leakage test of door assemblies.

V. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

1.05 SUBMITTALS

A. Shop Drawings: Indicate door and frame elevations and sections, materials, gauges, fire ratings, finishes, fabrication and erection details, location and extent of hardware reinforcement, type and location of frame anchors, locations of finish hardware by dimension and locations/details of all openings and louvers. Do not proceed with any fabrication until all details are approved.

B. Certification of Compliance: Submit any information necessary to indicate compliance

to these specifications.

C. Submit samples if requested by the Architect.

D. Job Close-out: Provide 2 (two) complete Manufacturer's catalog's to the District Lockshop and Facilities.

1.06 QUALITY ASSURANCE

A. **All hollow metal doors and frames shall be the product of one (1) manufacturer. Exceptions will not be permitted under any circumstances.**

B. Certification of label construction: For components exceeding Underwriters Laboratories, Inc. (UL)- furnish inspection certificate stating that component construction conforms to UL rating requirements **only** if Architect is aware of such a limitation and has allowed the non-labeled unit.

C. Certification that the Polystyrene Core Swinging Type Fire Doors – Model 707 as manufactured by The Curries Company, has been investigated by Underwriters Laboratories and certified for Standard(s) of Safety: UL 10C – Standard for Positive Pressure Fire Tests of Door Assemblies, UBC 7-2, Fire Tests of Door Assemblies.

D. Hollow metal manufacture shall be a SDI member.

E. The Hollow Metal Manufacturer shall supply doors and frames through a national distribution system as described in 1.06.D herein. Marketing material through a factory direct method will not be acceptable to the Building Owner.

F. Hollow metal supplier shall be a qualified "local direct distributor" of products to be furnished. The distributor shall have in their regular employment an AHC and/or CDC with a local business address, telephone and fax line, who will be available at reasonable times through-out the project, to consult with the Architect, Contractor and District regarding matters affecting the door and frame openings.

G. The Contractor will allow in his bid for the replacement of **two (2) doors** which will be selected at random by the Project Architect and District's Representative for dismantling and inspection of internal construction and compliance with the specification. Contractor to provide labor and tools for inspection under the Architect's direction.

H. Failure of any hollow metal frame or door to meet specified standards shall be grounds to reject the entire shipment of hollow metal doors and frames, including the hollow metal manufacturer. Items shall be replaced at Contractor's expense, including two additional doors for dismantling. No extensions of time or additions to the contract will be allowed due to a rejection of material and substitution of the hollow metal manufacturer.

I. Installer requirement: Firm with a minimum of five (5) years experience in the installation of metal doors and frames similar in the type included in this specification.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver doors and frames cardboard wrapped, crated, palletized or otherwise protected during transit and site storage.

B. Inspect doors and frames upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and accepted by the Architect. Otherwise remove and replace damaged items.

C. Store doors and frames at the building site in a dry, secure place.

1. Place units on minimum 4 inch high wood blocking.
2. Avoid non-vented shelters [covering] that can create a humidity chamber.
3. If cardboard wrapper on door becomes wet, remove carton immediately.
4. Provide 1/4-inch spaces between stacked doors to promote air circulation.

1.08 SEQUENCING AND SCHEDULING

A. Deliver all doors and frames to the job site in a timely manner so not to delay progress of other trades.

B. Issue purchase orders to frame, door and hardware suppliers in sufficient time so as not to interfere with normal quoted delivery of materials.

1.09 WARRANTY

A. Hollow metal doors and frames shall be supplied with a one (1) year warranty against defects in materials and workmanship.

B. Warranty to commence with substantial completion of the job.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Manufacturers:

1. Curries

B. Or Equal, provided products meet the specified performance requirements and are acceptable to the Owner. Such products are subject to California Public Contracts

Code Section 3400.

C. Performance criteria as specified in 2.03 will be supported by an independent laboratory cycle and twist test certification document, and will be included in supplier's shop submittals. Any proposed substitution will be reviewed by District Facilities Mgt. Requests will include a list of recent institutional installations, date of installation, and the current contact names and facilities telephone number.

2.02 MATERIALS

A. Steel requirements, all doors and frames to be manufactured of commercial quality, stretcher leveled flatness, cold rolled steel per ASTM-A366 and A-568 general requirements or galv. to A60 minimum coating weight standard per ASTM-A924 or A653 hot dip galvanized to A60 minimum coating weight standard. Internal reinforcing may be manufactured of hot rolled pickled and oiled steel per ASTM-A569.

B. Coating Materials Primer: all doors and frames to be bonderized and finished as standard with manufacturer's baked-on primer conforming to ANSI-A224.1-1990.

C. Door Core

1. Polystyrene core. All doors to have:
   a. Non-labeled or labeled doors: polystyrene slab [minimum .24 U Factor], self extinguishing, non-toxic in case of fire.
   b. Permanently bonded to the inside of each face sheet providing rigidity, insulating and sound deadening properties to the door.
   c. Refer to 2.03 for additional specification.
   d. **Steel ribbed doors are not acceptable in the SBCUSD.**
2. Temperature rise rated doors should be provided for stairwell enclosures which indicate "Temperature rise 30 minutes - 450 degrees F maximum or 250 degrees F maximum" as required by the local building code.

D. Glass lite frames in doors fabricated of not less than 18GA. galvanized steel with attachment screws allowed only on the non-secure side, screws not visible when viewing door lite frame face.

2.03 FABRICATION

A. General

1. Fabricate all doors and frames in accordance with ANSI A250.8-1998/SDI-100 except where more stringent requirements are specified.
2. As detailed on plans, fabricated "welded" frame units to be delivered to job site as single units. Transoms, sidelights, and window walls which are "oversize" for transportation and installation, shall be furnished with field splices to be field assembled by the general contractor.
3. Supply only doors and frames manufactured by the acceptable manufacturer listed in this specification
4. Doors to be 707 Series as Manufactured by the Curries Co, Mason City, IA. 727 Series at Temperature rise rated doors which indicate "Temperature rise 30 Min.-450F degrees maximum or 250F degrees maximum" as required by local building code.
5. Prepare doors to receive door hardware per approved schedule, including internal reinforcing. Through-Bolts (SNB) are not permitted unless specifically requested by the Architect and/or District. Do not include unnecessary cutouts in door faces not required by hardware template.

B. Door Construction

1. Classification: SDI Level III - Model 2 (16GA. doors).
2. Face sheets formed of cold rolled steel.
3. Exterior doors to be galvanized to A60 minimum weight standard.
4. Seamless construction **[Equal to Curries 707T]** by **continuous wire weld** of both edges full height of door, and to be done at the factory.
5. On louver doors, perimeter channel reinforcement at louver cutouts to be sealed watertight.
6. Lock edges beveled 1/8 inch in 2 inches.
7. Door lock edge reinforcing shall be **one-piece, full height 14GA. Channel.** Door hinge edge reinforcing shall be **one-piece, full height 12GA. Channel** formed and tapped for hinges or as required per listed hardware.
8. Both hinge and lock channels to be welded to each face sheet of the door.
9. Top and bottom channels:
   a. Not less than 16GA. - flush or inverted.
   b. Welded to the face sheet.
   c. Close tops of exterior doors flush by the addition of 16GA. Galvanized. steel channel fillers. Channel filler to sealed watertight.
10. Astragals: Where called for to be flat security type or 'Z' as called for in drawings or specifications.
11. All doors to conform to A.N.S.I.-A 250.4 Test Procedure and Acceptance Criteria for Physical Endurance. Door size cycle tested to be 4070 to minimum Level A

performance for 18 or 16GA. door. **Furthermore, doors will have been subjected to an additional one (1) million cycle and twist tests with a combined two (2) million cycles and 46 twist tests. Tests will have been conducted by an independent lab. Certification of this criteria to be submitted with approval drawings by the distributor. Exceptions will not be considered.**

12. Transom Panels: To be constructed similar to doors.
13. Where indicated, provide insert type louvers in bottom of doors. Louvers to be not less than 18 gauge prime coated steel.

C. Door and Window Frame Construction

1. Frames shall comply with ANSI/SDI A250.5 Level A, one million cycle swing test performance for a 4070 door frame.
2. All frames to be formed from cold rolled steel. Furnish 14GA. exterior door and window frames and 16GA. interior door and window frames. Both exterior door and window frames to be galvanized to A60 minimum weight standard.
3. All frames are to be welded face/jamb depth, ground smooth, and re-primed at the welded area.
4. Window frame glass stops shall be minimum 18GA.steel and 5/8" in height. Exterior stops & countersunk flat-head attachment screws to be galvanized.
5. Provide temporary shipping bars to help protect from damage during transit and handling.
6. Temporary shipping bars to be removed before setting frames.
7. All welds on frames, transoms and sidelites to be flush with neatly mitered or butted material cuts.
8. All exterior door and window frame joints to be sealed water tight by other. [Refer to 09900 Painting Section].

D. Frame Anchors

Provide sufficient anchorage to attach to wall in accordance with ANSI/SDI A250.5-'94 Test Compliance Level A of one million cycles, or anchorage as detailed on plans to specific wall conditions.

1 Wall anchor for frame attachment to masonry construction: Masonry anchors, adjustable, flat, corrugated or perforated 'T' shaped anchors with leg not less than 2 inches wide by 10 inches long or masonry wire type not less than 3/16 inch dia.
2. All frame jamb anchors to be provided: one each jamb per 24 inches of frame height or fraction thereof. Furnish a minimum of two head anchors for frames installed in stud walls and three or more anchors in frame width exceeding 42".
3. Floor anchors - angle clip type:
   a. Minimum 16GA.
   b. To receive 2 fasteners per jamb.
   c. Welded to the bottom of each jamb.

4. In place masonry or concrete:
   a. 3/8 inch countersunk flat head stove bolt and expansion shields.
   b. Spaced 6 inches from top and bottom of frame and at 26 inches on center maximum between.
   c. Weld pipe spacers or other type of spacers per Manufacturer's standard design in back of frame soffit to protect frame profile during tightening of bolts and anchors.
5. Head struts: for frames not anchored to masonry or concrete construction provide ceiling struts spot welded to jambs each side extending to building structure where called for on schedule.

E. Hardware Preparation

1. Reinforcements: reinforce components for hardware installation in accord with ANSI-A115. Provide minimum gage hardware reinforcing for mortise or surface applied hardware as follows:

Hinge	- 10GA. or equivalent number of threads on doors.
Hinge	- 7GA. on frames for mortise hinges.
	- 12GA. full length on frames for continuous hinges.
Lock	- 12GA. or equivalent number of threads.
Panic Devices	- 12GA.
Surface Closer	- 12GA.
Hold Open Arm	- 12GA.

Field drilling and/or tapping for surface applied hardware is installation Contractor's responsibility.

Additional Door Related Reinforcements:

a. Lock reinforcement shall be 16GA. Channel type typical of Curries G2B [161] and G3 [86] four sided compression resistant design.
b. Panic reinforcement to be 14GA. channel type.
c. Closer reinforcement to be 12GA. Channel type.
d. Hinge and lock reinforcing on doors to be channel type, continuous from top to bottom of door welded to face sheets.

2. Punch single leaf frames to receive three (3) silencers. Double leaf frames to receive one silencer per leaf at head.
3. Factory prepared hardware locations to be in accord with "Recommended Locations for Builders' Hardware for Standard Steel Doors and Frames", as adopted by The Steel Door Institute.
4. Supply welded in mortar guards at all hardware cutouts in frames built into masonry or grouted in full.

F. Excess Material

1. Contractor to deliver any unused doors and frames to the District's designated Representative. Review with District.

G. Existing Construction [MODERNIZATIONS]

1. Contractor is responsible for **field survey** of existing doors and/or frames to determine compatibility of specified locksets, exit devices, trim, strikes, closers, overhead stops, flushbolts, coordinators and hinge sizes/weights as listed in the specification.

   a. **Regardless of the Architect's plans and door/frame schedule, the required field survey will include the field measurement of each opening specified to receive a replacement door and/or frame, to determine door/jamb/header dimensions, and opening jamb depths.**
   b. **The Contractor will submit a compiled list of respective door and frame measurements to the Project Architect for consideration, review and approval before any door and frame is ordered. Coordination with the door and frame supplier's is mandatory.**
      The Door and frame supplier will be available to the contractor for consultation and technical assistance.

2. Existing doors and/or frames to be modified for all items of hardware specified, including necessary hardware reinforcements.
3. Existing frames with new doors to be templated with lockset latchbolt aligned with existing frame strike. Where 4-7/8 ASA strikes are required in frames with less than necessary dimensions, Contractor will field cut existing strike jambs, remove the existing strikes, then weld reinforced strike prep to accept the required 4-7/8 ASA strike. Surface installation is prohibited.
4. Contractor will fill, patch, sand and repaint doors and/or frames affected by the removal of existing hardware and the installation of replacement hardware. In addition, whether listed or not, **Contractor shall be responsible for furnishing** fillers for removed hinges, locksets, strikes, closers, panics, door stops and etc.
5. If the respective doors and/or frames are considered unsuitable for reuse, and/or do not correspond to the hardware specification, the Architect and/or Building Owner's Representative will be notified immediately in order to address the issue at the earliest opportunity.
6. Modification of labeled doors and frames must be approved and certified by [ITS] Intertek Testing Service [Warnock Hersey].

PART 3 EXECUTION

3.01 FRAME INSTALLATION

A. Erection Installation: Install hollow metal units in accordance with manufacturer's instructions and final shop drawings. Fit doors to frames and floors with proper clearances and to achieve the maximum operational effectiveness and appearance of each unit. SDI 120-90 "Installation and Trouble Shooting Guide for Standard Steel Doors and Frames" or "The Installation of Commercial Steel Doors and Steel Frames" as published by DHI are recommended guidelines.

B. Set welded frames in position prior to beginning partition work. Brace frames until permanent anchors are set.

C. Set anchors for frames as work progresses. Install anchors at hinge and strike levels.

D. Use temporary setting spreaders at all locations. Use intermediate spreaders to assure proper door clearances and header braces for grouted frames.

E. Install frames in prepared openings in concrete and masonry walls using countersunk bolts and expansion anchors.

F. Install all fire rated frames in accord with requirements of N.F.P.A.-80, there listing and manufacturer's recommendations.

G. Where frames require ceiling struts or other structural overhead bracing, they shall be Anchored securely to structure above, as required.

H. Frames shall be filled solid with Portland cement grout where shown or required by class of opening in masonry or concrete walls. Provide steel plaster guards or mortar boxes, welded to frame, at back of hardware cutouts where installed in concrete, masonry or plaster openings. Protect inside throat of each frame in grout filled wall conditions or where antifreeze additives are used in fill, with a waterproof undercoating type material minimum 1/8 inch thick, field applied by installer.

3.02 DOOR INSTALLATION

A. Install hollow metal doors in frames using hardware specified in Section 08710 Finish Hardware. Doors are to be expertly hung and shall fit snug against all stops. Doors Shall fit accurately and hang free from hinge bind with a uniform clearance of 1/8 inch at head and jambs. After hanging, make all adjustments and then remove respective hardware for finish painting. Reinstall hardware after finish painting.

B. Maximum clearances at edge of doors:

1. Between door and frame at head and jambs: 1/8 inch.
2. At meeting edges pairs of doors and at mullions: 1/8 inch.
3. At transom panels, without transom bars: 1/8 inch.
4. At sills without thresholds: 5/8 inch max above finish floor.
5. At sills with thresholds: 1/8 inch above threshold.

C. Hardware Installation: to be installed securely without marking or defacing hardware or Finish work. Protect finish hardware with suitable protective covering until completion of building. Leave all hardware in perfect working order. Clean and polish.

3.03 ADJUSTMENT AND CLEANING

A. Remove dirt and excess sealant, mortar or glazing compounds from exposed surfaces.

B. Adjust for smooth operation as required. Install shims as required to allow for proper closing.

C. Fill all dents, holes, etc. with metal filler and sand smooth and flush with adjacent surfaces - reprime/paint to match finish.

[END OF SECTION]

SECTION 08210

WOOD DOORS

1. GENERAL

1.1 WORK INCLUDES

A. Base Bid:

1. Prime Contractor provide:
   a. New wood doors shown on drawings, specified and required for complete and proper installation.

1.2 RELATED WORK

A. Specified elsewhere:

1. 06100 - Rough Carpentry.
2. 06200 - Finish Carpentry.
3. 08110 - Hollow Metal Doors/Frames.
4. 08710 - Finish Hardware.

1.3 REFERENCES

A. WDMA – Window and Door Manufacturers Association: 15 1-A Industry Standard for Architectural Flush Wood Doors.

B. NFPA-80 Standards for Fire Doors Edition.

C. Uniform Building Code: UBC 7-2 or UL 10b, Neutral Pressure Fire Door Test Method.

D. NFPA-105 Recommended Practice for Installation of Smoke-Control Door Assemblies.

1.4 QUALITY ASSURANCE

A. Acceptable Manufacturers: Qualified to manufacture doors to meet the current A.N.S.I. Window and Door Manufacturers Association IS 1-A Industry Standard for Architectural Flush Wood Doors. Manufacturers not appearing under Section 2.1 of this document will not be acceptable nor will they be considered.

B. Wood door supplier to be a qualified factory direct distributor of products to be furnished. The distributor shall have in their regular employment an AHC/CDC or person of equivalent experience who will be available at reasonable times to consult with the Project Architect, Contractor and/or District regarding matters affecting the project's wood doors.

C. **Contractor will allow in his bid for replacement of two (2) doors** which will be selected at random by the Architect for destructive testing to verify that product supplied correlates

with samples approved. Contractor will provide labor and tools to cut open and dismantle door under Architect's direction.

D. Allowable tolerances for fabrication of doors:

1. Sizing and Hardware Preparation: All doors to be factory pre-fit, beveled and prepared for builders hardware to assure compliance with the latest edition of WDMA I.S. 1-A Section P-3 Dimensional Tolerances and sizing authorities for fire rated doors.

a.	Factory Prefit:	±1/32 " (0.8 mm) width
		± 1/16 " (1.6 mm) height
		± 1/16 "(1.6 mm) thickness
b.	Hardware Prep:	± 1/32 " (0.8 mm) location
		+ 1/32 ", -0" (+0.8 mm, - 0 mm)height
		+ 1/32 ", -0" (+0.8 mm, -0 mm) width
		+ .025", -0" (+0.6 mm, -0 mm) depth
		+ 0", -1/32" (+0 mm, -0.8 mm) hinge backset

2. Maximum Warp: 1/4 inch within any 3'-6" by 7'-0" door section per WDMA I.S. 1-A Test T-2
3. Squareness: Per WDMA I.S. 1-A Test T-3. All four corners of the door shall be square. The length of the diagonal measurement on the face of the door from the upper right corner to the lower left corner shall be within 1/8 inch (3.2 mm) of the diagonal measurement from the upper left corner to the lower right corner.
4. Show-Through (Telegraphing): Per WDMA I.S. 1-A Test T-1. Variation between the thickness of vertical or horizontal edges and cores shall be considered a defect if there is a deviation from a true plane in excess of 1/100 inch (.025 mm) in any 3 inch (75 mm) span when measured on the door face.

E. Regulatory Requirements:

1. Doors scheduled to receive a 20, 45, 60, or 90 Minute fire labels shall be fabricated in strict accordance with manufacturers authorities.
2. Affix permanent certified testing laboratory fire door label to each fire door to show class scheduled on drawings.

1.5 SUBMITTALS

A. In accord with Division 1, General Requirements.

1. Shop Drawings:
   a. Show details of door construction.
   b. Glazing materials and thickness.
   c. Face veneer pattern and species.

2. Door Schedule: Indicate opening identifying symbol, size, door type and grade, show elevations, swing, undercuts, light cutouts, and fire classification marking.

B. Certification: Provide manufacturer's certification that doors scheduled to receive a 20/45/60 and 90 Minute rating or fire labels have been fabricated in strict accordance with requirements of Underwriters Laboratories Inc., ITS, Warnock Hersey, or other certified testing agency and that doors conform to requirements for labeled construction.

1.6 DELIVERY, STORAGE AND HANDLING

A. In accord with Article 01050 of Standard Documents for Construction.

B. In accord with Article 01504 of Standard Documents for Construction.

C. In accord with WDMA I.S. 1-A Care and Installation at Job Site Instructions.

1. Deliver doors to jobsite only after "wet" construction operations are completed.
2. Storage building to be dry and have reached average prevailing relative humidity.
3. Do not walk or stack other materials on top of stacked doors, nor drag across....
4. Deliver prefinished components in manufacturer's original unopened protective covering, clearly marked with manufactuer's name, brand name and identifying number on the covering or container.

1.7 WARRANTY

A. Provide manufacturer's warranty for all wood doors. Warranty period: Lifetime of original installation for interior doors, and two (2) years for exterior doors. Doors shown to be defective during warranty period shall be replaced (including hanging and finishing) with new doors. These terms shall be part of the manufacturers standard warranty.

1. Warranty not to be in effect for any field finish doors not having been sealed properly on edges and faces per manufacturer's specifications.

2. PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Algoma Hardwoods, Inc., 1001 Perry St., Algoma, WI 54201; telephone (800) 678-8910; fax (920) 487-3636.

B. Eggers Industries, 164 Lake St., Neenah, WI 54956; telephone (920) 722-6444; fax (920) 722-0357.

B. Graham Manufacturing Corp., 1502 12th St. NW, Mason City, IA 50401; telephone (641) 423-2444; fax (800) 672-8110.

2.2 MATERIALS

A. Wood doors shall be 1-3/4 inches (44 mm) thick flush bonded core, hardwood veneered doors conforming to requirements for the WDMA I.S. 1-A and the following:

1. Door Construction:
   b. Core construction shall be bonded (SCL) structural composite lumber, or bonded mineral core (FD) conforming to WDMA I.S. 1-A, as required.
   c. Door construction shall conform to WDMA I.S. 1-A Premium Grade requirements equal to Graham GPD.

2. Hardboard Faces [Medium Density Overlay – MDO]:
   a. Hardboard shall comply with requirements of ANSI/AHA A 135.4.
   b. Class 2 Standard, Modulus of rupture (min av per panel-4500 psi).
   c. Minimum 1/8" nominal thickness.

3. Adhesives: Face to core adhesives shall be Type I or Type II as appropriate for location in building. Adhesives must be classified Type I or Type II per WDMA TM-6 "Adhesive Bond Test Method". Type I adhesives shall be used for doors in exterior applications, Type II adhesives shall used for doors in interior applications.

4. Core:
   a. Non-rated and 20 minute doors: (SCL) structural composite lumber.
   b. Fire rated doors: Non-combustible mineral core containing no asbestos.

B. All doors shall be the product of one manufacturer.

2.3 FABRICATION

A. Moisture Content: 12% maximum at time of fabrication for wood material.

B. Solid Core:

1. Engineered Composite Core: conforming to WDMA I.S. 1-A and ANSI A208.1 for LD-1 or LD-2 Door Core.
   a. Bond stiles and rails to core. Fully abrasive plane both core faces to assure flatness of core and frame assembly.
   b. Stile: 1-3/8 inch (35 mm) minimum width after factory pre-fit and bevel of the door. Measured at the centerline of the stile from door face to door face. Laminated stile construction with stile face specie to match door face specie per WDMA I.S.1-A Section S-9. Veneered edge bands are **not** acceptable.
   c. Top and bottom rails: 1-1/4 inch (32 mm) minimum width.

C. Face Panels:

1. Face panels of MDO, minimum nominal thickness 1/8 inch.
2. Bond Medium Density Overlay to natural wood crossband.
3. Construction to be balanced and stable.

D. Light Openings:

1. Molding and glass stops shall conform to WDMA I.S. 1-A .

2. Light openings size as indicated on drawings, referenced by visible glass size.

E. Fire Rated Doors:

1. "B" Label – 1-1/2 hour rated doors.
   a. Solid mineral core construction with laminated composite edge bands conforming to the manufacturers label construction requirements. Stile faces shall match the door face veneer per WDMA I.S. 1-A, Section 21. Stiles and rails shall contain no fire retardant treatments. Stiles shall provide minimum direct screw withdrawal of 1130 lbs. when tested per WDMA TM-10.
   b. GP six (6) inch blocking at top and bottom rail required at mineral core construction. Additional blocking required at armor, kick and mop plate applications, and mid-rail blocking at exit device applications.

2. "C" Label - 3/4 hour rated doors.
   a. Solid mineral core construction with laminated composite edge bands conforming to the manufacturers label construction requirements. Stile faces shall match the door face veneer per WDMA I.S. 1-A, Section 21. Stiles and rails shall contain no fire retardant treatments. Stiles shall provide minimum direct screw withdrawal of 1130 lbs. when tested per WDMA TM-10.

3. Faces as specified in Paragraph 2.3 C of this document.
4. Vision Panels:
   a. "B" Label – 1-1/2 hour rating: Total maximum area to 100 sq. inches, 33 inches maximum dimension, 6 inches minimum to edge of door.
   b. Provide minimum 20 gauge formed metal stops attached per manufacturer's authorities.

5. Unless otherwise specified, provide door manufacturer's approved and listed construction eliminating metal edges and/or overlapping astragal at the meeting stiles of paired doors.
6. Furnish each fire rated door with rating agency metal label indicating fire rating, fastened to hinge stile edge of door.

F. Factory Pre-fit and Pre-machine Doors:

1. Factory pre-fit and pre-machine doors to fit frame opening sizes indicated with the uniform clearances and bevels as stated in Paragraph 1.3 B. of this section.
   a. Comply with final hardware schedules and door frame shop drawings and with hardware templates.
   b. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before proceeding with factory pre-machining.

G. Field Finishing:

1. Finishing of MDO doors to be in accord with Painting Section [09900].

2. Architect to be furnished a minimum of two (2) factory samples if requested. Samples to be hand delivered to the Architect.

2.4 PROTECTION

A. Provide protection buttons each side of bottom rails for protection until hung.

B. Exterior doors shall be water repellent treated after manufacturing has been completed. Treatment shall comply with WDMA I.S. 4, and provide a minimum water repellant efficiency of 55% as tested per WDMA TM-2.

C. Outswinging exterior wood doors shall have non-ferrous metal flashing at top edge, manufacturer applied.

3. EXECUTION

3.1 INSPECTION

A. Verify that door frames are of type required for door and are installed plumb and square as required for proper installation of doors.

B. Do not install doors in frames which would hinder operation of doors.

C. Project require door assemblies and components that are compliant with positive pressure and S label requirements. Specifications must be cross referenced and coordinated to ensure that total opening engineering is compatible with UL 10C Standard for Positive Pressure Fire Tests of Door Assemblies, and UBC 7-2 1997, Fire Tests of Door Assemblies.

1. Certification(s) of compliance shall be made available upon request by the Authority Having Jurisdiction.

3.2 INSTALLATION

A. Handle doors per recommendations of WDMA I.S.1-A, "Care & Installation at Job Site".

B. Condition doors to average temperature and humidity in area of installation for not less than 48 hours prior to installation. Store doors per recommendations of WDMA I.S. 1-A, “Care and Installation at Job Site”.

C. Install hardware as scheduled.

1. See Section 08710 for installation of finish hardware.

D. Adjust door hinges to provide uniform clearances at heads, jambs, and floor as indicated below and to contact frame silencers or stops uniformly. Perform these alterations only if doors are not factory pre-fit and pre-machined as specified in Paragraph 1.3. B.1, and only if the doors are not fire rated.

1. Fit doors to width by planing equally from both sides.
2. Bevel lock and hinge edges 1/8 inch in 2 inches.
3. Side and top clearance 1/8 inch.
4. Floor clearance - 3/4 inch.

E. Doors shall be installed to hang plumb and true in frames, to contact stops uniformly and with same head, jamb and floor clearances as required for metal doors.

F. Remove and replace doors found to be inoperable or unacceptable due to warp, twist, bow, cup or otherwise damaged. File proper claims with the manufacturer's representative if defect is due to manufacture.

G. At completion of installation, doors shall be undamaged and all surfaces shall be in satisfactory condition for field finishing if provided without factory finish.

H. If doors are to be field finished the process must follow the WDMA I.S. 1-A "Care and Handling at Job Site" instructions for field applied finishes.

I. Protect doors and frames from damage before, during and after finishing and installation.

3.3 ADJUST AND CLEAN

A. Replace or re-hang doors which are hinge bound, or do not swing or operate freely. Correct the frame or hardware conditions that may contribute to the improper operation of the door.

B. Refinish or replace job finished doors damaged during installation.

C. Re-adjust door heights after carpet is laid.

D. Properly sized pilot holes shall be drilled prior to the installation of any builders hardware to eliminate splits at door edges or face veneer damage.

E. Doors displaying face veneer damage or wood splits in excess of ½ inch (12 mm) in length at hardware locations shall be removed from the job site and replaced. No job site repairs shall be performed that will void the manufacturer's warranty or the fire door label authority.

F. After the installation of fire rated doors is completed, an operational test shall be conducted. These tests shall be adequate to determine that the system has been installed and functions as intended.

[END OF SECTION]

SECTION 08710

DOOR HARDWARE

PART 1: GENERAL

1.01 SUMMARY

A. SECTION INCLUDES:

1. Work under this section comprises the furnishing and installation of hardware specified herein and noted on drawings for a complete and operational system, including any electrified hardware components, systems and controls.
2. Related Documents, drawings and general provisions of contract, including General and Supplementary Conditions, and Division 1.
3. Items include but are not limited to the following:
   a. Hinges
   b. Exit Devices
   c. Locksets
   d. Cylinders
   e. Push/Pull Plates
   f. Automatic Flush Bolts
   g. Closers
   h. Kick, Mop and Protection Plates
   i. Stops and Overhead Controls
   j. Thresholds, Gasketing and Door Bottoms
   k. Miscellaneous Accessories and Trim

B. RELATED WORK:

Section 08210 - Wood Doors
Section 06200 - Finish Carpentry.
Section 08110 - Hollow Metal Work.
Sections within 08800 - Glazing.
Sections within 09900 - Painting.
Electrical Division 16.

1.02 SUBSTITUTIONS

A. References to specific products are used to establish minimum standards of utility and quality. Unless otherwise approved, furnish only the specified products.

B. Requests for substitutions to be in accordance with Division 1, General Requirements. Proposed substitutions must be submitted in writing and hand delivered to the Architect. Approvals must be by addendum ten [10] days prior to bid opening. **Building Service's Director will be notified of any requests.**

C. All requests to be accompanied by two [2] copies of the manufacturer's brochures and a physical sample of each item in the appropriate design and finish.Items listed with no substitute have been requested by the Building Owner to match existing building standards.

E. Should the Contractor make any substitutions without the written consent of the Architect, Contractor shall remove all substituted hardware, replacing same with the hardware as specified and at no additional cost to the Building Owner.

1.03 REFERENCES

A. References specified in this section subject to compliance as directed and shall meet requirements of Federal, State and local codes having jurisdiction over this project including:
1. CCR - California Code of Regulations Title 24.
2. ADA - American Disabilities Ac
3. NFPA 80 - Standard for Fire Doors and Windows.
4. NFPA 101 - Life Safety.
5. ITS - Intertek Testing Service [Warnock Hersey].
6. UL - Underwriters Laboratories.
7. ANSI/BHMA A156 Product Listing.
8. CBC Building Code, State Codes and Authority Having Jurisdiction.
9. UL 10C for Positive Pressure Fire Tests of Door Assemblies and UBC 7-2.

B. Hardware that is furnished and/or installed that does not meet code requirements, shall be removed and replaced with correct material at no additional expense to the Building Owner.

1.04 QUALITY ASSURANCE

A. PRODUCT UNIFORMITY: Except where specified, all hinges, keyed cylinders, electro-mechanical components, locksets, latchsets, exit devices, closers, overhead stop/holders and component parts shall be furnished by one manufacturer.

B. RATED OPENINGS: Hardware used in labeled fire or smoke rated openings to be listed for those types of openings and bear the identifying label or mark indicating U.L. [Underwriter's Laboratories] approved for fire. Exit devices in non-labeled openings to be listed for panic.

C. SUPPLIER: Shall be responsible for detailing hardware that meets project standards and where appropriate, retrofit applications which requires inspection of openings prior to detailing and ordering respective hardware items.

D. **PRE-INSTALLATION CONFERENCE**: Prior to installation of hardware, arrange a conference between supplier, installers, and related trades to review materials, procedures, hardware mounting locations and related work.

E. **INSTALLATION EXERCISE**: Contractor/Installer is required to install one complete exterior opening Hardware Set and the respective hollow metal door and frame to establish both know-ledge and skill as required for this project. Door/frame and hardware installation practice will be coordinated with the Project Architect and Building Owner's Representative, and shall be accomplished to the PA's satisfaction, and prior to the installation of any doors/frames and door hardware. Typical hardware set to be comprised of hinges, panic device, trim, door closer, overhead stop if detailed, flat goods, threshold, sweep, drip cap and perimeter seal or as directed by the Architect.
Damage resulting in replacement material or repair, including labor, shall be absorbed by the Contractor/Installer.

F. **POST-INSTALLATION POLICING**: Will be required by the Hardware Supplier, Contractor and Architect to determine compliance with the hardware specification and building standards.

G. SUPPLIER QUALIFICATIONS:

1. Hardware supplier must be a recognized, Southern California based FACTORY DIRECT contract distributor with a minimum five (5) years experience specializing in institutional grade builders hardware of the type specified herein. Distributor's with less than two (2) years of history of furnishing builders hardware in the project's vicinity will not be acceptable.
2. Supplier must have in his/her employment on a full time basis, a Certified Hardware Consultant [AHC] or person of equal experience who is acceptable to the Architect and CM. This individual shall be available for consultation and service to the architect, contractor, and building owner during construction and on an ongoing consulting service to the building owner following the completion of the project.
3. Supplier who does not maintain personnel in a permanent facility within a reasonable driving radius of the project area for consultation and service with the Architect, Contractor and Building Owner will not be acceptable.

1.05 GENERAL REQUIREMENTS

A. COORDINATION: Coordinate as necessary with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

B. SEQUENCING AND SCHEDULING: Any part of the finish hardware required by the frame or door manufacturers or other suppliers, that is needed in order to produce doors or frames is to be sent to those suppliers in a timely manner.

C. DEFECTIVE HARDWARE: All hardware shall be new and free from defects affecting both serviceability and appearance. Working parts shall be properly fitted, smooth working and without excessive play.

D. FUNCTION/MODIFICATION:

1. Should any hardware fail to meet the intended operational requirements or require any modification to suit the intended location, this matter, or any other necessary advance information, shall be brought to the attention of the architect for correction or advice in ample time to avoid delay in the manufacture and delivery of the hardware.
2. Modifications to specified hardware, required by reason of construction characteristics, shall be furnished in the specified operational, functional features, quality and finish. Modifications shall be subject to acceptance of the Architect at no additional cost to the Building Owner.
3. Items of hardware not specified herein but necessary for completion of the work shall be furnished at no additional cost to the Owner. Such items shall be of the type specified and comparable to adjacent hardware.

E. DOORS AND FRAMES: Hollow metal and wood doors shall be manufactured to templates. If required, physical hardware items shall be furnished to related manufacturers in sufficient time to avoid delay in work.

F. Contractor/Installer will deliver all unused finish hardware to the District Lockshop.

G. EXISTING **[MODERNIZATION – EACH SITE]**

Contractor is responsible for a field survey of doors, frames and hardware to determine compatibility of specified hardware, including, but not limited to: locksets, panic devices, strikes, automatic flushbolts, overhead stops, coordinators, closers, threshold/seal, hinge sizes & weights <u>including wide throw hinges</u> needed to achieve maximum door swing at exterior doors. With the exception of mechanical/storage/single occupancy restrooms, furnish overhead stop control [CPS/CPSH] only where conditions dictate, and required.

Unless directed otherwise, Contractor to modify openings to meet ADA elevation threshold requirements. Contractor to survey and where necessary, furnish and install ADA approved threshold systems where applicable and approved by the Architect. Work shall comply with minimum ADA specifications as well as create a flat sub-surface for specified thresholds.

Existing doors and frames to be modified for hardware as permitted by UL, WHI and local code authority. Where required, Contractor shall cut and weld necessary reinforcements to existing jambs and doors, for listed hardware as applicable and required. Contractor to patch, sand and repaint/refinish reused door & frame surfaces affected by the removal of hdwe, and modification for replacement hdwe.

Whether listed or not, Contractor shall furnish frame/door hinge, strike, lock face, panic, closer and overhead auxiliary stop fillers where required for a clean finished appearance. Related costs to field modify existing frames and/doors shall be part of the Contractor's base bid and shall include a **$500.00 allowance** for door and frame fillers. Intertek Testing Service inspection and certification is required for the labeling of non-rated doors and frames, and the modification of any labeled door and frame. Contractor is responsible for contacting and coordinating this required labeling service.

The Contractor is responsible for the careful removal, treatment and delivery of all existing replaced and any unused new hardware to the Building Service's Director.

1.06 SUBMITTALS **[BY HARDWARE SUPPLIER]**

A. HARDWARE SCHEDULE: Submit typewritten copies of schedule in accordance with Division 1, General Requirements. Schedule to be in VERTICAL format, listing each door opening including; location, handing of opening, all hardware scheduled for each opening or otherwise required to allow for proper function of door opening as intended, finish of hardware, and respective manufacturers. Doors with closers or door controls shall require the degree of door opening.

1. Supply six [6] copies of the schedules within fifteen [15] working days from date of purchase order.
   a. The hardware schedule shall conform with DHI's: Recommended Procedure for Processing Hardware Schedules and Templates."
   b. Submit manufacturer's catalog cut sheets of all hardware items scheduled and any special mounting instructions with the hardware schedule.
   c. Include recommended mounting location data for each type of scheduled door hardware. **Include** electrified hardware w/appl.
2. No hardware item shall be delivered until the hardware schedule has been approved by the Project Architect.
3. Approval of the hardware schedule by the Architect does not relieve the hardware supplier from the responsibility of furnishing the job complete.

B. SAMPLES:

1. If directed by the Architect, submit physical samples of each item of hardware proposed in work.
2. Samples will be returned on the request of and at the expense of the Contractor.

C. MFR'S CATALOG ILLUSTRATIONS AND HARDWARE DATA:

1. Submit, to the Architect, two [2] catalog cuts of every item of hardware furnished for this project. Data shall be contained in a binder appropriately divided by the respective manufacturers.

2. Cuts shall include manufacturer's illustrations and shall identify finishes, sizes and product numbers. Abbreviations to be fully explained.

D. OPERATIONAL DATA:
1. Deliver to the District, through the Architect,
   a. One [1] set of factory catalogues for hardware listed in the approved hardware list.
   b. One [1] copy of approved door hardware shop drawings.
   c. One [1] copy of door hardware specifications.

E. TEMPLATES: Templates for door hardware items to be sent to related door and frame suppliers within three [3] working days of receipt of approved hardware schedule. Templates **shall not** be issued until the door hardware schedule has been reviewed and approved by the Project Architect.

F. CERTIFICATION OF COMPLIANCE: Submit any information necessary to indicate compliance to any or all of these specifications as required.

G. KEYING SCHEDULE:
1. Submit three [3] copies of a separate detailed keying schedule to the Contractor.
2. Indicate keying of all cylinders, exit devices, locksets, and padlocks. Include door & item numbers as set forth in the approved hdwe schedule.
3. Keying data shall follow "Keying Systems and Nomenclature" as established by DHI.
4. Prior to placing a factory order, the key schedule shall be approved in writing by the S.B.C.U.S.D Building Services management.
5. Arrange with S.B.C.U.S.D Building Services for the handling of the District's key bitting list. Copy of the list must be sent to Sargent's Key Record's Department.

1.07 DELIVERY, STORAGE AND HANDLING

A. PACKAGING: Each unit of hardware shall be individually packaged in the manufacturer's original containers as required by the respective hardware manufacturers.
1. Packaging shall include factory original installation instructions, fastenings and all items necessary for complete installation.

B. WRAPPING: Wrap and cushion each item to prevent scratches and dents during delivery and storage.

C. ENVIRONMENTAL PACKAGING: Hardware shipped to the jobsite is to be packaged in biodegradable packs, such as paper or cardboard boxes and wrapping. If non-biodegradable packing is utilized, such as plastic, plastic bags or styrofoam, then the Contractor will be responsible for the disposal of the non-biodegradable packing to a licensed or authorized collector for recycling of the material.

D. MARKINGS: Each package shall be clearly marked on the outside, identifying contents with specific opening number corresponding to those listed in the hardware schedule. Include door and item number for each product.

E. DELIVERY: Except as dictated otherwise, deliver all hardware to the job site. The Contractor and Hardware Supplier's Representative shall check each item of hardware against the approved finish hardware schedule.

F. STORAGE: All hardware shall be stored in a locked storage space until ready for installation. Hardware shall be protected against damage after application and during construction period.

1.08 WARRANTY

A. All door hardware shall be supplied with a one [1] year warranty against defects in materials and workmanship, commencing with substantial completion of job.

PART 2: PRODUCT:

2.01 MANUFACTURERS

A. ACCEPTABLE MANUFACTURERS:
1. All materials or products specified herein shall be furnished AS SPECIFIED. Refer to Para. 1.02 SUBSTITUTIONS.
2. Any substitution request must be evaluated and approved by S.B.C.U.S.D Building Services management personnel.
3. Following are approved manufacturers which comprise the base bid:

PRODUCT	SPECIFIED MFRS	APPROVED MFRS
Hinge	McKinney	Hager,Stanley
Lockset	Marks	Sargent **FW10L**
Exit Device	Sargent	As Specified
Cylinder/Keying	Sargent	As Specified
Closer	Sargent	As Specified
Anti-Vandal Pull	Trimco	Sargent
Push/Pull/KP	Trimco	BBW,Quality
O.H. Stop	Sargent	As Specified
Door Stop	Trimco	BBW,Quality
Thresh/Seal	Pemko	McKinney,Reese

2.02 FASTENINGS

A. Furnish hardware with all necessary screws, bolts or other fastenings of suitable type and size to anchor the hardware in position for long life and heavy use.
Fasteners shall include expansion shields, sex bolts, toggle bolts, or other approved anchors according to material to which it is applied and as recommended.
1. Furnish Phillips flat-head screws except as otherwise indicated.

2. Thru-bolts to be furnished for closers, panic and overhead stops per district standard. Doors/frames are to be reinforced per Curries HM 08110 standard.
3. Hdwe applied to concrete shall be installed with RED-HED anchors.
4. **Self tapping screws are <u>not</u> permitted in S.B.C.U.S.D work.**

B. Design of all fastenings shall harmonize with hardware as to material and finish.

2.03 HINGES

A. All hinges and pivots, including single and double acting types, pocket hinges, electric hinges and continuous aluminum geared hinges to be of one manufacturer as listed for continuity and consideration of warranty.

B. Unless otherwise specified, furnish five-knuckle exposed tip as specified; full mortise template type hinges with non-rising loose pins.

C. Out-swinging exterior doors to be furnished with anchor hinges of stainless steel or solid bronze with non-removable pins [NRP].

D. Interior doors to be furnished with wrought steel, polished and plated to match specified finish.

E. Furnish three [3] hinges up to 90 inches high and one [1] additional hinge for every 30 inches or fraction thereof.

F. Furnish standard weight hinges on doors up to 36 inches in width, and extra heavy weight on doors exceeding 36", or as indicated in the hardware schedule.

G. Furnish 4.5 x 4.5 inch for all 1-3/4 inch thick doors up to 36 inch wide, and 5 x 4.5 over 36 inch wide. Doors over 1-3/4 inch thru 2-1/4 inch thick, use 5 x 5 inch hinges.

H. Where required, furnish hinges of sufficient width to clear trim and/or permit the door to swing 180 degrees as required by the specific opening.

I. Furnish oil-impregnated bearing hinges at all doors.

2.03A CONTINUOUS HINGES

A. Hinge line to be available in concealed flush mount with or without inset, full surface and half surface types as specified in the hardware sets. Furnish wide throw hinges as required to clear trim permitting doors to open 180 degrees.

B. All hinges to be made of extruded 6063-T6 aluminum alloy with thrust bearings.

C. All concealed hinges to be fire-rated 20,45 and 90 minutes when incorporated into proper door and frame labeled installations, without necessitating the use of fusible link pins.

D. All hinges to be available in standard, heavy and extra heavy duty weight. All mortise and wide throw as specified in the hardware sets.

E. Exterior openings: furnish MCK-14HDWT [wide throw] where conditions dictate to achieve maximum door swing, and MCK-14HD where applicable, and required. Contractor is responsible for a building/opening survey to determine wide throw hinge requirements.

F. All hinges to be factory cut for door size.

2.04 MORTISE LOCKS

A. All mortise locksets, panic, trim and cylinders to be of one manufacturer as listed for continuity of design and consideration of warranty.

B. Locksets shall be Sargent 8200 Series x LNL trim [WTL where dictated at existing escutcheon templating only]. Where WTL is used involving mulitiple doors, furnish same trim for continuity. Review with SBCUSD Building Services.

C. All lockset functions shall be manufactured in a single sized case formed from 12 gauge steel minimum. the case shall be closed on all sides and back. The lockset shall have a field-adjustable, beveled armored front, with a .125 inch thickness minimum. the lockset shall be 2 3/4 inch backset standard, with a one piece 3/4 inch throw anti-friction stainless steel latchbolt. The deadbolt shall be a full one inch throw made of stainless steel and have 2 hardened steel roller inserts.

D. Lever return springs shall be internal. Springs used for leveling and lever return shall not be located outside of the lock case. Return springs shall not be located in the exterior rose or trim.

E. Full lever retraction at only 30 degrees for ADA accommodation.

F. Handing shall be field reversible without opening the lock case.

G. Mortise locksets for labeled fire doors shall have a fusible link mechanism to prevent latchbolt retraction in case of fire.

H. Provide curve lip strikes with wrought boxes for all locks. Strikes shall be of sufficient length to protect trim or the inactive leaf of a pair of doors.

2.05 CYLINDRICAL LOCKS

A. All cylindrical locks to be of one manufacturer as hereafter listed for continuity of design and consideration of warranty.

B. Locksets shall be Mark's 195 Survivor Series with 2-3/4" backset.

C. Locksets and latches shall be heavy duty cylindrical type Grade 1. Latchbolts shall have minimum of ½ inch projection.

D. Lock and latchsets shall be constructed with thru-bolted design and independent spring cartridge system for lever stability and operation.

E. Provide 4-7/8" curve lip strikes with wrought boxes. Strikes shall be of sufficient length to protect trim or the inactive leaf of a pair of doors.

2.06 EXIT DEVICES

A. All exit devices, lever trim, and cylinders to be of one manufacturer as listed and in the hardware sets for continuity of design and consideration of warranty.

B. Exit devices shall be Sargent 80 Series at new construction x Trimco 1097HA trim, and as listed.

C. Sargent 30 Series exit devices required as listed.

D. Exit devices to be "UL" listed for life safety. All exit devices for labeled doors shall have "UL" label for "Fire Exit Hardware." All devices mounted on labeled wood doors are to be thru-bolted or per the manufacturer's listing requirements. All devices to conform to NFPA 80 and 101 requirements.

E. All exit devices to be of a heavy duty, chassis mounting design, with one piece removable covers, eliminating necessity of removing the entire device from the door for standard maintenance.

F. All trim to be thru-bolted to the lock stile case.

G. Exit devices shall be push pad devices finished to match that of the locksets. Push pad to be high impact resistant black lexan with a maximum 3 inch projection.

H. Rail assemblies of all exit devices to be of solid stainless steel, as required in the hardware schedule.

I. Removable Mullions to be heavy duty steel 12-L980@rated, and L980S@non-rated.

J. **Exit devices shall comply with UBC Std-10-4 and CBC 1003.1.9.**

2.07 CLOSERS

A. All closers to be the product of a single manufacturer for continuity of design and consideration of warranty.

B. Closers shall be Sargent 351 Series x P10/PH10/CPS/CPSH and as specified. Hold-open devices are not to be furnished at air-conditioned spaces.

C. Closers shall be heavy duty, surface mounted, hydraulic type, with high strength cast case. Full rack and pinion constructed of heavy steel.

D. Size all closers in accordance with the Mfr's recommendations at the work site.

E. Closers to have adjustable spring power, which allows for closer sizing. Closers to have separate tamper resistant, non-critical regulating screw valves for closing speed, latching speed and backcheck control as standard features.

F. Closer arms to be forged steel, interchangeable with all closers specified on this project for simplification of future Owner maintenance considerations.

G. Supply appropriate arm assembly for each closer so that closer body and arm are mounted on non-public side of door opening and on the interior side of exterior openings, except where otherwise detailed.

H. All closers to be rectangular, full cover type of non-ferrous, non-corrosive material painted to match lockset finish.

I. **Refer to 3.02.A.8 Installation for CBC opening force requirements.**

2.08 PUSH PLATES, DOOR PULLS AND KICKPLATES

A. All push plates, door pulls, kickplates and other miscellaneous hardware as listed in hardware sets.

B. Supply 18 GA [.050] thick stainless steel, beveled 4 sides. Doors with louvers narrow bottom rails, kickplate height to be 1 inch less than the dimension shown from the door bottom to the bottom of the louver or glass.
   1. Kickplates to be 10 inches high and Mop plates to be 6 inches high, both by 2 inches or 1 inch less than the door width as specified.
   2. Armor plates, edge guards and protective hardware to be supplied in sizes as scheduled in the hardware sets.

2.09 DOOR STOPS

A. Door stops to be furnished for every door leaf. OH stops to be furnished when a wall and/or floor stop is unacceptable. Exterior outswinging door floor stop to be Trimco's 1209HAx630. 1214CK at interior. Wall stops to be Trimco's 1270SV.

B. Install door stops in such a position that they permit maximum door swing, but do not present a hazard or obstruction. **Floor stops must be installed within (4) four inches of the adjacent wall max, and within 4 inches from the strike edge of dr.**

C. Where overhead stops are specified, or otherwise required for proper door operation, they are to be heavy duty and of extruded brass or bronze with no plastic parts. No steel channels, arms, or brackets allowed.

2.10 AUTOMATIC FLUSH BOLTS, COORDINATORS AND SILENCERS

A. Furnish automatic flushbolts with dust proof strikes and coordinators as detailed and/or as required in the respective hardware sets. Finish to match adjacent hardware.

B. Silencers to be furnished as follows:
   1. Three [3] each at single doors and two [2] each at pairs of doors.

2.11 THRESHOLDS AND GASKETING

A. Supply materials and finishes as listed hardware sets. All thresholds must be in accordance with the requirements of the ADA and CBC.
   1. Furnish thresholds with machine screws and lead anchors. Furnish all necessary anchoring devices for gasketing and seal.
   2. Thresholds may require modification based on final drawings and frame/floor details.
   3. All listed thresholds to be verified with final construction drawings/elevations, and as dictated by existing sill conditions.
   4. Contractor to review the score and pour application with the Project Architect. Procedure will allow for the installation of Pemko's plate threshold system as detailed or required as determined by the Contractor's field survey, and final elevation drawings.
   5. Rated openings: omit threshold at 20 Minute rated openings, unless otherwise required per plans/elevations.

2.12 FINISH

A. Special care shall be taken to coordinate the finish of the various manufacturers to insure a uniform finish. This finish shall match the finish of the locksets.
   1. Plated hardware shall be BHMA626 [US26D] or as detailed in US32D.

B. Painted hardware items shall be lacquered to closely match plated hardware.

2.13 KEYING

MODERNIZATION WORK:

- **EXISTING CYLINDERS TO BE REUSED IN ALL MODERNIZATION WORK. WHERE NEW REPLACMENT LOCKING DEVICES ARE REQUIRED, AND TO AVOID CONFLICT WITH THE DISTRICT'S MASTERKEY SYSTEMS, CONTRACTOR SHALL CAREFULLY REMOVE, AND REINSTALL RESPECTIVE CYLINDERS IN THE SAME DOORS IN WHICH THEY WERE REMOVED. CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING CYLINDERS, CORRECT CAMS AND TAILPIECES TO PROPERLY OPERATE REPLACEMENT LOCKING COMPONENTS.**
  CONTRACTOR SHALL INCLUDE IN THE BASE BID, THE COST FOR NEW CYLINDERS WHERE NEW OPENINGS OCCUR, AND/OR WHERE NEW CYLINDERS ARE REQUIRED DUE TO EXISTING CYLINDER CONFLICT WITH REPLACEMENT HARDWARE. CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING CORRECT CYLINDERS, CAMS AND TAILPIECES TO PROPERLY OPERATE THEIR RESPECTIVE LOCKING COMPONENTS.

  WHERE NEW CYLINDERS ARE REQUIRED, CONTRACTOR SHALL CONTACT THE SBCUSD BUILDING SERVICES DIRECTOR FOR DIRECTION, COORDINATION, AND AUTHORIZATION TO SECURE CYLINDERS, INCLUDING EXISTING SPECIAL SBCUSD "RESTRICTED" CLARKE SECURITY PLATINUM SERIES, AND OTHER EXISTING "RESTRICTED" KEY SYSTEMS. CYLINDERS SHALL BE CONSTRUCTION MASTERKEYED AND KEYED TO THE RESPECTIVE PROJECT AND OPENINGS AS DIRECTED BY THE DISTRICT. SUPPLY TWO CHANGE KEYS EACH CYLINDER.

2.14 PROPRIETARY PRODUCTS

A. Refer to Para 1.02. Unless otherwise approved, furnish only the specified products.

PART 3: EXECUTION

3.01 INSPECTION

A. After installation has been completed, hardware supplier shall have a qualified Hardware Consultant [AHC] inspect project to determine the proper application of hardware according to the approved hardware and keying schedules.
   1. Check operation and adjustment of all hardware items.
   2. Recommended hardware adjustments shall be made by the Contractor/Installer.

3.02 INSTALLATION

A. Installation of finish hardware is specified under other sections. However, the following requirements apply to the work as follows:

1. Hardware shall be installed by a QUALIFIED MECHANIC skilled in the application of institutional grade builders hardware.
2. Install all hardware in full compliance with MFR'S instructions. When cutting and fitting is required to install hardware onto or into surfaces which are to be painted or finished, install each item completely and then remove during application. After completion, re-install each item.
3. Care shall be exercised not to mar or damage adjacent work. Damaged work shall be repaired or replaced to the satisfaction of the Architect.
4. Provide ADEQUATE BACKING in stud partitions for the attachment of all respective finish hardware.
5. If door swing is changed from original drawings during construction, the contractor shall make necessary changes at no cost to the owner.
6. Latches and bolts shall be installed to automatically engage strikes, whether activated by closers or manual push. In no instance should unusual manual pressure be required to engage latch or bolt in strikes. Install locks with keyways in proper position, with levers, roses, and/or escutcheons firmly affixed. Adjust strikes after silencers and/or seal are in place.
7. Predrill pilot holes in wood for screws. Drill and tap for surface mounted hardware on metal. Set hinge leaf snug and flat in mortises, turn screws to flat seat [do not drive].
8. **Closers** are to have opening force adjusted so as to comply with current applicable accessibility requirements as follows: interior doors 5 pounds maximum pressure to operate; exterior doors 5 pounds maximum pressure; The Authority having Jurisdiction may increase the maximum effort to operate doors required to be fire rated to achieve positive latching, but in no case shall the pressure exceed 15 pounds per CBC 2001, Section 1133B.2.5. Door closers to comply with 1133B.2.5.1, closer delay time.
9. Door closers when provided the sweep period of the closer shall be adjusted to so that from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3" from the latch, measured to the landing side of the door. Refer to 1133B2.5.1.
10. Mount closers and overhead stops/holders in accordance with the manufacturer's template for the degree of swing indicated on the drawings [180 degree swing where conditions allow].
11. Floor stops must be installed within (4) four inches of the adjacent wall maximum, and within (4) inches from the strike edge of door Policy 99-08.
12. Wall stops to have wall surfaces prepared and reinforced.All hardware shall meet the requirements of CBC Sections 1133B.2.1, 1133B.2.5.1 and 1003.3.1.8.
13. Door Sweeps and Seals to be installed with attachment screws placed within a minimum of one [1] inch from the end of the seal and sweep.

14. Panic hardware shall comply with UBC standards 10-4 and shall be mounted between 36" minimum to 44" maximum above the finish floor surface.
15. The unlatching force shall not exceed 15# applied in the direction of travel. Panic devices shall comply with CBC Section 1003.3.1.9.
16. All hardware shall meet the requirements of CBC Sections 1133B.2.1, 1133B2.5.1 and 1003.3.1.8.

B. HARDWARE LOCATIONS: Review and verify mounting locations with the Architect before issuing templates and door/hardware purchase orders. Mounting height of latching hardware shall be 30" to 44" FF per CBC Section 1133B.2.5.2. The following hardware locations shall be adhered to unless modified by the Architect. Minor adjustments are permitted to meet specific door mfr's standards.

1.	40 inches	Locksets, Panic Devices and Roller Latches-centerline of strike from bottom of frame.
2.	42 inches	Pull Plates-centerline of grip from bottom of frame.
3.	42 inches	Combination Push Bars-centerline from btm of frame.
4.	44 inches	Push Plates-centerline from bottom of frame.
5.	Hinges	Per manufacturer's standard.

C. THRESHOLD AND PERIMETER SEAL:
1. Cut and fit thresholds to profile of door frames, with mitered corners and hairline joints.
2. On exterior doors, set thresholds in a bed of sealant.
3. Before installation, carefully read manufacturer's instructions to assure tight and contiguous seal at the perimeter and corners of doors and frames.
4. Specified thresholds are subject to modification. Review final elevations.
5. Thresholds shall comply with CBC Section 1133B.2.4.1.

3.03 ADJUSTING AND CLEANING

A. At final completion, all hardware shall be left clean and free from disfigurement. Contractor shall make a final adjustment to all door closers and other items of hardware. Where hardware is found defective, repair or replace or otherwise correct as directed.
1. Following the activation of building heating and air conditioning system, the Contractor shall readjust all exterior and interior door closers.

B. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Adjust hardware so that moving parts operate freely, without bind, or excessive play. Hardware shall be free of paint, corrosion, or damage of any kind.

3.04 PROTECTION

A. The Contractor is responsible for the proper protection of all items of hardware until the owner accepts the project as complete.

3.05 OWNER'S STOCK

A. Refer to 1.06 for close-out requirements.

B. Contractor/Installer to carefully remove and protect replaced hardware, and deliver all replaced, and new unused finish hardware to the District Lockshop.

3.06 MANUFACTURER'S ABBREVIATIONS OF LISTED HARDWARE:

[RIX]	**RIXSON**
[MAG]	MAG ENGINEERING
[MAR]	MARKS
[MAS]	MASTER
[MCK]	MCKINNEY
[NDC]	NATIONAL DOOR CONTROLS
[PEM]	PEMKO
[RW]	RICHARDS WILCOX
[RIX]	RIXSON
[SBH]	SECURITY BLDRS HDWE
[SGT]	SARGENT
[STA]	STANLEY
[TEL]	TELKEE
[TRM]	TRIMCO

PRIOR TO SUBMITTING SHOP DRAWINGS, CONTRACTOR REQUIRED TO CONDUCT SITE/BUILDING/OPG SURVEY(S). REFER TO 1.05.G FOR ADD'L MODERN SURVEY REQS.

- **NOTE: FURNISH MCK-12HDWT WIDE THROW WHERE CONDITIONS DICTATE TO ACHIEVE MAX DR SWING. FURNISH MCK-12/HD14HD W/APPLICABLE.**
- **NOTE: CONTRACTOR TO SCORE/POUR TO GRADE AT SILLS TO ACCOMMODATE LISTED THRESHOLDS.**
- **LISTED THRESHOLDS ARE SUBJECT TO EXISTING CONDITIONS. MODIFY AS DICTATED BY SPECIFIC DOOR/SILL CONDITIONS.**
- **NOTE: EXTERIOR SILL CONDITIONS TO BE FIELD INSPECTED TO ENSURE THAT LISTED THRESHOLDS WILL ACCOMMODATE RESPECTIVE OPENINGS. FURNISH PER FINAL PLANS AND ELEVATIONS, AND EXISTING SITE CONDITIONS.**
- **NOTE: FURNISH PEMKO 196Ax192A WHERE ¼" OFFSET EXISTS, OR 227A WHERE ½" MAXIMUM OFFSET EXISTS. REFER TO FINAL PLAN/ELEVS. ALSO, CONTRACTOR TO FIELD VERIFY CONDITIONS & APPLICATIONS. NO THRESHOLD WILL BE ORDERED UNLESS ALL RESPECTIVE SILLS ARE FIELD MEASURED TO ENSURE COMPATIBILITY.**
- **NOTE: EXISTING [REUSED] HM DOORS WITH CYLINDRICAL LOCK TEMPLATING TO BE FURNISHED MARKS 195 SERIES WITH APPLICABLE FUNCTIONS AS LISTED/REQ.**
- **NOTE: WHERE EXISTING [REUSED] DOORS ARE TEMPLATED FOR MORTISE LOCKSETS, FURNISH SARGENT 8200WTL SERIES IN FUNCTIONS AS LISTED/REQ.**
- **CONTRACTOR TO FURNISH MAG REINFORCER DEVICES WHERE CONDITIONS DICTATE TO ACCOMMODATE REPLACEMENT LOCKSETS OR PANIC DEVICES.**

- **CONTRACTOR TO PLUG/WELD/FILL AND REFINISH ALL DOORS AND FRAMES THAT ARE MODIFED WHERE OCCURRING.**
- **NOTE: ALL OPENINGS TO BE FIELD INSPECTED FOR CORRECT HINGE SIZE, WEIGHT AND WIDE THROW REQUIREMENTS NEEDED FOR MAXIMUM DR SWING.**
- **NOTE: FURNISH CLOSER BRACKETS AS DICTATED BY DOOR/FRAME & OPG. COND.**
- **NOTE: CONTRACTOR TO REMOVE FLOOR CLOSERS AND INTERMEDIATE PIVOTS. FILL WITH CAVITY WITH CONCRETE, AND HANG DOOR WITH HDWE AS LISTED.**
- **NOTE: DISTRICT STANDARD REQUIRES CLOSER ARMS TO ACHIEVE MAXIMUM**
- **DOOR SWING. CPS/CPSH CLOSER ARMS TO BE FURNISHED ONLY WHERE CONDITIONS DICTATE OVERHEAD STOP CONTROL.**
- **NOTE: INTERIOR OPENINGS - FURNISH TRIMCO 1214CK FLOOR STOP WHERE CONDITIONS PREVENT 1270SV WALL STOP.**
- **DISTRICT REQUIRES THAT EXTERIOR DOORS BE NON-HOLD-OPEN. EXISTING HOLD-OPEN DEVICES TO BE REMOVED AND REPLACED WITH LISTED STOPS. EXCEPTIONS ARE CUSTODIAL/MECHANICAL/STORAGE/STUDENT RESTROOMS.**
- **NOTE: FURNISH 4 EA. HINGE@SGL DOORS AND 8 EA.HGE@PAIRS IN EXCESS OF 90".**
- **NOTE: FURNISH STD WEIGHT HINGES WHERE EXISTING DR/FR TEMPLATE DICTATE.**
- **NOTE: CONTRACTOR TO FURNISH TRIMCO 2 EACH KH050 GLAZING BACKING SUPPORT KICKPLATES AT EXISTING ALUM/HM FG DOORS THAT DO NOT COMPLY WITH CBC 10" BOTTOM RAIL REQUIREMENT. FURNISH K0050@BAL W/APPLICABLE.**
- **FURNISH PEMKO SHOE 222APK AT DOORS THAT INVOLVE BOTTOM RAIL CUTTING.**
- **FURNISH SWEEP 18100CP AT NEW AND EXISTING DOORS THAT ARE NOT FIELD CUT.**
- **CONTRACTOR TO CAREFULLY SEAL AND REFINISH EXISTING WOOD DRS REQUIRING BOTTOM RAIL CUTTING.**
- **CONTRACTOR TO WELD BOTTOM CAP, AND REFINISH EXISTING HOLLOW METAL DRS REQUIRING BOTTOM RAIL CUTTING.**
- **CONTRACTOR TO FURNISH SPECIAL STRIKES WHERE REQUIRED.**

MODERNIZATION WORK [CYLINDERS]:

EXISTING CYLINDERS TO BE REUSED IN ALL MODERNIZATION WORK. WHERE NEW REPLACMENT LOCKING DEVICES ARE REQUIRED, AND TO AVOID CONFLICT WITH THE DISTRICT'S MASTERKEY SYSTEMS, CONTRACTOR SHALL CAREFULLY REMOVE, AND REINSTALL RESPECTIVE CYLINDERS IN THE SAME DOORS IN WHICH THEY WERE REMOVED. CONTRACTOR IS RESPONSIBLE FOR FURNISHING CORRECT CYLINDERS, CAMS AND TAILPIECES TO PROPERLY OPERATE REPLACEMENT LOCKING COMPONENTS.

CONTRACTOR SHALL INCLUDE IN THE BASE BID, THE COST FOR NEW CYLINDERS WHERE NEW OPENINGS OCCUR, AND/OR WHERE NEW CYLINDERS ARE REQUIRED DUE TO EXISTING CYLINDER CONFLICT WITH REPLACEMENT HARDWARE. CONTRACTOR IS RESPONSIBLE FOR FURNISHING CORRECT CYLINDERS, CAMS AND TAILPIECES TO PROPERLY OPERATE RESPECTIVE LOCKING COMPONENTS.

WHERE NEW CYLINDERS ARE REQUIRED, CONTRACTOR SHALL CONTACT THE SBCUSD BUILDING SERVICES DIRECTOR FOR DIRECTION, COORDINATION, AND AUTHORIZATION TO SECURE CYLINDERS, INCLUDING EXISTING SPECIAL SBCUSD "RESTRICTED" CLARKE SECURITY PLATINUM SERIES, AND OTHER EXISTING "RESTRICTED" KEY SYSTEMS. CYLINDERS SHALL BE CONSTRUCTION MASTERKEYED

AND KEYED TO THE RESPECTIVE PROJECT AND OPENINGS AS DIRECTED BY THE DISTRICT. SUPPLY TWO CHANGE KEYS EACH CYLINDER.
[NOTE]: FURNISH 2 EA KH050 KP EACH DOOR@GLAZED DOORS WHERE OCCURRING.
[NOTE]: FURNISH 80 SERIES PH EXCEPT AT UTILITY/STORAGE WHERE 30 SERIES IS REQ'D.

[NOTE: SOME HARDWARE SETS MAY NOT BE USED IN THIS WORK]
[NOTE: USE ONLY APPLICABLE HW SETS AS REFERENCED IN THE RESPECTIVE DR SCH]

Items listed in the following Finish Hardware Schedule shall conform to the specification. The last column in the hardware schedule refers to the manufacturer's abbreviation listed above.

3.07 HARDWARE SETS

HW1 **[EXTERIOR/*PAIR*/PANIC 8804/10/MULLION]**

EACH PAIR TO HAVE:

			FIN	MFR
2 EA.	CONT HINGE	MCK-12HDWT	628	MCK
1 EA.	EXIT DEVICE	43-8804xLESS TRIMxTBxLC	630	SGT
1 EA.	EXIT DEVICE	43-8810xLESS TRIMxTB	630	SGT
1 EA.	REM MULLION	L980SxLC	600	SGT
2 EA.	CYLINDER	RIM/MORTISE [PER CAMPUS REQ]	626	
2 EA.	PULL	1097HASP	630	TRM
2 EA.	CLOSER	351DA-CPSxTBx125VFx581-2x351-D	689	SGT
2 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
2 EA.	REINFORCER	520S OR AS REQUIRED@CURTIS	630	MAG
2 EA.	STOP	1209HA [OMIT@CPS]	630	TRM
1 EA.	THRESHOLD	196Ax192AxWELD	628	PEM
1 EA.	DRIP CAP	346C [OMIT@OVERHANG]	628	PEM
2 EA.	SWEEP	18100CP	628	PEM
2 SET	SEAL	35041CP HD/JAMBS	628	PEM

FURNISH P10, 1209HA AND MCK-12HD HINGE WHERE APPLICABLE.
FURNISH HOLD-OPEN ARMS@MECH/STOR. FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW1A **[EXTERIOR/*PAIR*/PANIC 8804/10/MULLION/CPS]**

EACH PAIR TO HAVE:

2 EA.	CONT HINGE	MCK-12HD	628	MCK
1 EA.	EXIT DEVICE	43-8804xLESS TRIMxTBxLC	630	SGT
1 EA.	EXIT DEVICE	43-8810xLESS TRIMxTB	630	SGT
1 EA.	REM MULLION	L980SxLC	600	SGT
2 EA.	CYLINDER	RIM/MORTISE [PER CAMPUS REQ]	626	
2 EA.	PULL	1097HASP	630	TRM
2 EA.	CLOSER	351DA-CPSxTBx125VFx581-2x351-D	689	SGT
2 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
2 EA.	REINFORCER	520S OR AS REQUIRED	630	MAG
1 EA.	THRESHOLD	196Ax192AxWELD	628	PEM
1 EA.	DRIP CAP	346C [OMIT@OVERHANG]	628	PEM
2 EA.	SWEEP	18100CP	628	PEM
2 SET	SEAL	35041CP HD/JAMBS	628	PEM

FURNISH HOLD-OPEN ARMS@MECH/STOR.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW1B **[EXTERIOR/*RATED*/PAIR/12-8813ETJ/10/MULLION]**

EACH PAIR TO HAVE:

2 EA.	CONT HINGE	MCK-12HDWT	628	MCK
1 EA.	EXIT DEVICE	43-12-8813ETLxTBxLC	630	SGT
1 EA.	EXIT DEVICE	43-12-8810xTB	630	SGT
1 EA.	REM MULLION	12-L980xLC	600	SGT
2 EA.	CYLINDER	MORTISE [PER CAMPUS REQ]	626	
2 EA.	CLOSER	351DA-CPSxTBx125VFx581-2x351-D	689	SGT
2 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
2 EA.	STOP	1209HA [OMIT@CPS]	630	TRM
1 EA.	THRESHOLD	196Ax192AxWELD	628	PEM
1 EA.	DRIP CAP	346C [OMIT@OVERHANG]	628	PEM
2 EA.	SWEEP	18100CP	628	PEM
2 SET	SEAL	35041CP HD/JAMBS	628	PEM

FURNISH P10, 1209HA AND MCK-12HD HINGE WHERE APPLICABLE.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW1BX **[EXTERIOR/*RATED*/PAIR/12-8813ETJ/10/MULLION]**

EACH PAIR TO HAVE:

2 EA.	CONT HINGE	MCK-12HD	628	MCK
1 EA.	EXIT DEVICE	43-12-8813ETJxTBxLC	630	SGT
1 EA.	EXIT DEVICE	43-12-8810xTB	630	SGT
1 EA.	REM MULLION	12-L980xLC	600	SGT
2 EA.	CYLINDER	RIM/MORTISE [PER CAMPUS REQ]	626	
2 EA.	CLOSER	351DA-CPSxTBx125VFx581-2x351-D	689	SGT
2 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	THRESHOLD	196Ax192AxWELD	628	PEM
1 EA.	DRIP CAP	346C [OMIT@OVERHANG]	628	PEM
2 EA.	SWEEP	18100CP	628	PEM
2 SET	SEAL	35041CP HD/JAMBS	628	PEM

FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW1C **[EXTERIOR/*PAIR*/PANIC 8504/10/MULLION@ALUM NARROW STILE DRS]**

EACH PAIR TO HAVE:

2 EA.	CONT HINGE	MCK-12HDWT	628	MCK
1 EA.	EXIT DEVICE	43-8504xLESS TRIMxLC	630	SGT
1 EA.	EXIT DEVICE	43-8510xLESS TRIM	630	SGT
1 EA.	REM MULLION	650AxLC	628	SGT
2 EA.	CYLINDER	RIM/MORTISE [PER CAMPUS REQ]	626	
2 EA.	PULL	1097HASP	630	TRM
2 EA.	CLOSER	351DA-CPSx125Vx581-2x351-D	689	SGT
4 EA.	KICKPLATE	KH050 10x2 LDW [2EA.K0050 W/APPL]	630	TRM
2 EA.	STOP	1209HA [OMIT@CPS]	626	TRM
1 EA.	THRESHOLD	196Ax192AxWELD	628	PEM
2 EA.	SWEEP	18100CP	628	PEM
2 SET	SEAL	BY ALUM DR SUPPLIER	N/A	N/A

FURNISH 8800 SERIESxL980A@WIDE STILE DOORS W/APPLICABLE, EXCEPT CURTIS.
FURNISH P10, 1209HA AND MCK-12HD HINGE WHERE APPLICABLE.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW1D **[EXTERIOR/*PAIR*/PANIC 8804/10/MULLION@ALUM WIDE STILE DRS]**

EACH PAIR TO HAVE:

2 EA.	CONT HINGE	MCK-12HDWT	628	MCK
1 EA.	EXIT DEVICE	43-8804xLESS TRIMxLC	630	SGT
1 EA.	EXIT DEVICE	43-8810xLESS TRIM	630	SGT
1 EA.	REM MULLION	L980Ax507xLC	628	SGT
2 EA.	CYLINDER	RIM/MORTISE [PER CAMPUS REQ]	626	
2 EA.	PULL	1097HASP	630	TRM
2 EA.	CLOSER	351DA-CPSx125Vx581-2x351-D	689	SGT
4 EA.	KICKPLATE	KH050 10x2 LDW [2EA.K0050 W/APPL]	630	TRM
2 EA.	STOP	1209HA [OMIT@CPS]	626	TRM
1 EA.	THRESHOLD	196Ax192AxWELD	628	PEM
2 EA.	SWEEP	18100CP	628	PEM
2 SET	SEAL	BY ALUM DR SUPPLIER	N/A	N/A

FURNISH P10, 1209HA AND MCK-12HD HINGE WHERE APPLICABLE.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW1E **EXTERIOR/*PAIR*/PANIC 8804/10/MULLION]**

EACH PAIR TO HAVE:

2 EA.	CONT HINGE	MCK-12HDWT	628	MCK
1 EA.	EXIT DEVICE	43-8804xLESS TRIMxTBxLC	630	SGT
1 EA.	EXIT DEVICE	43-8810xLESS TRIMxTB	630	SGT
1 EA.	REM MULLION	L980SxLC	600	SGT
2 EA.	CYLINDER	RIM/MORTISE [PER CAMPUS REQ]	626	
2 EA.	PULL	1097HASP	630	TRM
2 EA.	CLOSER	351DA-CPSxTBx125VFx581-2x351-D	689	SGT
2 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
2 EA.	REINFORCER	520S OR AS REQUIRED@CURTIS	630	MAG
2 EA.	STOP	1209HA [OMIT@CPS]	630	TRM
1 EA.	THRESHOLD	196Ax192AxWELD	628	PEM
1 EA.	DRIP CAP	346C [OMIT@OVERHANG]	628	PEM
2 EA.	SWEEP	18100CP	628	PEM
2 SET	SEAL	35041CP HD/JAMBS	628	PEM

FURNISH P10, 1209HA AND MCK-12HD HINGE WHERE APPLICABLE.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW2 **[EXTERIOR/*PAIR*/UNEQUAL/PANIC 8804/MULLION/FB/CPS]**

EACH PAIR TO HAVE:

2 EA.	CONT HINGE	MCK-12HDWT	628	MCK
1 EA.	EXIT DEVICE	43-8804xLESS TRIMxTBxLC	630	SGT
1 EA.	REM MULLION	L980SxLC	600	SGT
2 EA.	CYLINDER	RIM/MORTISE [PER CAMPUS REQ]	626	
2 EA.	FLUSHBOLT	3917x3911DPS	626	TRM
1 EA.	PULL	1097HASP@ACT	630	TRM
1 EA.	CLOSER	351DA-CPSxTBx125VFx581-2x351-D	689	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW@ACT	630	TRM
2 EA.	STOP	1209HA [OMIT@CPS]	630	TRM
1 EA.	THRESHOLD	196Ax192AxWELD	628	PEM
2 EA.	SWEEP	18100CP	628	PEM
1 EA.	DRIP CAP	346C [OMIT@OVERHANG]	628	PEM
2 SET	SEAL	35041CP HD/JAMBS	628	PEM

FURNISH P10@ACTIVE, 1209HA AND MCK-12HD HINGE WHERE APPLICABLE.
OCCUPANCY/APPROVAL FOR APPLICATION BY PROJECT ARCHITECT.
ACTIVE LEAF TO BE A MIN OF 42" WITH THE INACTIVE LEAF SECURED BY FB. .
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW2A **[EXTERIOR/*PAIR*/UNEQUAL/PANIC 14-8706/10/CPS]**

EACH PAIR TO HAVE:

2 EA.	CONT HINGE	MCK-12HDWT	628	MCK
1 EA.	EXIT DEVICE	43-14-8710x306xLESS TRIMxTBxLC	630	SGT
1 EA.	EXIT DEVICE	43-14-8710xLESS TRIMxTB	630	TRM
1 EA.	CYLINDER	MORTISE [PER CAMPUS REQ]	626	
2 EA.	PULL	1097HASP	630	TRM
2 EA.	CLOSER	351DA-CPSxTBx125VFx581-2x351-D	689	SGT
2 EA.	KICKPLATE/GD	PG8002 10x1 LDW	630	TRM
2 EA.	STOP	1209HA [OMIT@CPS]	630	TRM
1 EA.	THRESHOLD	196Ax192AxWELD	628	PEM
2 EA.	SWEEP	18100CP	628	PEM
1 SET	MTG ASTRAGAL	351Cx351CS	628	PEM
1 EA.	DRIP CAP	346C [OMIT@OVERHANG]	628	PEM
1 SET	SEAL	35041CP HD/JAMBS	628	PEM

FURNISH P10, 1209HA AND MCK-12HD HINGE WHERE APPLICABLE.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW2B **[EXTERIOR/*PAIR*/UNEQUAL/PANIC 8406/10/CPS@ALUM NARROW STILE]**

EACH PAIR TO HAVE:

2 EA.	CONT HINGE	MCK-12HDWT	628	MCK
1 EA.	EXIT DEVICE	43-8410-106xLESS TRIMxLC	630	SGT
1 EA.	EXIT DEVICE	43-8410xLESS TRIM	630	TRM
1 EA.	CYLINDER	MORTISE [PER CAMPUS REQ]	626	
2 EA.	PULL	1097HASP	630	TRM
2 EA.	CLOSER	351DA-CPSx125Vx581-2x351-D	689	SGT
4 EA.	KICKPLATE	KH050 10x1 LDW [2EA.K0050 W/APPL]	630	TRM
2 EA.	STOP	1209HA [OMIT@CPS]	630	TRM
1 EA.	THRESHOLD	196Ax192AxWELD	628	PEM
2 EA.	SWEEP	18100CP	628	PEM
1 SET	SEAL/MTG ASTR	BY ALUM DR SUPPLIER	N/A	N/A

FURNISH P10, 1209HA AND MCK-12HD HINGE WHERE APPLICABLE.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW2C **[EXTERIOR/*PAIR*/UNEQUAL/PANIC 14-8706/10/CPS@EXIST AL WIDE STILE]**

EACH PAIR TO HAVE:

2 EA.	CONT HINGE	MCK-12HDWT	628	MCK
1 EA.	EXIT DEVICE	43-14-8710-306xLESS TRIMxLC	630	SGT
1 EA.	EXIT DEVICE	43-14-8710xLESS TRIM	630	TRM
1 EA.	CYLINDER	MORTISE [PER CAMPUS REQ]	626	
2 EA.	PULL	1097HASP	630	TRM
2 EA.	CLOSER	351DA-CPSx125Vx581-2x351-D	689	SGT
2 EA.	KICKPLATE/GD	PG8002 10x1 LDW	630	TRM
2 EA.	STOP	1209HA [OMIT@CPS]	630	TRM
1 EA.	THRESHOLD	196Ax192AxWELD	628	PEM
2 EA.	SWEEP	18100CP	628	PEM
1 SET	SEAL/MTG ASTR	BY ALUM DR SUPPLIER	N/A	N/A

FURNISH P10, 1209HA AND MCK-12HD HINGE WHERE APPLICABLE.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW2D **[EXTERIOR/*RATED*/PAIR/UNEQUAL/12-8713ETL/10/MULLION]**

EACH PAIR TO HAVE:

2 EA.	CONT HINGE	MCK-12HD	628	MCK
1 EA.	EXIT DEVICE	43-12-8713ETLx LESS TRIMxTBxLC	630	SGT
1 EA.	EXIT DEVICE	43-12-8710xLESS TRIMxTB	630	SGT
2 EA.	CYLINDER	MORTISE [PER CAMPUS REQ]	626	
2 EA.	CLOSER	351DA-CPSxTBx125VFx581-2x351-D	689	SGT
2 EA.	KICKPLATE/GD	PG8002 10x1 LDW	630	TRM
1 EA.	THRESHOLD	196Ax192AxWELD	628	PEM
1 SET	MTG ASTRAGAL	2/303AS	628	PEM
1 EA.	DRIP CAP	346C [OMIT@OVERHANG]	628	PEM
2 EA.	SWEEP	18100CP	628	PEM
1 SET	SEAL	35041CP HD/JAMBS	628	PEM

FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW2E **[EXTERIOR/*PAIR*/UNEQUAL/PANIC 8804/MULLION/FB]**

EACH PAIR TO HAVE:

2 EA.	CONT HINGE	MCK-12HDWT	628	MCK
1 EA.	EXIT DEVICE	43-8804xLESS TRIMxTBxLC	630	SGT
1 EA.	REM MULLION	L980SxLC	600	SGT
2 EA.	CYLINDER	RIM/MORTISE [PER CAMPUS REQ]	626	
2 EA.	FLUSHBOLT	3917x3911DPS	626	TRM
1 EA.	PULL	1097HASP@ACT	630	TRM
1 EA.	CLOSER	351DA-CPSxTBx125VFx581-2x351-D	689	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW@ACT	630	TRM
2 EA.	STOP	1209HA [OMIT@CPS]	630	TRM
1 EA.	THRESHOLD	196Ax192AxWELD	628	PEM
2 EA.	SWEEP	18100CP	628	PEM
1 EA.	DRIP CAP	346C [OMIT@OVERHANG]	628	PEM
2 SET	SEAL	35041CP HD/JAMBS	628	PEM

FURNISH P10@ACTIVE, 1209HA AND MCK-12HD HINGE WHERE APPLICABLE.
OCCUPANCY/APPROVAL FOR APPLICATION BY PROJECT ARCHITECT.
ACTIVE LEAF TO BE A MIN OF 42" WITH THE INACTIVE LEAF SECURED BY FB. .
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW3 **[EXTERIOR/PANIC 8804]**

EACH SGL TO HAVE:

1 EA.	CONT HINGE	MCK-12HDWT	628	MCK
1 EA.	EXIT DEVICE	43-8804xLESS TRIMxTBxLC	630	SGT
1 EA.	CYLINDER	RIM [PER CAMPUS REQ]	626	
1 EA.	PULL	1096HASP	630	TRM
1 EA.	CLOSER	351DA-CPSxTBx125V-VFx581-2x351-D	689	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW [2EA.KH050@ALUM]	630	TRM
1 EA.	REINFORCER	520S OR AS REQUIRED@CURTIS	630	MAG
1 EA.	STOP	1209HA [OMIT@CPS]	630	TRM
1 EA.	THRESHOLD	196Ax192AxWELD	628	PEM
1 EA.	SWEEP	18100CP	628	PEM
1 EA.	DRIP CAP	346C [OMIT@OVERHANG]	628	PEM
1 SET	SEAL	35041CP HD/JAMBS [SEAL BY ALUM SUP]	628	PEM

FURNISH P10, 1209HA AND MCK-12HD HINGE WHERE APPLICABLE.
FURNISH CPSH/PH10@MULTI-OCCUP. RESTROOM, MECHANICAL, STORAGE.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.
FURNISH 3828 SERIES AT UTILITY/STORAGE DOORS WHERE OCCURRING.

HW3A **[EXTERIOR/PANIC 8804/CPS]**

EACH SGL TO HAVE:

1 EA.	CONT HINGE	MCK-12HD	628	MCK
1 EA.	EXIT DEVICE	43-8804xLESS TRIMxTBxLC	630	SGT
1 EA.	CYLINDER	RIM [PER CAMPUS REQ]	626	
1 EA.	PULL	1096HASP	630	TRM
1 EA.	CLOSER	351DA-CPSxTBx125VFx581-2x351-D	689	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW [2EA.KH050@ALUM]	630	TRM
1 EA.	REINFORCER	520S OR AS REQUIRED	630	MAG
1 EA.	THRESHOLD	196Ax192AxWELD	628	PEM
1 EA.	SWEEP	18100CP	628	PEM
1 EA.	DRIP CAP	346C [OMIT@OVERHANG]	628	PEM
1 SET	SEAL	35041CP HD/JAMBS	628	PEM

FURNISH CPSH@MULTI-OCCUP. RESTROOM, MECHANICAL, STORAGE.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.
FURNISH 3828 SERIES AT UTILITY/STORAGE DOORS WHERE OCCURRING.

HW3B **[EXTERIOR/*RATED*/PANIC 12-8813ETL]**

EACH SGL TO HAVE:

1 EA.	CONT HINGE	MCK-12HDWT	628	MCK
1 EA.	EXIT DEVICE	43-12-8813ETLxTBxLC	630	SGT
1 EA.	CYLINDER	MORTISE [PER CAMPUS REQ]	626	
1 EA.	CLOSER	351DA-CPSxTBx125VFx581-2	689	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	STOP	1209HA [OMIT@CPS]	630	TRM
1 EA.	THRESHOLD	196Ax192AxWELD	628	PEM
1 EA.	SWEEP	18100CP	628	PEM
1 EA.	DRIP CAP	346C [OMIT@OVERHANG]	628	PEM
1 SET	SEAL	35041CP HD/JAMBS	628	PEM

FURNISH P10, 1209HA AND MCK-12HD HINGE WHERE APPLICABLE.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW3C **[EXTERIOR/PANIC 8504@ALUM NARROW STILE]**

EACH SGL TO HAVE:

1 EA.	CONT HINGE	MCK-12HDWT	628	MCK
1 EA.	EXIT DEVICE	43-8504xLESS TRIMxLC	630	SGT
1 EA.	CYLINDER	RIM [PER CAMPUS REQ]	626	
1 EA.	PULL	1096HASP	630	TRM
1 EA.	CLOSER	351DA-CPSx125Vx581-2x351-D	689	SGT
2 EA.	KICKPLATE	KH050 10x2 LDW [1EA.K0050 W/APPL]	630	TRM
1 EA.	STOP	1209HA [OMIT@CPS]	630	TRM
1 EA.	THRESHOLD	196Ax192AxWELD	628	PEM
1 EA.	SWEEP	18100CP	628	PEM
1 SET	SEAL	BY ALUM DR SUPPLIER	N/A	N/A

FURNISH 43-8804 SERIES@WIDE STILE DOORS WHERE APPLICABLE.
FURNISH P10, 1209HA AND MCK-12HD HINGE WHERE APPLICABLE
FURNISH HW1C@PAIR OPGS REQUIRING REM. MULLION IN LIEU OF FIXED.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW3D **[EXTERIOR/PANIC 8804]**

EACH SGL TO HAVE:

1 EA.	CONT HINGE	MCK-12HDWT	628	MCK
1 EA.	EXIT DEVICE	43-8804xLESS TRIMxTBxLC	630	SGT
1 EA.	CYLINDER	RIM [PER CAMPUS REQ]	626	
1 EA.	PULL	1096HASP	630	TRM
1 EA.	CLOSER	351DA-CPSxTBx125V-VFx581-2x351-D	689	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	REINFORCER	520S OR AS REQUIRED@CURTIS	630	MAG
1 EA.	STOP	1209HA [OMIT@CPS]	630	TRM
1 EA.	THRESHOLD	196Ax192AxWELD	628	PEM
1 EA.	SWEEP	18100CP	628	PEM
1 EA.	DRIP CAP	346C [OMIT@OVERHANG]	628	PEM
1 SET	SEAL	35041CP HD/JAMBS [SEAL BY ALUM SUP]	628	PEM

FURNISH P10, 1209HA AND MCK-12HD HINGE WHERE APPLICABLE.
FURNISH CPSH/PH10@MULTI-OCCUP. RESTROOM.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW4 **[INTERIOR/PUSH-PULL/AR@ALUM]**

4 EA.	HINGE	TA2714 4.5x4.5 [3EA.TO 90"]	652	MCK
1 EA.	DEADLATCH	4711x4590	628	AR
1 EA.	CYLINDER	MORTISE [PER CAMPUS REQ]	626	
2 EA.	PULL	1191-4J BTB MTG	630	TRM
1 EA.	CLOSER	351-Hx351-A	689	SGT
2 EA.	KICKPLATE	KH050 10x2 LDW [K0050 W/APPL]	630	TRM
1 EA.	STOP	1214CK	626	SGT
1 SET	SEAL	BY ALUM DR SUPPLIER	N/A	N/A

FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW5 **[EXTERIOR/INSWING/DOGGING 8292]**

EACH SGL TO HAVE:

1 EA.	CONT HINGE	MCK-12HD	628	MCK
1 EA.	LOCKSET	8292LNLxLC	626	SGT
2 EA.	CYLINDER	MORTISE [PER CAMPUS REQ]	626	
1 EA.	PULL	1097HA	630	TRM
1 EA.	PUSH	1001-11@RESTRM	630	TRM
1 EA.	CLOSER	351DA-0xTB	689	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	REINFORCER	504S OR AS REQUIRED@CURTIS	630	MAG
1 EA.	STOP	1214CK	626	TRM
1 EA.	THRESHOLD	196Ax192AxWELD	628	PEM
1 EA.	SWEEP	18100CP	628	PEM
1 SET	SEAL	35041CP HD/JAMBS	628	PEM

FURNISH HOLD-OPEN HT@RESTRM. INSTALL PUSH 1001-11 ABOVE 8292.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW5A **[EXTERIOR/PANIC 8804/CPS@EXPOSED MECH YARD DR]**

EACH SGL TO HAVE:

1 EA.	CONT HINGE	MCK-12HD	628	MCK
1 EA.	EXIT DEVICE	43-8804xLESS TRIMxTBxLC	630	SGT
1 EA.	CYLINDER	RIM [PER CAMPUS REQ]	626	
1 EA.	PULL	1096HASP	630	TRM
1 EA.	CLOSER	351DASRI-CPSxTBx351-D	PC	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	THRESHOLD	196Ax192AxWELD [FIELD VERIFY]	628	PEM
1 EA.	DRIP CAP	346C	628	PEM
3 EA.	SILENCER	1229A	GR	TRM

FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW6 **[EXTERIOR/INSWING/STORAGE 8206]**

EACH SGL TO HAVE:

1 EA.	CONT HINGE	MCK-12HD	628	MCK
1 EA.	LOCKSET	8206LNLxLC	626	SGT
1 EA.	CYLINDER	MORTISE [PER CAMPUS REQ]	626	
1 EA.	PULL	1097HA	630	TRM
1 EA.	CLOSER	351DA-HxTB	689	SGT
1 EA.	REINFORCER	520S OR AS REQUIRED@CURTIS	630	MAG
1 EA.	STOP	1214CK	626	TRM
1 EA.	THRESHOLD	196Ax192AxWELD	628	PEM
1 EA.	SWEEP	18100CP	628	PEM
1 SET	SEAL	35041CP HD/JAMBS	628	PEM

FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW6A **[NOT USED]**

HW7 **[EXTERIOR/INSWING/HOTEL 8250]**

EACH SGL TO HAVE:

1 EA.	CONT HINGE	MCK-12HD	628	MCK
1 EA.	LOCKSET	50-LB8250LNLxLC	626	SGT
1 EA.	CYLINDER	MORTISE [PER CAMPUS REQ]	626	
1 EA.	CLOSER	351DA-0xTB	689	SGT
1 EA.	MOP PLATE	KM050 6x1 LDW	630	TRM
1 EA.	REINFORCER	520S OR AS REQUIRED@CURTIS	630	MAG
1 EA.	COAT HOOK	3071 [INSTALL@48"FFF]	626	TRM
1 EA.	STOP	1270SV	630	TRM
1 EA.	THRESHOLD	196Ax192AxWELD	628	PEM
1 EA.	SWEEP	18100CP	628	PEM
1 SET	SEAL	35041CP HD/JAMBS	628	PEM

FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW7A **[INTERIOR/*RATED*/HOTEL 8250/CPS]**

EACH SGL TO HAVE:

4 EA.	HINGE	STA2714 4.5x4.5 [3EA.TO 90"]	652	MCK
1 EA.	LOCKSET	50-LB8250LNLxLC	626	SGT
1 EA.	CYLINDER	MORTISE [PER CAMPUS REQ]	626	
1 EA.	CLOSER	351DA-CPSxTB [0@INSWG]	689	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	MOP PLATE	KM050 6x1 LDW	630	TRM
1 EA.	COAT HOOK	3071 [INSTALL@48"FFF]	626	TRM
1 EA.	STOP	1270SV@INSWG	630	TRM
1 EA.	THRESHOLD	2/196Ax191AxWELD@45M+	628	PEM
1 SET	SEAL	316APK HD/JAMBS	628	PEM

HW8 **[INTERIOR/*RATED*/*PAIR*/PANIC 12-8813ETL/10/MULLION]**

EACH PAIR TO HAVE:

8 EA.	HINGE	T4A3786 4.5x4.5 [6EA.TO 90"]	652	MCK
1 EA.	EXIT DEVICE	43-12-8813ETLxTBxLC	630	SGT
1 EA.	EXIT DEVICE	43-12-8810xTB	630	TRM
1 EA.	REM MULLION	12-L980xLC	600	SGT
2 EA.	CYLINDER	MORTISE [PER CAMPUS REQ]	626	
2 EA.	CLOSER	351DA-CPSxTB	689	SGT
2 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
2 EA.	STOP	1214CK [OMIT@CPS]	626	TRM
1 EA.	THRESHOLD	2/196Ax191AxWELD@45M+	628	PEM
2 SET	SEAL	35041CP HD/JAMBS	628	PEM
2 SET	SEAL	HSS2000 HD/JAMBS@WD	N/A	PEM

- **FURNISH P10 WHERE APPLICABLE.**

HW8A **[INTERIOR/*PAIR*/PANIC 8804/10/MULLION]**

EACH PAIR TO HAVE:

8 EA.	HINGE	T4A3786 4.5x4.5 [6EA.TO 90"]	652	MCK
1 EA.	EXIT DEVICE	43-8804xLESS TRIMxTBxLC	630	SGT
1 EA.	EXIT DEVICE	43-8810xLESS TRIMxTB	630	TRM
1 EA.	REM MULLION	L980SxLC	600	SGT
2 EA.	CYLINDER	RIM/MORTISE [PER CAMPUS REQ]	626	
2 EA.	PULL	1097HASP	630	TRM
2 EA.	CLOSER	351DA-CPSHxTB	689	SGT
2 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
2 EA.	STOP	1214CK [OMIT@CPSH]	626	TRM
6 EA.	SILENCER	1229A	GR	TRM

FURNISH PH10 WHERE APPLICABLE.

HW8B **[INTERIOR/*RATED*/*PAIR* PANIC SVR 12-NB8713ETL/10]**

EACH PAIR TO HAVE:

8 EA.	HINGE	T4A3786 4.5x4.5 [6EA.TO 90"]	652	MCK
1 EA.	EXIT DEVICE	43-12-NB8713ETLxTBxLC	630	SGT
1 EA.	EXIT DEVICE	43-12-NB8710xTB	630	TRM
1 EA.	CYLINDER	MORTISE [PER CAMPUS REQ]	626	
2 EA.	CLOSER	351DA-CPSxTB	689	SGT
2 EA.	KICKPLATE	K0050 10x1 LDW	630	TRM
2 EA.	STOP	1214CK [OMIT@CPS]	626	TRM
1 SET	MTG ASTRAGAL	2/18061CP	628	PEM
1 EA.	THRESHOLD	2/196Ax191A WELD@45M+	628	PEM
1 SET	SEAL	35041CP HD/JAMBS	628	PEM

FURNISH P10 WHERE APPLICABLE.

HW8C **[INTERIOR/*PAIR* PANIC SVR NB8713ETL/10]**

EACH PAIR TO HAVE:

8 EA.	HINGE	T4A3786 4.5x4.5 [6EA.TO 90"]	652	MCK
1 EA.	EXIT DEVICE	43-NB8710x306xTBxLC	630	SGT
1 EA.	EXIT DEVICE	43-NB8710xTB	630	TRM
1 EA.	CYLINDER	MORTISE [PER CAMPUS REQ]	626	
2 EA.	PULL	1097HASP	630	TRM
2 EA.	CLOSER	351DA-CPSHxTB	689	SGT
2 EA.	KICKPLATE	K0050 10x1 LDW	630	TRM
2 EA.	STOP	1214CK [OMIT@CPSH]	626	TRM
1 SET	MTG ASTRAGAL	2/18061CP	628	PEM
2 EA.	SILENCER	1229A	GR	TRM

FURNISH PH10 WHERE APPLICABLE.

HW9 **[INTERIOR/*RATED*/PANIC 12-8813ETL]**

EACH SGL TO HAVE:

4 EA.	HINGE	T4A3786 4.5x4.5 [3EA.TO 90"][5x4.5@36+]	652	MCK
1 EA.	EXIT DEVICE	43-12-8813ETLxTBxLC	630	SGT
1 EA.	CYLINDER	MORTISE [PER CAMPUS REQ]	626	
1 EA.	CLOSER	351DA-CPSxTB [125VF@TP]	689	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	STOP	1214CK [OMIT@CPS]	626	TRM
1 EA.	THRESHOLD	2/196Ax191A WELD@45M+	628	PEM
1 SET	SEAL	35041CP HD/JAMBS	628	PEM
1 SET	SEAL	HSS2000 HD/JAMBS@WD	N/A	PEM

FURNISH P10 WHERE APPLICABLE. FURNISH HW9A@NON-RATED.

HW9A **[INTERIOR/PANIC 8804]**

EACH SGL TO HAVE:

1 EA.	CONT HINGE	MCK-12HD@MU1-OEHL&LINCOLN	628	MCK
4 EA.	HINGE	T4A3786 4.5x4.5 [3TO 90"][5x4.5@36+]	652	MCK
1 EA.	EXIT DEVICE	43-8804xLESS TRIMxTBxLC	630	SGT
1 EA.	CYLINDER	RIM [PER CAMPUS REQ]	626	
1 EA.	PULL	1097HASP	630	TRM
1 EA.	CLOSER	351DA-CPSHxTB [125VF@TP]	689	SGT
1 EA.	KICKPLATE	KH050 10x2 LDW [K0050@APPL]	630	TRM
1 EA.	STOP	1214CK [OMIT@CPSH]	626	TRM
3 EA.	SILENCER	1229A	GRM	TRM

FURNISH PH10 WHERE APPLICABLE. FURNISH MCK-12HD W/DICTATED.

HW9B **[INTERIOR/*PAIR*/PANIC 8504/10/MULLION@ALUM]**

EACH PAIR TO HAVE:

8 EA.	HINGE	T4A3786 5x4.5 [6EA.TO 90"]	652	MCK
1 EA.	EXIT DEVICE	43-8504xLESS TRIMxLC	630	SGT
1 EA.	EXIT DEVICE	43-8510xLESS TRIM	630	SGT
1 EA.	REM MULLION	650AxLC	628	SGT
2 EA.	CYLINDER	RIM/MORTISE [PER CAMPUS REQ]	626	
2 EA.	PULL	1097HASP	630	TRM
2 EA.	CLOSER	351DA-CPSHx125Vx581-2x351-D	689	SGT
4 EA.	KICKPLATE	KH050 10x2 LDW [2EA.K0050 W/APPL]	630	TRM
2 EA.	STOP	1214CK [OMIT@CPSH]	626	TRM
2 SET	SEAL	BY ALUM DR SUPPLIER	N/A	N/A

FURNISH PH10 WHERE APPLICABLE.
FURNISH 8804 SERIESxL980A@WIDE STILE DOORS W/APPLICABLE ACCEPT CURTIS.

HW9C **[INTERIOR/PANIC 8504@ALUM]**

EACH SGL TO HAVE:

4 EA.	HINGE	T4A3786 5x4.5 [3 EA.TO 90"]	652	MCK
1 EA.	EXIT DEVICE	43-8504xLESS TRIMxLC	630	SGT
1 EA.	CYLINDER	RIM [PER CAMPUS REQ]	626	
1 EA.	PULL	1097HASP	630	TRM
1 EA.	CLOSER	351DA-CPSHx125Vx581-2x351-D	689	SGT
2 EA.	KICKPLATE	KH050 10x2 LDW [K0050 W/APPL]	630	TRM
1 EA.	STOP	1214CK [OMIT@CPSH]	626	TRM
1 SET	SEAL	BY ALUM DR SUPPLIER	N/A	N/A

FURNISH PH10 WHERE APPLICABLE.
FURNISH 30 SERIES@WIDE STILE DOORS WHERE APPLICABLE ACCEPT CURTIS.

HW10 **[INTERIOR/STORAGE/CPSH]**

EACH SGL TO HAVE:

4 EA.	HINGE	TA2714 4.5x4.5 [3EA.TO 90"]	652	MCK
1 EA.	LOCKSET	195Fx10Lx4-7/8 STK	626	MAR
1 EA.	CYLINDER	CYLINDER [PER CAMPUS REQ]	626	
1 EA.	CLOSER	351DA-CPSHxTB [H@INSWG]	689	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	REINFORCER	4S2 OR AS REQUIRED@CURTIS	630	MAG
1 EA.	STOP	1214CK@INSWG	626	TRM
3 EA.	SILENCER	1229A	GR	TRM

HW10A **[INTERIOR/8206@DUTCH]**

EACH DD TO HAVE:

4 EA.	HINGE	ST4A3786 4.5x4.5 NRP	652	MCK
1 EA.	LOCKSET	8206LNLxLC	626	SGT
1 EA.	LOCKSET	8206LNJ@TOP LEAF [NO O/S TRIM]	630	SGT
1 EA.	CYLINDER	MORTISE [PER CAMPUS REQ]	626	
1 EA.	PULL	1111C	630	TRM
1 EA.	CLOSER	351-HTxTB	689	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	STOP	1214CK	626	TRM
1 EA.	STOP	1270SV@TOP LEAF	630	TRM
4 EA.	SILENCER	1229A	GR	TRM

SHELF BY DOOR SUPPLIER.

HW10B **[INTERIOR/*RATED*/8206/MAG HO@DUTCH]**

EACH DD TO HAVE:

4 EA.	HINGE	T4A3786 4.5x4.5 NRP	652	MCK
1 EA.	LOCKSET	8206LNLxLC	626	SGT
1 EA.	LOCKSET	8206LNJ@TOP LEAF [NO O/S TRIM]	630	SGT
1 EA.	CYLINDER	MORTISE [PER CAMPUS REQ]	626	
1 EA.	PULL	1111C	630	TRM
1 EA.	CLOSER	351-0TxTB	689	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	MAG HOLD-OPEN	990@TOP LEAF	626	RIX
1 EA.	STOP	1214CK	626	TRM
1 EA.	THRESHOLD	2/196Ax191A WELD@45M+	628	PEM
1 SET	SEAL	35041CP HD/JAMBS	628	PEM
1 SET	SEAL	HSS2000 HD/JAMBS@WD	N/A	PEM

COORD MAGNETIC HOLD-OPEN WITH DIV16. SHELF BY DOOR SUPPLIER.

HW11 **[INTERIOR/*RATED*/*PAIR*/STORAGE/AFB/COORD/CPS]**

EACH PAIR TO HAVE:

8 EA.	HINGE	TA2714 4.5x4.5 [6EA.TO 90"]	652	MCK
1 EA.	LOCKSET	195Fx10Lx3/4"BOLTx4-7/8 STK	626	MAR
1 EA.	CYLINDER	CYLINDER [PER CAMPUS REQ]	626	
2 EA.	AUTO FLUSHBOLT	3810/15x3911DPS	626	TRM
2 EA.	CLOSER	351DA-CPSxTB [0@INSWG]	689	SGT
1 EA.	COORDINATOR	3094 [2/3090@CPS]	600	TRM
2 EA.	KICKPLATE	K0050 10x1 LDW	630	TRM
2 EA.	STOP	1214CK@INSWG	626	TRM
1 EA.	THRESHOLD	2/196Ax191AxWELD@45M+	628	PEM
1 EA.	ASTRAGAL	357SCxS88T	600	PEM
2 EA.	SEAL	35041CP@JAMBS	628	PEM
1 EA.	SEAL	S88T@HEAD	TA	PEM
1 SET	SEAL	HSS2000 HD/JAMBS@WD	N/A	PEM

HW11A **[INTERIOR/*PAIR*/STORAGE/AFB/COORD/CPSH]**

EACH PAIR TO HAVE:

8 EA.	HINGE	TA2714 5x4.5 [6EA.TO 90"]	652	MCK
1 EA.	LOCKSET	195Fx10Lx3/4"BOLTx4-7/8 STK	626	MAR
1 EA.	CYLINDER	CYLINDER [PER CAMPUS REQ]	626	
2 EA.	AUTO FLUSHBOLT	3810/15x3911DPS	626	TRM
2 EA.	CLOSER	351DA-CPSHxTB [H@INSWG]	689	SGT
1 EA.	COORDINATOR	3094 [2/3090@CPSH]	600	TRM
2 EA.	KICKPLATE	K0050 10x1 LDW	630	TRM
2 EA.	STOP	1214CK@INSWG	626	TRM
1 EA.	ASTRAGAL	357SC	600	PEM
2 EA.	SILENCER	1229A	GR	TRM

HW11B **[INTERIOR/*PAIR*/STORAGE@DISPLAY]**

EACH PAIR TO HAVE:

4EA.	HINGE	TA2714 4.5x4.5	652	MCK
1 EA.	LOCKSET	195Fx10Lx3/4"BOLTx4-7/8 STK	626	MAR
1 EA.	CYLINDER	CYLINDER [PER CAMPUS REQ]	626	
1 EA.	FLUSHBOLT	3916x3910DPS [VERIFY]	626	TRM
2 EA.	SILENCER	1229A	GR	TRM

HW12 **[INTERIOR/*RATED*/STORAGE/CPS]**

EACH SGL TO HAVE:

4 EA.	HINGE	TA2714 4.5x4.5 [3EA.TO 90"]	652	MCK
1 EA.	LOCKSET	195Fx10Lx4-7/8 STK	626	MAR
1 EA.	CYLINDER	CYLINDER [PER CAMPUS REQ]	626	
1 EA.	CLOSER	351DA-CPSxTB [0@INSWG]	689	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	STOP	1214CK@INSWG	626	TRM
1 EA.	THRESHOLD	2/196Ax191AxWELD@45M+	628	PEM
1 SET	SEAL	35041CP HD/JAMBS	628	PEM
1 SET	SEAL	HSS2000 HD/JAMBS@WD	N/A	PEM

HW12A **[INTERIOR/STORAGE/590H]**

EACH SGL TO HAVE:

4 EA.	HINGE	TA2714 4.5x4.5 [3EA.TO 90"][5x4.5@48"]	652	MCK
1 EA.	LOCKSET	195Fx10Lx4-7/8 STK	626	MAR
1 EA.	CYLINDER	CYLINDER [PER CAMPUS REQ]	626	
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	REINFORCER	4S2 OR AS REQUIRED@CURTIS	630	MAG
1 EA.	OVERHEAD STOP	590HxTB	626	SGT
1 EA.	STOP	1214CK WHERE APPL	626	TRM
3 EA.	SILENCER	1229A	GR	TRM

HW13 **[INTERIOR/*RATED*/OFFICE]**

EACH SGL TO HAVE:

4 EA.	HINGE	TA2714 4.5x4.5 [3EA.TO 90"]	652	MCK
1 EA.	LOCKSET	195Sx10Lx4-7/8 STK	626	MAR
1 EA.	CYLINDER	CYLINDER [PER CAMPUS REQ]	626	
1 EA.	CLOSER	351DA-CPSxTB [0@INSWG]	689	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	STOP	1270SV [OMIT@CPSH]	630	TRM
1 EA.	THRESHOLD	2/196Ax191AxWELD@45M+	628	PEM
1 SET	SEAL	35041CP HD/JAMBS	628	PEM
1 SET	SEAL	HSS2000 HD/JAMBS	N/A	PEM

FURNISH P10/0 WHERE APPLICABLE.

HW13A **[INTERIOR/OFFICE]**

EACH SGL TO HAVE:

4 EA.	HINGE	TA2714 4.5x4.5 [3EA.TO 90"]	652	MCK
1 EA.	LOCKSET	195Sx10Lx4-7/8 STK	626	MAR
1 EA.	CYLINDER	CYLINDER [PER CAMPUS REQ]	626	
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	REINFORCER	4S2 OR AS REQUIRED@CURTIS	630	MAG
1 EA.	OVERHEAD STOP	590HxTB	626	SGT
1 EA.	STOP	1270SV WHERE APPL	630	TRM
3 EA.	SILENCER	1229A	GR	TRM

HW14 **[INTERIOR/*RATED*/COMMUNICATING]**

EACH SGL TO HAVE:

4 EA.	HINGE	T4A3786 4.5x4.5 [3EA.TO 90"]	652	MCK
1 EA.	LOCKSET	195DCx10Lx4-7/8 STK	626	MAR
2 EA.	CYLINDER	CYLINDER [PER CAMPUS REQ]	626	
1 EA.	CLOSER	351DA-CPSxTB	689	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	STOP	1214CK [OMIT@CPS]	626	TRM
1 EA.	THRESHOLD	2/196Ax191AxWELD@45M+	628	PEM
1 SET	SEAL	35041CP HD/JAMBS	628	PEM
1 SET	SEAL	HSS2000 HD/JAMBS@WD	N/A	PEM

FURNISH P10 WHERE APPLICABLE.

HW14A **[INTERIOR/COMMUNICATING/351]**

EACH SGL TO HAVE:

4 EA.	HINGE	T4A3786 4.5x4.5 [3EA.TO 90"]	652	MCK
1 EA.	LOCKSET	195DCx10Lx4-7/8 STK	626	MAR
2 EA.	CYLINDER	CYLINDER [PER CAMPUS REQ]	626	
1 EA.	CLOSER	351DA-CPSHxTB	689	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	STOP	1214CK [OMIT@CPSH]	626	TRM
3 EA.	SILENCER	1229A	GR	TRM

FURNISH PH10 WHERE APPLICABLE.

HW15 **[INTERIOR/*RATED*/*PAIR*/CLASSRM/AFB/COORD]**

EACH SGL TO HAVE:

8 EA.	HINGE	T4A3786 4.5x4.5 [6EA.TO 90"]	652	MCK
1 EA.	LOCKSET	195Sx10Lx3/4"BOLTx4-7/8 STK	626	MAR
1 EA.	CYLINDER	CYLINDER [PER CAMPUS REQ]	626	
2 EA.	AUTO FLUSHBOLT	3810/15x3911DPS	626	TRM
2 EA.	CLOSER	351DA-CPSxTB [0@INSWG]	630	TRM
1 EA.	COORDINATOR	3094 [2/3090@CPS/P10]	600	TRM
2 EA.	KICKPLATE	K0050 10x1 LDW	630	TRM
2 EA.	STOP	1214CK [OMIT@CPS]	626	TRM
1 EA.	THRESHOLD	2/196Ax191AxWELD@45M+	628	PEM
1 EA.	ASTRAGAL	357SPxS88T	600	PEM
2 EA.	SEAL	35041CP@JAMBS	628	PEM
1 EA.	SEAL	S88T@HEAD	TA	PEM
1 SET	SEAL	HSS2000 HD/JAMBS@WD	N/A	PEM

FURNISH P10/0 WHERE APPLICABLE.

HW15A **[INTERIOR/*PAIR*/CLASSRM/AFB/COORD]**

EACH SGL TO HAVE:

8 EA.	HINGE	T4A3786 4.5x4.5 [6EA.TO 90"]	652	MCK
1 EA.	LOCKSET	195Sx10Lx3/4"BOLTx4-7/8 STK	626	MAR
1 EA.	CYLINDER	CYLINDER [PER CAMPUS REQ]	626	
2 EA.	AUTO FLUSHBOLT	3810/15x3911DPS	626	TRM
2 EA.	CLOSER	351DA-CPSHxTB [H@INSWG]	630	TRM
1 EA.	COORDINATOR	3094 [2/3090@CPSH/PH10]	600	TRM
2 EA.	KICKPLATE	K0050 10x1 LDW	630	TRM
2 EA.	STOP	1214CK [OMIT@CPSH]	626	TRM
1 EA.	ASTRAGAL	357SP	600	PEM
2 EA.	SILENCER	1229A	GR	TRM

FURNISH PH10/H WHERE APPLICABLE.

HW16 **[INTERIOR/*RATED*/CLASSRM]**

EACH SGL TO HAVE:

4 EA.	HINGE	T4A3786 4.5x4.5 [3EA.TO 90"]	652	MCK
1 EA.	LOCKSET	195Sx10Lx4-7/8 STK	626	MAR
1 EA.	CYLINDER	CYLINDER [PER CAMPUS REQ]	626	
1 EA.	CLOSER	351DA-CPSxTB [0@INSWG]	689	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	STOP	1214CK [OMIT@CPS]	626	TRM
1 EA.	THRESHOLD	2/196Ax191AxWELD@45M+	628	PEM
1 SET	SEAL	35041CP HD/JAMBS	628	PEM
1 SET	SEAL	HSS2000 HD/JAMBS@WD	N/A	PEM
1 EA.	SIGN	753/754@RESTRM	BL	TRM

FURNISH P10/0 WHERE APPLICABLE. FURNISH ST4A HINGE@RESTRM

HW16A **[INTERIOR/CLASSRM/351]**

EACH SGL TO HAVE:

4 EA.	HINGE	T4A3786 4.5x4.5 [3EA.TO 90"]	652	MCK
1 EA.	LOCKSET	195Sx10Lx4-7/8 STK	626	MAR
1 EA.	CYLINDER	CYLINDER [PER CAMPUS REQ]	626	
1 EA.	CLOSER	351DA-CPSHxTB [H@INSWG]	689	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	REINFORCER	4S2 OR AS REQUIRED@CURTIS	630	MAG
1 EA.	STOP	1214CK [OMIT@CPS]	626	SGT
3 EA.	SILENCER	1229A	GR	TRM

FURNISH PH10/H WHERE APPLICABLE.

HW16B **[INTERIOR/CLASSRM/590H]**

EACH SGL TO HAVE:

4 EA.	HINGE	T4A3786 4.5x4.5 [3EA.TO 90"]	652	MCK
1 EA.	LOCKSET	195Sx10Lx4-7/8 STK	626	MAR
1 EA.	CYLINDER	CYLINDER [PER CAMPUS REQ]	626	
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	OVERHEAD STOP	590HxTB	626	SGT
1 EA.	STOP	1214CK WHERE APPL	626	TRM
3 EA.	SILENCER	1229A	GR	TRM

HW16C **[INTERIOR/CLASSRM/SOUND&LIGHT SEAL]**

EACH SGL TO HAVE:

4 EA.	HINGE	T4A3786 4.5x4.5 [3EA.TO 90"]	652	MCK
1 EA.	LOCKSET	195Sx10Lx4-7/8 STK	626	MAR
1 EA.	CYLINDER	CYLINDER [PER CAMPUS REQ]	626	
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	STOP	1214CK	626	TRM
1 EA.	THRESHOLD	271A	628	PEM
1 EA.	AUTO DR BTM	434ARL	628	PEM
1 SET	SEAL	S88T HD/JAMBS	TA	PEM
1 SET	SEAL	332CR HD/JAMBS@**PRACTICE**	628	PEM
1 SET	SEAL	376CF HD/JAMBS@**DARKRM**	628	PEM

HW17 **[INTERIOR/PUSH-PULL/8292@RESTRM]**

EACH SGL TO HAVE:

4 EA.	HINGE	ST4A3786 4.5x4.5 [3EA.TO 90"]	652	MCK
1 EA.	LOCKSET	8292LNJxLC	626	SGT
2 EA.	CYLINDER	MORTISE [PER CAMPUS REQ]	626	
1 EA.	PULL	1097HA	630	TRM
1 EA.	PUSH	1001-11 [INSTALL ABOVE 8292]	630	TRM
1 EA.	CLOSER	351DA-0TxTB [CPS@OUTSWG]	689	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	MOP PLATE	KM050 6x1 LDW@INSWG	630	TRM
1 EA.	STOP	1214CK [OMIT@CPS]	626	TRM
3 EA.	SILENCER	1229A	GR	TRM

FURNISH P10 IN LIEU OF CPS WHERE APPLICABLE.

HW17A **[INTERIOR/*PAIR&SGL*/PUSH-PULL/CPS]**

EACH SGL TO HAVE:

8 EA.	HINGE	T4A3786 4.5x4.5 [6/3EA.TO 90"] [3@SGL]	652	MCK
2 EA.	PULL	1017-3B [1@SGL]	630	TRM
2 EA.	PUSH	1001-11 [1@SGL]	630	TRM
2 EA.	CLOSER	351DA-CPSxTB [0T@INSWG][1@SGL]	689	SGT
2 EA.	KICKPLATE	K0050 10x2 LDW [1@SGL]	630	TRM
2 EA.	MOP PLATE	KM050 6x1 LDW@RR INSWG [1@SGL]	630	TRM
2 EA.	STOP	1214CK [OMIT@CPS] [1@SGL]	626	TRM
2 EA.	SILENCER	1229A [3@SGL]	GR	TRM

FURNISH P10/0 WHERE APPLICABLE. FURNISH ST4A@RESTRM.

HW18 **[INTERIOR/PRIVACY]**

EACH SGL TO HAVE:

4 EA.	HINGE	STA2714 4.5x4.5 [3EA.TO 90"]	652	MCK
1 EA.	PRIVACY	195Lx4-7/8 STK	626	MAR
1 EA.	CLOSER	351DA-CPSxTB [0@INSWG]	689	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	MOP PLATE	KM050 6x1 LDW@INSWG	630	TRM
1 EA.	REINFORCER	4S2 OR AS REQUIRED@CURTIS	630	MAG
1 EA.	STOP	1270SV@INSWG	630	TRM
1 EA.	COAT HOOK	3071 [INSTALL@48"FFF]	626	TRM
1 SET	SD SEAL	332CR HD/JAMBS	628	PEM

HW18X **[INTERIOR/*RATED*/HOTEL@SECURE STAFF RESTRM]**

EACH SGL TO HAVE:

4 EA.	HINGE	STA2714 4.5x4.5 [3EA.TO 90"]	652	MCK
1 EA.	LOCKSET	195Hx10Lx4-7/8 STK	626	MAR
1 EA.	CYLINDER	CYLINDER [PER CAMPUS REQ]	626	
1 EA.	CLOSER	351DA-CPSxTB [0@INSWG]	689	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	MOP PLATE	KM050 6x1 LDW@INSWG	630	TRM
1 EA.	STOP	1270SV@INSWG	630	TRM
1 EA.	COAT HOOK	3071@SGL OCCUP [INSTALL@48"FFF]	626	TRM
1 EA.	THRESHOLD	2/196Ax191AxWELD@45M+	628	PEM
1 SET	SEAL	316APK HD/JAMBS	628	PEM
1 SET	SEAL	HSS2000 HD/JAMBS@WD	N/A	PEM

- **DELETE THRESHOLD AND REPLACE GASKETING WITH 332CR@NON-RATED DRS.**

HW18A **[INTERIOR/*RATED*/PRIVACY]**

EACH SGL TO HAVE:

4 EA.	HINGE	STA2714 4.5x4.5 [3EA.TO 90"]	652	MCK
1 EA.	PRIVACY	195Lx4-7/8 STK	626	MAR
1 EA.	CLOSER	351DA-CPSxTB [0@INSWG]	689	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	MOP PLATE	KM050 6x2 LDW@INSWG	630	TRM
1 EA.	STOP	1270SV@INSWG	630	TRM
1 EA.	COAT HOOK	3071 [INSTALL@48"FFF]	626	TRM
1 EA.	THRESHOLD	2/196Ax191AxWELD@45M+	628	PEM
1 SET	SEAL	316APK HD/JAMBS	628	PEM
1 SET	SEAL	HSS2000 HD/JAMBS@WD	N/A	PEM

HW19 **[INTERIOR/PASSAGE/351@KG RESTRM+]**

EACH SGL TO HAVE:

4 EA.	HINGE	STA2714 4.5x4.5 [3EA.TO 90"]	652	MCK
1 EA.	PASSAGE	195Nx4-7/8 STK	626	MAR
1 EA.	CLOSER	351DA-CPSxTB [0@INSWG]	689	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	MOP PLATE	KM050 6x1 LDW@INSWG	630	TRM
1 EA.	STOP	1270SV@INSWG	630	TRM
1 EA.	COAT HOOK	3071 [INSTALL@48"FFF]	626	TRM
1 SET	SD SEAL	332CR HD/JAMBS	628	PEM

HW19A **[INTERIOR/*RATED*/PASSAGE@KG RESTRM+]**

EACH SGL TO HAVE:

4 EA.	HINGE	STA2714 4.5x4.5 [3EA.TO 90"]	652	MCK
1 EA.	PASSAGE	195Nx4-7/8 STK	626	MAR
1 EA.	CLOSER	351DA-CPSxTB [0@INSWG]	689	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	MOP PLATE	KM050 6x1 LDW@INSWG	630	TRM
1 EA.	STOP	1270SV@INSWG	630	TRM
1 EA.	COAT HOOK	3071 [INSTALL@48"FFF]	626	TRM
1 EA.	THRESHOLD	2/196Ax191AxWELD@45M+	628	PEM
1 SET	SEAL	316APK HD/JAMBS	628	PEM
1 SET	SEAL	HSS2000 HD/JAMBS@WD	N/A	PEM

HW20 **[EXTERIOR/*PAIR*/PANIC 8804/10/MULLION/CLOSER@GATES]**

EACH PAIR GATE TO HAVE:

8 EA.	HINGE	BB855 5x6 WELDED	600	STA
1 EA.	EXIT DEVICE	36-43-16-8804xCPCxLESS TRIMxLC	630	SGT
1 EA.	EXIT DEVICE	36-43-16-8810xCPCxLESS TRIMxLC	630	SGT
3 EA.	CYLINDER	RIM/MORTISE [PER CAMPUS REQ]	626	
1 EA.	PADLOCK	25xRVS 18 KWYxLB KEY BOW		MAS
2 EA.	PULL	1097HASPxSHS	630	TRM
2 EA.	CLOSER	36-351SRI-PH10x351-D [POWDER COAT]	PC	SGT
2 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
2 EA.	STOP	1209HA	630	TRM
1 EA.	REM MULLION	BY GATE SUPPLIER	N/A	N/A

FURNISH MCK T4A3386 5x4.5 NRPx630@MESH TUBE FRAME.
HINGES TO BE OMITTED AT EXISTING GATE RENOVATION.
GATE SUPPLIER TO FURNISH CENTER MULLION W/ HASP FOR LISTED PADLOCK.
MULLION TO BE HELD RIGID BY STEEL SLEEVE IN CONCRETE [REFER TO ELEV].
GATE SUPPLIER TO COORDINATE TEMPLATING WITH HDWE SUPPLIER.
BB855 HINGES TO BE PAINTED WITH ZINC BASED PRIMER.

HW20A **[EXTERIOR/PANIC 8804/CLOSER@GATE]**

EACH SGL GATE TO HAVE:

4 EA.	HINGE	BB855 5x6 WELDED	600	STA
1 EA.	EXIT DEVICE	36-43-16-8804xCPCxLESS TRIMxLC	630	SGT
2 EA.	CYLINDER	RIM/MORTISE [PER CAMPUS REQ]	626	
1 EA.	PULL	1097HASPxSHS	630	TRM
1 EA.	CLOSER	36-351SRI-PH10x351-D [POWDER COAT]	PC	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	STOP	1209HA	630	TRM

HINGES TO BE OMITTED AT EXISTING GATE RENOVATION.
GATE SUPPLIER TO COORDINATE TEMPLATING WITH HDWE SUPPLIER.
HINGES TO BE PAINTED WITH ZINC BASED PRIMER.
BALANCE OF HARDWARE BY GATE SUPPLIER.

HW20B **[EXTERIOR/*PAIR AND SGL*/PADLOCK@GATE]**

EACH GATE TO HAVE:

8 EA.	HINGE	BB855 5x6 WELDED@PAIR	600	STA
4 EA.	HINGE	BB855 5x6 WELDED @SGL	600	STA
1 EA.	PADLOCK	25xRVS 18 KWYxLB KEY BOW		MAS
2 EA.	CANE BOLT	524-P23 [1@SGL]	ZC	RW

HINGES TO BE OMITTED AT EXISTING GATE RENOVATION.
GATE SUPPLIER TO COORDINATE TEMPLATING WITH HDWE SUPPLIER.
HINGES TO BE PAINTED WITH ZINC BASED PRIMER.
BALANCE OF HARDWARE BY GATE SUPPLIER.

HW20C **[EXTERIOR/*PAIR*/PANIC 8804/10/PANIC REPLACEMENT ONLY@GATES]**

EACH PAIR GATE TO HAVE:

1 EA.	EXIT DEVICE	43-36-16-8804xCPCxLESS TRIMxLC	630	SGT
1 EA.	EXIT DEVICE	43-36-16-8810xCPCxLESS TRIMxLC	630	SGT
3 EA.	CYLINDER	RIM/MORTISE [PER CAMPUS REQ]	626	
2 EA.	PULL	1097HASP	630	TRM
2 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM

BALANCE OF HARDWARE TO BE REUSED.

HW20D **[EXTERIOR/*PAIR*/PANIC 8804/10/PANIC REPLACEMENT ONLY@GATES]**

EACH PAIR GATE TO HAVE:

1 EA.	EXIT DEVICE	43-36-16-8804xCPCxLESS TRIMxLC	630	SGT
1 EA.	EXIT DEVICE	43-26-16-8810xCPCxLESS TRIMxLC	630	SGT
3 EA.	CYLINDER	RIM/MORTISE [PER CAMPUS REQ]	626	
2 EA.	PULL	1097HASP	630	TRM
2 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM

BALANCE OF HARDWARE TO BE REUSED.
PANIC SUPPORT, HINGES, CENTER MULLION, AND SECURITY MESH BY GATE SUP.

HW20E **[EXTERIOR/SGL/PANIC 8804/PANIC REPLACEMENT ONLY@GATE]**

EACH SGL GATE TO HAVE:

1 EA.	EXIT DEVICE	43-36-16-8804xCPCxLESS TRIMxLC	630	SGT
2 EA.	CYLINDER	RIM/MORTISE [PER CAMPUS REQ]	626	
1 EA.	PULL	1097HASP	630	TRM
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM

BALANCE OF HARDWARE TO BE REUSED.
PANIC SUPPORT, HINGES AND SECURITY MESH BY GATE SUPPLIER.

HW21 **[INTERIOR/DA/GATE]**

EACH GATE TO HAVE:

1 SET	PIVOT	4007MRB	626	MCK

BALANCE OF HARDWARE BY GATE SUPPLIER.

[BALANCE OF HARDWARE TO BE REUSED – HW22A – HW22K]
[WHERE TEMPLATED FOR MORTISE LOCK, FURNISH SARGENT 8200WTL SERIES IN LIKE FUNCTIONS AS LISTED BELOW].
[FURNISH MAG REINF. #4S2 OR AS DICTATED BY HARDWARE APPL AND DOOR PREP.]
[FURNISH 3-3/4" LATCHBOLTS WHERE CONDITIONS REQUIRE]
[FURNISH SPL SBH 4-1/4" STRIKES WHERE CONDITIONS REQUIRE']

HW22A [STORAGE]

1 EA.	**STORAGE** LOCKSET	195Fx10Lx4-7/8 STK	626	MAR
1 EA.	CYLINDER	CYLINDER [PER CAMPUS REQ.]	626	
1 EA.	CLOSER	351DA-CPSx125VFx581-Dx351-DxTB	689	SGT
1 EA.	REINF.	4S2 [FIELD VERIFY]	630	MAG
1 EA.	STRIKE	4-1/4" SPL [FIELD VERIFY]	626	SBH

FURNISH P10/0 WHERE APPLICABLE.

HW22B [OFFICE]

1 EA.	**OFFICE** LOCKSET	195Sx10Lx4-7/8 STK	626	MAR
1 EA.	CYLINDER	CYLINDER [PER CAMPUS REQ]	626	
1 EA.	CLOSER	351DA-CPSx125VFx581-Dx351-DxTB	689	SGT
1 EA.	REINF.	4S2 [FIELD VERIFY]	630	MAG
1 EA.	STRIKE	4-1/4" SPL [FIELD VERIFY]	626	SBH

FURNISH P10/0 WHERE APPLICABLE.

HW22C [CLASSRM]

1 EA.	**CLASSRM** LOCKSET	195Sx10Lx4-7/8 STK	626	MAR
1 EA.	CYLINDER	CYLINDER [PER CAMPUS REQ]	626	
1 EA.	CLOSER	351DA-CPSx125VFx581-2x351-DxTB	689	SGT
1 EA.	REINF.	4S2 [FIELD VERIFY]	630	MAG
1 EA.	STRIKE	4-1/4" SPL [FIELD VERIFY]	626	SBH

FURNISH P10/0 WHERE APPLICABLE.

HW22D [COMMUNICATING]

1 EA.	**COMM** LOCKSET	195DCx10Lx4-7/8 STK	626	MAR
2 EA.	CYLINDER	CYLINDER [PER CAMPUS REQ]	626	
1 EA.	CLOSER	351DA-CPSx125VFx581-Dx351-DxTB	689	SGT
1 EA.	REINF.	4S2 [FIELD VERIFY]	630	MAG
1 EA.	STRIKE	4-1/4" SPL [FIELD VERIFY]	626	SBH

FURNISH P10/0 WHERE APPLICABLE.

HW22E **[PRIVACY]**

1 EA.	**PRIVACY**	195Lx4-7/8 STK	626	MAR
1 EA.	CLOSER	351DA-CPSx125VFx581-2xTB [0@INSWG]	689	SGT
1 EA.	REINF.	4S2 [FIELD VERIFY]	630	MAG
1 EA.	STRIKE	4-1/4" SPL [FIELD VERIFY]	626	SBH

HW22EX **[PASSAGE]**

1 EA.	**PASSAGE**	195Nx4-7/8 STK	626	MAR
1 EA.	REINF.	4S2 [FIELD VERIFY]	630	MAG
1 EA.	STRIKE	4-1/4" SPL [FIELD VERIFY]	626	SBH

HW22F **[CLOSER ONLY]**

2 EA.	CLOSER	351DA-CPSx125VFx581-2x351-DxTB	689	SGT

FURNISH 1 EA@SINGLE DOORS WHERE OCCURRING.

- **FURNISH P10/0 WHERE APPLICABLE, AND 0-ARM@INSWG WHERE OCCURRING.**

HW22FX **[CLOSER/SEAL]**

2 EA.	CLOSER	351DA-CPSx125VFx581-2x351-DxTB	689	SGT
2 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 SET	SEAL	35041CP HD/JAMBS	628	PEM

FURNISH 1 EA. CLOSER/KP@SINGLE DOORS WHERE OCCURRING.

- **FURNISH P10/0 WHERE APPLICABLE, AND 0-ARM@INSWG WHERE OCCURRING.**

HW22G **[HINGE/STOP ONLY]**

2 EA.	CONT HINGE	MCK-54HD OR 22HD [FIELD VERIFY]	628	MCK
2 EA.	STOP	1214CK [1270SV W/APPL]	626	TRM

FURNISH 1 EA@SINGLE DOORS WHERE OCCURRING.

HW22H **[KP/STOP ONLY@ALUM]**

2 EA.	KICKPLATE	KH050 10x1 LDW [K0050 W/APPL]	630	TRM
2 EA.	STOP	1214CK [1270SV W/APPL]	626	TRM

FURNISH 1 EA@SGL DOORS WHERE OCCURRING.

HW22J **[HINGE/CLOSER/SEAL@RATED]**

3 EA.	HINGE	TA2714 4.5x4.5 [VERIFY SIZE/WGT]	652	MCK
1 EA.	CLOSER	351DA-CPSx125VFx351-DxTB	689	SGT
1 SET	SEAL	316APK HD/JAMBS	628	PEM
1 SET	SEAL	HSS2000 HD/JAMBS	N/A	PEM

FURNISH P10/0 WHERE APPLICABLE.]
REUSE EXISTING LOCKSET AND STOPS.
WHI TO INSPECT/CERTIFY EXISTING DRS/FRAMES.
CONTRACTOR TO FILL HOLES AND REPAINT DRS/FMS.

HW22K **[THRESHOLD ONLY]**

1 EA.	THRESHOLD	271A	628	PEM

[EXTERIOR ONLY – LISTED THRESHOLDS REQUIRE FIELD VERIFICATION]
[NOTE: RB = REVERSE BEVEL – OUTSWING DRS]

HW23A **[EXTERIOR/PAIR/PANIC]**

1 EA.	EXIT DEVICE	43-8804xLESS TRIMxTBxLC	630	SGT
1 EA.	EXIT DEVICE	43-8810xLESS TRIMxTB	630	SGT
1 EA.	REM MULLION	L980SxLC	600	SGT
2 EA.	CYLINDER	RIM/MORTISE [PER CAMPUS REQ]	626	
2 EA.	PULL	1097HASP	630	TRM
2 EA.	CLOSER	351DA-CPSx125VFx581-2x351-DxTB	689	SGT
2 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
2 EA.	STOP	1209HA [OMIT@CPS]	630	TRM
2 EA.	REINFORCER	520S OR AS REQUIRED	630	MAG
1 EA.	THRESHOLD	196Ax192AxWELD **[FIELD VERIFY]**	628	PEM
2 EA.	DOOR SHOE	222APK **[18100CP@NON-CUT]**	628	PEM

FURNISH P10 WHERE APPLICABLE.
BALANCE OF HDWE TO BE REUSED.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW23B **[EXTERIOR/PAIR/UNEQUAL/PANIC]**

EACH PAIR TO HAVE:

1 EA.	EXIT DEVICE	43-8804xLESS TRIMxTBxLC	630	SGT
2 EA.	FLUSHBOLT	3917x3911DPS	626	TRM
1 EA.	REM MULLION	L980SxLC	600	SGT
2 EA.	CYLINDER	RIM/MORTISE [PER CAMPUS REQ]	626	
1 EA.	PULL	1097HASP@ACT	630	TRM
1 EA.	CLOSER	351DA-CPSx125VFx581-2x351-DxTB	689	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW@ACTIVE	630	TRM
2 EA.	STOP	1209HA [OMIT@CPS]	630	TRM
1 EA.	REINFORCER	520S ORAS REQUIRED	630	MAG
1 EA.	THRESHOLD	196Ax192AxWELD **[FIELD VERIFY]**	628	PEM
2 EA.	DOOR SHOE	222APK **[18100CP@NON-CUT]**	628	PEM

ARCHITECT TO CONFIRM THAT OCCUPANCY WILL PERMIT THIS APPLICATION.
WHERE OCCURRING, REMOVE ANY EXISTING CLOSER FROM INACTIVE LEAF.
CONTRACTOR TO CUT/REINFORCE FOR REQ'D INACTIVE LEAF FLUSHBOLTS.
FURNISH P10 WHERE APPLICABLE.
BALANCE OF HDWE TO BE REUSED.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW23BX [EXTERIOR/PAIR/PANIC/INACTIVE@ANDERSON&WHERE DETAILED]

EACH PAIR TO HAVE:

1 EA.	EXIT DEVICE	3828-10xLESS TRIMxTB@INACT	PEN	SGT
1 EA.	REM MULLION	L980SxLC	600	SGT
2 EA.	CYLINDER	RIM/MORTISE [PER CAMPUS REQ]	626	
1 EA.	PULL	1097HASP@ACT	630	TRM
2 EA.	CLOSER	351DA-CPSx125VFx581-2x351-DxTB	689	SGT
2 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
2 EA.	STOP	1209HA [OMIT@CPS]	630	TRM
1 EA.	REINFORCER	520S OR AS REQUIRED	630	MAG
1 EA.	THRESHOLD	196Ax192xWELD **[FIELD VERIFY]**	628	PEM
2 EA.	DOOR SHOE	222APK **[18100CP@NON-CUT]**	628	PEM

FURNISH P10 WHERE APPLICABLE. FURNISH 8810x630 W/APPLICABLE.
BALANCE OF HDWE TO BE REUSED, INCLUDING ACTIVE LEAF PANIC.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW23C [EXTERIOR/SGL/PANIC]

1 EA.	CONT HINGE	MCK-12HD@REV.SWG RESTRM DRS	628	PEM
1 EA.	EXIT DEVICE	43-8804xLESS TRIMxTBxLC	630	SGT
1 EA.	CYLINDER	RIM [PER CAMPUS REQ]	626	
1 EA.	PULL	1096HASP	630	TRM
1 EA.	CLOSER	351DA-CPSx125VFx581-2x351-DxTB	689	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	STOP	1209HA [OMIT@CPS]	630	TRM
1 EA.	REINFORCER	520S OR AS REQUIRED	630	MAG
1 EA.	THRESHOLD	196Ax192AxWELD **[FIELD VERIFY]**	628	PEM
1 EA.	DOOR SHOE	222APK **[18100CP@NON-CUT]**	628	PEM

FURNISH P10 WHERE APPLICABLE.
BALANCE OF HDWE TO BE REUSED.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW23C.1 [EXTERIOR/*RATED*/SGL/PANIC]

1 EA.	CONT HINGE	MCK-12HD	628	PEM
1 EA.	EXIT DEVICE	43-12-8813ETLxTBxLC	630	SGT
1 EA.	CYLINDER	RIM [PER CAMPUS REQ]	626	
1 EA.	CLOSER	351DA-CPSx125VFx581-2x351-DxTB	689	SGT
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	STOP	1209HA [OMIT@CPS]	630	TRM
1 EA.	REINFORCER	520S OR AS REQUIRED	630	MAG
1 EA.	THRESHOLD	196Ax192AxWELD **[FIELD VERIFY]**	628	PEM
1 EA.	DOOR SHOE	222APK **[18100CP@NON-CUT]**	628	PEM

FURNISH P10 WHERE APPLICABLE.
BALANCE OF HDWE TO BE REUSED.

FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW23D [EXTERIOR/SGL/DOGGING LOCK/INSWING]

1 EA.	LOCKSET	8292LNLxLC	626	SGT
2 EA.	CYLINDER	MORTISE [PER CAMPUS REQ]	626	
1 EA.	PULL	1097HA	630	TRM
1 EA.	REINF.	MORTISE SERIES	630	MAG
1 EA.	CLOSER	351DA-0xTB	689	SGT
1 EA.	REINFORCER	504S OR AS REQUIRED	630	MAG
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	THRESHOLD	196Ax192AxWELD **[FIELD VERIFY]**	628	PEM
1 EA.	DOOR SHOE	222APK **[18100CP@NON-CUT]**	628	PEM

CONTRACTOR TO PREP DOOR FOR MORTISE LOCKSET.
BALANCE OF HDWE TO BE REUSED.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW23E [EXTERIOR/SGL/STORAGE LOCK/INSWING]

1 EA.	LOCKSET	8206LNLxLC	626	SGT
1 EA.	CYLINDER	MORTISE [PER CAMPUS REQ]	626	
1 EA.	PULL	1097HA	630	TRM
1 EA.	CLOSER	351DA-HxTB	689	SGT
1 EA.	REINFORCER	504S OR AS REQUIRED	630	MAG
1 EA.	KICKPLATE	K0050 10x2 LDW	630	TRM
1 EA.	THRESHOLD	196Ax192AxWELD **[FIELD VERIFY]**	628	PEM
1 EA.	DOOR SHOE	222APK **[18100CP@NON-CUT]**	628	PEM

CONTRACTOR TO PREP DOOR FOR MORTISE LOCKSET.
BALANCE OF HDWE TO BE REUSED.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW23F [EXTERIOR/PAIR&SGL/CLOSER/THRESH/SHOE]

2 EA.	CLOSER	351DA-CPSx125VFx581-2x351-DxTB	689	SGT
4 EA.	KICKPLATE	KH050 10x2 LDW [2EA.K0050 W/APPL]	630	TRM
2 EA.	STOP	1209HA@RB [OMIT@CPS]	630	TRM
1 EA.	THRESHOLD	196Ax192AxWELD **[FIELD VERIFY]**	628	PEM
2 EA.	DOOR SHOE	222APK **[18100CP@NON-CUT]**	628	PEM

FURNISH 1 EA. CLOSER, 2EA.K0050, STOP, SHOE@SGL DRS WHERE OCCURRING.
FURNISH P10 WHERE APPLICABLE, AND 0-ARM@INSWG WHERE OCCURRING.
BALANCE OF HDWE TO BE REUSED.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW23G [EXTERIOR/SGL/CLOSER/THRESH/SHOE]

1 EA.	CLOSER	351DA-CPSx125VFx581-2x351-DxTB	689	SGT
2 EA.	KICKPLATE	KH050 10x2 LDW [1EA.K0050 W/APPL]	630	TRM
1 EA.	STOP	1209HA@RB [OMIT@CPS]	630	TRM
1 EA.	THRESHOLD	196Ax192AxWELD **[FIELD VERIFY]**	628	PEM
1 EA.	DOOR SHOE	222APK **[18100CP@NON-CUT]**	628	PEM

FURNISH P10 WHERE APPLICABLE, AND 0-ARM@INSWG WHERE OCCURRING.
BALANCE OF HDWE TO BE REUSED.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW23GX [EXTERIOR/SGL/CLOSER]

1 EA.	CLOSER	351DA-CPSx125VFx581-2x351-DxTB	689	SGT
1 EA.	STOP	1209HA@RB [OMIT@CPS]	630	TRM

FURNISH P10 WHERE APPLICABLE, AND 0-ARM@INSWG WHERE OCCURRING.
BALANCE OF HDWE TO BE REUSED.

HW23H [EXTERIOR/SGL/CLOSER/1951A THRESH/SHOE]

1 EA.	CLOSER	351DA-CPSx125VFx581-2x351-DxTB	689	SGT
2 EA.	KICKPLATE	KH050 10x2 LDW [1EA.K0050 W/APPL]	630	TRM
1 EA.	STOP	1209HA@RB [OMIT@CPS]	630	TRM
1 EA.	THRESHOLD	1951A **[FIELD VERIFY]**	628	PEM
1 EA.	DOOR SHOE	222APK **[18100CP@NON-CUT]**	628	PEM

FURNISH P10 WHERE APPLICABLE, AND 0-ARM@INSWG WHERE OCCURRING.
BALANCE OF HDWE TO BE REUSED.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW23J [EXTERIOR/PAIR&SGL/THRESH/SHOE ONLY]

4 EA.	KICKPLATE	KH050 10x2 LDW [2EA.K0050 W/APPL]	630	TRM
2 EA.	STOP	1209HA@RB	630	TRM
1 EA.	THRESHOLD	196Ax192AxWELD **[FIELD VERIFY]**	628	PEM
2 EA.	DOOR SHOE	222APK **[18100CP@NON-CUT]**	628	PEM

FURNISH 2 EA. KH050, STOP AND SHOE@SGL DRS WHERE OCCURRING.
BALANCE OF HDWE TO BE REUSED.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW23JX [EXTERIOR/PAIR&SGL/THRESH ONLY]

4 EA.	KICKPLATE	KH050 10x2 LDW [2EA.K0050 W/APPL]	630	TRM
1 EA.	THRESHOLD	196Ax192AxWELD **[FIELD VERIFY]**	628	PEM
2 EA.	DOOR SHOE	222APK **[18100CP@NON-CUT]**	628	PEM

FURNISH 2EA.K0050 AND SHOE@SGL DRS WHERE OCCURRING.
BALANCE OF HDWE TO BE REUSED.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW23K [EXTERIOR/PAIR/CLOSER/THRESH/SHOE]

2 EA.	CLOSER	351DA-CPSx125VFx581-2x351-DxTB	689	SGT
4 EA.	KICKPLATE	KH050 10x2 LDW [2EA.K0050 W/APPL]	630	TRM
2 EA.	STOP	1209HA@RB [OMIT@CPS]	630	TRM
1 EA.	THRESHOLD	196Ax192AxWELD **[FIELD VERIFY]**	628	PEM
2 EA.	DOOR SHOE	222APK **[18100CP@NON-CUT]**	628	PEM

FURNISH P10 WHERE APPLICABLE, AND 0-ARM@INSWG WHERE OCCURRING.
BALANCE OF HDWE TO BE REUSED.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW23L [EXTERIOR/PAIR/1097/THRESH/SHOE ONLY]

1 EA.	PULL	1097HASP	630	SGT
4 EA.	KICKPLATE	KH050 10x2 LDW [2EA.K0050 W/APPL]	630	TRM
2 EA.	STOP	1209HA@RB	630	TRM
1 EA.	THRESHOLD	196Ax192AxWELD **[VERIFY]**	628	PEM
2 EA.	DOOR SHOE	222APK **[18100CP@NON-CUT]**	628	PEM

BALANCE OF HDWE TO BE REUSED.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW23M [EXTERIOR/PAIR/NDC REPL PIVOT/CLOSER/THRESH/SHOE]

2 EA.	REPL PIVOT	101 PACKAGE W/FLR CLS OCCUR	626	NDC
2 EA.	CLOSER	351DA-CPSx125Vx581-2x351-DxTB	689	SGT
4 EA.	KICKPLATE	KH050 10x2 LDW [2EA.K0050 W/APPL]	630	TRM
2 EA.	STOP	1209HA [OMIT@CPS]	630	TRM
1 EA.	THRESHOLD	176A TYPE 13 **[VERIFY]**	628	PEM
2 EA.	DOOR SHOE	222APK **[18100CP@NON-CUT]**	628	PEM

FURNISH P10 x 1209HA WHERE APPLICABLE.
CONTR TO REMOVE DRS & INSTALL INDEPENDENT NDC PIVOTS W/OCCURRING.
REPLACE TOP PIVOT WHERE EXISTING UNIT IS OUT OF ALIGNMENT.
CONTRACTOR TO REPLACE EXISTING THRESHOLD AS LISTED.
BALANCE OF HDWE TO BE REUSED.
FIELD VERIFY THRESHOLD APPLICATION.

HW23N [EXTERIOR/PAIR/NDC REPL PIVOT/CLOSER/THRESH/SHOE]

2 EA.	REPL PIVOT	101 PACKAGE W/FLR CLS OCCUR	626	NDC
2 EA.	CLOSER	351DA-CPSHx125Vx581-2x351-DxTB	689	SGT
4 EA.	KICKPLATE	KH050 10x2 LDW [2EA.K0050 W/APPL]	630	TRM
2 EA.	STOP	1209HA [OMIT@CPSH]	630	TRM
1 EA.	THRESHOLD	176A TYPE 13 **[VERIFY]**	628	PEM
2 EA.	DOOR SHOE	222APK **[18100CP@NON-CUT]**	628	PEM

FURNISH PH10 x 1209HA WHERE APPLICABLE.
CONTR TO REMOVE DRS AND INSTALL INDEPENDENT NDC PIVOTS W/OCCURRING.
REPLACE TOP PIVOT WHERE EXISTING UNIT IS OUT OF ALIGNMENT.
CONTRACTOR TO REPLACE EXISTING THRESHOLD AS LISTED.

BALANCE OF HDWE TO BE REUSED.
FIELD VERIFY THRESHOLD APPLICATION.

HW23P **[EXTERIOR/SGL/NDC REPL PIVOT/CLOSER/THRESH/SHOE]**

1 EA.	REPL PIVOT	101 PACKAGE W/FLR CL OCCUR	626	NDC
1 EA.	CLOSER	351DA-CPSx125Vx581-2x351-DxTB	689	SGT
2 EA.	KICKPLATE	KH050 10x2 LDW [2EA.K0050 W/APPL]	630	TRM
1 EA.	STOP	1209HA [OMIT@CPS]	630	TRM
1 EA.	THRESHOLD	176A TYPE 13 **[VERIFY]**	628	PEM
1 EA.	DOOR SHOE	222APK **[18100CP@NON-CUT]**	628	PEM

FURNISH P10 x 1209HA WHERE APPLICABLE.
CONTRACTOR TO REMOVE DR & INSTALL INDEPENDENT NDC PIVOT W/OCCURRING.
REPLACE TOP PIVOT WHERE EXISTING UNIT IS OUT OF ALIGNMENT.
CONTRACTOR TO REPLACE EXISTING THRESHOLD AS LISTED.
BALANCE OF HDWE TO BE REUSED.
FIELD VERIFY THRESHOLD APPLICATION.

HW23Q **[EXTERIOR/PAIR&SGL/THRESH/SHOE ONLY]**

4 EA.	KICKPLATE	KH050 10x2 LDW [2EA.K0050 W/APPL]	630	TRM
2 EA.	STOP	1209HA@RB	630	TRM
1 EA.	THRESHOLD	196Ax192AxWELD **[VERIFY]**	628	PEM
2 EA.	DOOR SHOE	222APK **[1@SGL] [18100CP@NON-CUT]**	628	PEM

BALANCE OF HDWE TO BE REUSED.
FURNISH 1EA. LISTED COMPONENT@SGLS WHERE OCCURRING [2EA.KH050].
FIELD VERIFY THRESHOLD APPLICATION.
FURNISH PEMKO 227A WHERE ½" MAXIMUM OFFSET CONDITION EXISTS.

HW23R **[EXTERIOR/PAIR/MCK-22HD ONLY]**

2 EA.	CONT HINGE	MCK-22HD **[FIELD VERIFY] [1@SGL]**	628	PEM
2 EA.	STOP	1209HA@RB	630	TRM

BALANCE OF HDWE TO BE REUSED. FIELD VERIFY CH APPLICATION.

HW23S **[EXTERIOR/SGL/T4A3386 ONLY]**

4 EA.	WT HINGE	T4A3386 5x6 NRP [FIELD VERIFY]	626	MCK
1 EA.	STOP	1209HA@RB	630	TRM

BALANCE OF HDWE TO BE REUSED.
CONTRACTOR TO CUT AND REINFORCE EXISTING MULLION FOR NEW BUTT HGS.

[INTERIOR ONLY]

HW24A [INTERIOR/*RATED*/SGL/PH]

1 EA.	EXIT DEVICE	43-12-8813ETLxTBxLC	630	SGT
1 EA.	CYLINDER	MORTISE [PER CAMPUS REQ]	626	
1 EA.	CLOSER	351DA-CPSHx125Vx581-Dx351-DxTB	689	SGT
1 EA.	REINFORCER	520S OR AS REQUIRED	630	MAG

FURNISH P10 WHERE APPLICABLE.
BALANCE OF HDWE TO BE REUSED.

HW24B [INTERIOR/SGL/PH]

1 EA.	EXIT DEVICE	43-8804xTBxLC	630	SGT
1 EA.	CYLINDER	RIM [PER CAMPUS REQ]	626	
1 EA.	PULL	1097HASP	630	TRM
1 EA.	CLOSER	351DA-CPSHx125Vx581-2x351-DxTB	689	SGT
1 EA.	STOP	1214CK [OMIT@CPSH]	626	TRM
1 EA.	REINFORCER	520S OR AS REQUIRED	630	MAG

FURNISH PH10 WHERE APPLICABLE.
BALANCE OF HDWE TO BE REUSED.

HW24C [INTERIOR/PAIR/PH

1 EA.	EXIT DEVICE	43-NB8710x306xTBxLC	630	SGT
1 EA.	EXIT DEVICE	43-NB8710xTB	630	SGT
1 EA.	CYLINDER	MORTISE [PER CAMPUS REQ]	626	
2 EA.	PULL	1097HASP	630	TRM
2 EA.	CLOSER	351DA-PH10x125Vx581-2x351-DxTB	689	SGT
2 EA.	KICKPLATE	K0050 10x1 LDW	630	TRM
2 EA.	STOP	1214CK	626	TRM

BALANCE OF HDWE TO BE REUSED.

HW25A [INTERIOR/PAIR/NDC REPL PIVOT]

2 EA.	REPL PIVOT	101 PACKAGE W/FLR CLS OCCUR	626	NDC
2 EA.	CLOSER	351DA-CPSHx125Vx581-2x351-DxTB	689	SGT
4 EA.	KICKPLATE	KH050 10x2 LDW [2EA.K0050 W/APPL]	630	TRM
2 EA.	STOP	1214CK	626	TRM
1 EA.	THRESHOLD	176A x TYPE 13 **[VERIFY]**	628	PEM

CONTRACTOR TO REMOVE DOORS AND INSTALL INDEPENDENT NDC PIVOTS.
REPLACE TOP PIVOT WHERE EXISTING UNIT IS OUT OF ALIGNMENT.
FURNISH PH10 x 1214CK WHERE CONDITIONS ALLOW.
BALANCE OF HDWE TO BE REUSED.
FIELD VERIFY THRESHOLD APPLICATION.

HW25B [INTERIOR/SGL/NDC REPL PIVOT]

1 EA.	REPL PIVOT	101 PACKAGE W/FLR CL OCCUR	626	NDC
1 EA.	CLOSER	351DA-CPSHx125Vx581-2x351-DxTB	689	SGT
2 EA.	KICKPLATE	KH050 10x2 LDW [K0050 W/APPL]	630	TRM
1 EA.	STOP	1214CK	626	TRM
1 EA.	THRESHOLD	176A x TYPE 13 **[VERIFY]**	628	PEM

CONTRACTOR TO REMOVE DOORS AND INSTALL INDEPENDENT NDC PIVOT.
REPLACE TOP PIVOT WHERE EXISTING UNIT IS OUT OF ALIGNMENT.
FURNISH PH10 x 1214CK WHERE CONDITIONS ALLOW.
BALANCE OF HDWE TO BE REUSED.
FIELD VERIFY THRESHOLD APPLICATION.

HW25C [INTERIOR/SGL/THRESHOLD]

EACH SGL TO HAVE:

2 EA.	KICKPLATE	KH050 10x2 LDW@MU1, MU2, MU3	630	TRM
2 EA.	THRESHOLD	273A@MU2, MU3 **[VERIFY]**	628	PEM

BALANCE OF HDWE TO BE REUSED.
FIELD VERIFY THRESHOLD APPLICATION.

HW26 [EXISTING HARDWARE]

ALL HDWE TO BE REUSED.

HW26A [MISCELLANEOUS]

FURNISH 192Ax196A WELDED AND/OR PER PLANS/SITE CONDITIONS [VERIFY] REFER TO CONSTR KEYNOTE #48 W/OCCURRING. BAL OF EXISTING HDWE TO BE REUSED. DOOR MAT [CONSTRUCTION KEYNOTE #47 [OR AS DETAILED] BY OTHER.

EACH SITE: EXTRA HDWE TO BE DELIVERED TO THE S.B.C.U.S.D LOCKSHOP.

1 EA.	EXIT DEVICE	43-8804xTB	630	SGT
1 EA.	EXIT DEVICE	43-8813ETJxTB	630	SGT
1 EA.	EXIT DEVICE	3828-04xTB	PEN	SGT
1 EA.	LOCKSET	195Fx10L	626	MAR
1 EA.	LOCKSET	195DCx10L	626	MAR
1 EA.	LOCKSET	195Sx10L	626	MAR
1 EA.	CLOSER	351DA-UHxTB	689	SGT
1 EA.	CLOSER	351DA-P10xTB	689	SGT
1 EA.	ARM	CPS	689	SGT
1 EA.	PULL	1097HASP	630	TRM
1 EA.	PULL	1096HA	630	TRM
8 EA.	STOP	1270SV	630	TRM
8 EA.	STOP	1214CK	626	TRM

[REFER TO 1.05.G FOR SURVEY ALLOWANCE@MODERNIZATION PROJECTS]
Related costs to field modify existing frames and/doors shall be part of the Contractor's base bid and shall include a $500.00 allowance for door and frame fillers. An additional allowance of $20.00 each existing modified door and frame opening will be part of the Contractor's base bid. This allowance will be allocated for time invested in the required survey, and engineering necessary for detailing a complete and accurate hardware schedule. Survey(s) to be carefully coordinated with the door and hardware suppliers.

v[END OF SECTION]

SECTION 08800

GLAZING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Glass and glazing for Sections referencing this Section for products and installation.

B. Mirrors larger than 18 x 30 inches.

1.02 REFERENCES

A. ASTM C1036 - Flat Glass.

B. ASTM C1048 - Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.

C. ASTM D792 - Specific Gravity (Relative Density) and Density of Plastics by Displacement.

D. ASTM E773 - Seal Durability of Sealed Insulating Glass Units.

E. ASTM E774 - Sealed Insulating Glass Units.

F. GANA - Glass Association of North America - Glazing Manual, 1997 Edition.

G. FGMA - Flat Glass Marketing Association - Sealant Manual, 1990 Edition.

H. GTA - Glass Tempering Division of Glass Association of North America.

I. LSGA - Laminators Safety Glass Association - Standards Manual.

J. SIGMA - Sealed Insulated Glass Manufacturers Association - Glazing Manual.

K. Chapter 24 and 26 Plastic, California Building Code.

L. Section KCMZ, UL Building Materials Directory, Latest Edition.

M. UBC Standards 7-2 and 7-4.

N. CPSC 16 CFR 1201 Consumer Protection Safety Commission, Code of Federal Regulations.

O. ANSI Z-97.1- Glazing Materials Used in Buildings, Safety Performance Specifications and Method of Test.

1.03 PERFORMANCE REQUIREMENTS

A. Provide minimum frame lap in accordance with Table 24-B, California Building Code.

B. Glazing materials and assemblies shall be tested in accordance with UBC Standard 7-2 (For Fire Doors) and UBC Standard 7-4 (For Fire Windows) and shall be labeled and installed in accordance with their listing.

C. Glazing in fire door and fire window assemblies subject to human impact in hazardous locations shall comply with requirement of CBC Sections 2406.6 and 2406.3.

1.04 SUBMITTALS

A. Product Data on Glass Types Specified: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

B. Three samples of each material specified illustrating coloration and design.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with:
   1. GANA Glazing Manual.
   2. FGMA Sealant Manual.
   3. LSGA Standards Manual.
   4. SIGMA Glazing Manual, Class CBA.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Do not install glazing when ambient temperature is less than 50 degrees F.

1.07 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

1.08 COORDINATION

A. Coordinate the Work with glazing frames, wall openings, and perimeter air and vapor seal to adjacent Work.

1.09 WARRANTY

A. Provide ten year manufacturer's warranty from Date of Substantial Completion.

B. Warranty: Include 15 year silver spoilage coverage for reflective coating on mirrors and replacement of same.

1.010 IDENTIFICATION

A. Each lite shall bear the manufacturer's label designating the type and thickness of glass. Conform to Section 2402, California Building Code.

B. Each lite of safety glazing material installed in hazardous locations as defined in Section 2406, California Building Code shall be identified by a label which will specify the labeler, whether the manufacturer or installer, and state that safety glazing material has been utilized in such installation.

C. Each lite of fire-rated glazing shall be identified by a label which verifies fire-resistant glazing as per CBC 713.9.

PART 2 - PRODUCTS

2.01 MANUFACTURERS - FLAT GLASS MATERIALS

A. Products of following manufacturers form basis for design and quality intended.
   1. PPG Industries, Pittsburgh, PA.
   2. Pilkington Libbey-Owens-Ford Co., Toledo, OH.
   3. Guardian Industries Corp. Corsicana TX.

B. Or equal as approved in accordance with Division 1, General Requirements for Substitutions.

2.02 FLAT GLASS MATERIALS

A. Flat Glass: ASTM C1036, Type I transparent annealed flat glass, Class 1 clear, Quality q3 Glazing, 1/4 inch thick minimum.

B. Safety Glass: ASTM C1048, Kind FT fully tempered, Condition A uncoated, Type I transparent glass, Class 1 clear, Quality q3 Glazing select, 1/4 inch thick minimum.

C. Uncoated Monolithic Tinted Glass: ASTM C1048, Kind FT glass. Condition A, Type I, Class 3 light reducing, Quality q3, 1/4 inch thick minimum, by PPG Industries.
   1. Graylite Glass: light transmittance of 14%, shading coefficient of 0.53.

D. Mirror Glass: ASTM C1036, annealed float glass, Type I Transparent Flat Glass, Class 1 Clear, Quality Q2 mirror, with silver coating. Vinyl-backed safety mirror glass per CPSC 16 CFR 1201, Category II and ANSI Z-97.1, 1/4 inch thick minimum, sizes noted on Drawings.
   1. Frame: Frame face 3/4 x 3/4 inch welded seamless stainless steel, No. 304 finish, 20 gage galvanized steel backing, Series No. 290, by Bobrick Washroom Equipment Inc., North Hollywood, CA, or equal.

E. Laminated Glass: ASTM C1048 and C1172, two layers 1/8 inch thick each with minimum .060 inch thick clear polyvinyl butyral interlayer, Condition A uncoated, Kind LI fully tempered, Type I, Class I clear, Quality q3 select. Clear outboard lite, float glass, clear inboard lite. Nominal thickness: 1/4 inch.

1. Color of Interlayer:
   a. Clear: At clear glass.

2.03 FIRE RATED GLASS MATERIALS

A. TGP Premium Firelite Plus 5/16" thick, clear laminated fire rated, impact safety rated glass ceramic, CPSC 16 CFR 1201 Category II:
   1. 20 min. doors 2,835 sq. in. max. at doors, (3,325 sq. in. max. at non-doors).
   2. 45 minute: doors 1,296 sq. in. max. at doors, (3,325 sq. in. max. at non-doors).
   3. 60 minute: doors 1,296 sq. in. max. at doors, (2,271 sq. in. max. at other than doors) (100 sq. in. max. at temperature rise doors).

2.04 MANUFACTURERS - PLASTIC SHEET MATERIALS

A. Products of the following manufacturers form the basis for design and quality intended.
   1. Sheffield Plastics, Inc., Shelfield, MA. Product: Makrolon.
   2. G.E. Plastics, Pittsfield, MA.
   3. Atohaas N.A. Inc., Philadelphia, PA.
   4. Cyro Industries, Rockaway, NJ.

B. Or equal as approved in accordance with Division 1, General Requirements for Substitutions.

2.05 PLASTIC SHEET MATERIALS

A. Polycarbonate Sheet: ASTM D792; plastic compound, ultraviolet stabilized; silicone abrasion resistant coating both sides for scratch resistance; 1/4 inch thick minimum, specific gravity 1.20.
   1. For Interior: Makrolon AR, clear.
   2. For Exterior above 10 feet: Makrolon AR, Dark Gray 7135/
   3. For Exterior below 10 feet: Makrolon GP 9180 Pebble Texture, Dark Gray 7135 (pebble finish on exterior).

B. Material shall meet requirements of Chapter 26, California Building Code for CC1 Type Plastic.

2.06 GLAZING ACCESSORIES

A. Setting Blocks: 80-90 Shore A durometer hardness, length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.

B. Spacer Shims: 50-60 Shore A durometer hardness, minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self-adhesive on one side.

C. Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10 - 15 Shore A durometer hardness; coiled on release paper; black color.

D. Glazing Splines: Resilient polyvinyl chloride extruded shape to suit glazing channel retaining slot.

E. Sealants: as specified in Section 07900.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify prepared openings.

B. Verify that openings for glazing are correctly sized and within tolerance.

C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions and ready to receive glazing.

3.02 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant.

D. Mirror Glass: flat polish edge treatment. Seal edges for mirror glass after edge treatment to prevent chemical or atmospheric penetration of glass coating.

3.03 EXTERIOR - DRY METHOD (PREFORMED GLAZING)

A. Cut glazing spline to length; install on glazing pane. Seal corners by butting spline and sealing junctions with butyl sealant.

B. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.

C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.

D. Install removable stops without displacing glazing. Exert pressure for full continuous contact.

3.04 EXTERIOR - WET/DRY METHOD (PREFORMED TAPE AND SEALANT)

A. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with butyl sealant. Apply cap bead of silicone type sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

B. Apply toe bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.

C. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.

D. Rest glazing on setting blocks and push against tape and toe bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.

E. Install removable stops, with spacer strips inserted between glazing and applied stops, 1/4 inch below sight line.

F. Fill gap between glazing and stop with silicone type sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.

G. Apply cap bead of silicone type sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.05 EXTERIOR - WET METHOD (SEALANT AND SEALANT)

A. Place setting blocks at 1/4 points and install glazing pane or unit.

B. Install removable stops with glazing centered in space by inserting spacer shims both sides at 24 inch intervals, 1/4 inch below sight line.

C. Fill gaps between glazing and stops with silicone type sealant to depth of bite on glazing, but not more than 3/8 inch below sight line to ensure full contact with glazing and continue the air and vapor seal.

D. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.06 INTERIOR - DRY METHOD (TAPE AND TAPE)

A. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.

B. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.

C. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.

D. Place glazing tape on free perimeter of glazing in same manner described above.

E. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.

F. Knife trim protruding tape.

3.07 INTERIOR - WET/DRY METHOD (TAPE AND SEALANT)

A. Cut glazing tape to length and install against permanent stops, projecting 1/16 inch above sight line.

B. Place setting blocks at 1/4 points with edge block nor more than 6 inches from corners.

C. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.

D. Install removable stops, with spacer shims inserted between glazing and applied stops at 24 inch intervals, 1/4 inch below sight line.

E. Fill gaps between pane and applied stop with silicone type sealant to depth equal to bite on glazing, to uniform and level line.

F. Trim protruding tape edge.

3.08 INSTALLATION - MIRRORS

A. Set mirrors in specified frame.

B. Attach assembly to wall with concealed, theftproof screws.

3.09 MANUFACTURER'S FIELD SERVICES

A. Glass and glazing product manufacturers to provide field surveillance of the installation of their products.

B. Monitor and report installation procedures, unacceptable conditions and report deficiencies to the Architect.

3.010 CLEANING

A. Remove glazing materials from finish surfaces.

B. Remove labels after Work is complete.

C. Clean and polish surfaces and frames.

3.011 PROTECTION OF FINISHED WORK

A. Protect finished Work.

B. After installation, mark pane with an 'X' by using removable plastic tape or paste. Do not mark heat absorbing glass units.

END OF SECTION

SECTION 09050

COLORS AND MATERIALS - FINISH SCHEDULE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Interior and exterior Finishes Schedules

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. As scheduled herein and specified in individual sections.

PART 3 EXECUTION

3.01 SCHEDULES

Section	Exterior	
09900	Painting:	4 colors as selected by Architect

Interior

FLOORING

Section		
09310	Ceramic Mosaic Tile:	Dal Tile" Colors: 3 colors as selected by Architect, Price Group 2
09651	Resilient Tile Flooring: (VCT)	Azrock Style: Cortina Colors Colors: 3 colors as selected by Architect
09653	Top Set Base:	Burke Color: 701 Black
09680	Carpet:	Bigelow Commercial Style: Fairfield II Color: To be selected by Architect.

WALLS

09310	Ceramic Tile:	Dal Tile: Dal Matte: As selected by Architect Accent: As selected by Architect
09900	Base Paint:	Colors: As selected by Architect
09900	Accent Paints:	Colors: (2) As selected by Architect

MILLWORK

06410	Upper and Lower Casework: (Doors of base cabinets and wall cabinets.)	Color: As selected by Architect
	Accent/Counter Tops:	Colors: (2) As selected by Architect

CEILING

	ACT-1	200-01 Series

MISCELLANEOUS

10165	Toilet Partitions:	Santana Color: Paisley
10440	Signs - Restrooms:	Colors: As selected by Architect
10441	Room Identification Signs:	Colors: As selected by Architect

SECTION 09130

ACOUSTICAL SUSPENSION SYSTEMS

PART 1 GENERAL

1.01 WORK INCLUDED

A. New acoustical suspension system, heavy duty.

B. Removal, repair and re-installation of existing acoustical panels and suspension systems.
   1. Field verify the extent of the Work to match existing.

C. Perimeter trim.

D. Suspension trim.

1.02 RELATED SECTIONS

A. Section 09511 - Acoustical Ceilings

1.03 REFERENCES

A. ASTM C635 - Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings

B. ASTM C636 - Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.

C. ASTM E84 - Surface Burning Characteristics of Building Materials.

D. ASTM E580 - Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint.

E. Chapter 19A California Building Code.

F. Chapter 23A California Building Code.

G. DSA IR M-3, June 2003.

1.04 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacture of ceiling suspension system with five years minimum experience.

B. Installer: Company with five years minimum experience.

1.05 SUBMITTALS

A. Submit shop drawings indicating, grid layout and related dimensioning, junctions with other work or ceiling finishes and interrelation of mechanical and electrical items. Photographic reproductions of the contract drawings shall not be used.

B. Submit product data.

C. Submit three samples of each suspension system main runner, cross runner and edge trim.

D. Submit manufacturer's installation instructions.

E. Submit UL Design number or State Fire Marshal listing number for required fire-rated grid system.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Products of the following manufacturers form the basis for design and quality intended.
   1. Chicago Metallic Corp., Los Angeles, CA, Product: SERIES 1200 Heavy Duty, 15/16 inch wide face, exposed T.
   2. BPB Celotex, Tampa, FL.
   3. Armstrong World Industries. Lancaster, CA.
   4. USG Interiors Inc., Chicago, IL.

B. Existing Suspension Systems:
   1. Existing system is a suspended grid complete with wall moldings with members forming a 24 inch by 24 inch grid.
   2. New suspension system and their components for patching existing system shall match existing.

C. Or equal as approved in accordance with Division 1, General Requirements for substitutions.
   1. Substitutions shall have a current product acceptance document filed with DSA prior to submission of Bids.

2.02 SUSPENSION SYSTEM MATERIALS

A. Grid: ASTM C635, heavy duty, exposed T, components die cut and interlocking.
   1. Main Runners: 200-01.
   2. Cross Tees - Stepped End: 1204, 1210, 1226 at 24 x 24 inch grid.
   3. Hold-Down Clips: 425, 820 or 935 at fire-rated corridors and exitways.
   4. Edge Trim: 1420, 15/16 x 15/16 inch angle.

B. Accessories: Stabilizer bars, splices, edge trim and all necessary components required for the specified suspended grid system. Provide manufacturers standard hold-down clips at fire-rated assemblies and at panel weighing less than 1 lb PSF.

C. Grid Materials: Commercial quality cold rolled steel with galvanized coating.

D. Grid Finish: Factory applied standard white.

E. Hanger Wire: No. 12 gage galvanized, annealed steel wire.

F. Suspension Trim: USG, Model Compasso Trim, painted steel, sizes 6" and 8". Provide attachment clips and splices. Refer to drawings for location and sizes.

2.03 FIRE CLASSIFICATION REQUIREMENTS

A. ASTM E84, all materials shall have a flame spread density rating of less than 25 and a smoke density rating of less than 450.

PART 3 EXECUTION

3.01 INSPECTION

A. Verify that existing conditions are ready to receive work.

B. Verify that layout of hangers will not interfere with other work.

C. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION

A. Install system in accordance with ASTM C636, ASTM E580, Section 2501 California Building Code and DSA IR M-3, and as supplemented in this Section.

B. Lay-in ceiling assemblies in exitways shall be installed with a main runner, crossrunner or ledger surrounding all sides of each panel and each light fixture or grill. Splices and intersections of such runners shall be attached with through-connectors such as pop rivets screws, pins, plates with bent tabs or by other approved connectors at wall slip joint and wall ledger, provide a main runner parallel to wall, suspended with 12 gage hangar wires spaced 4 ft oc and one pair of parallel bracing wires spaced 12 ft oc. Such main runner shall be locked to each intersecting, perpendicular grid member by an approved through-connection splice.

C. Ceilings shall not support material or building components other than grilles or light fixtures except as herein provided. Ductwork, plumbing and like work shall have its own support system and shall not utilize the ceiling system or suspension wires.

D. 12 gage hanger wires shall be used to support a maximum ceiling area of 16 square feet, spaced at 4 x 4 foot along main runners. Splices will not be permitted in any hanger wires.

E. Provide 12 gage minimum hanger wires at the ends of main and cross runners within 8 inch from the support or within 1/4 of the length of the end tee, whichever is least, for the perimeter of the ceiling area.

F. Provide trapeze or other supplementary support members at obstructions to main hanger spacing. Provide additional hangers, struts or braces as required at ceiling breaks, soffits or discontinuous areas. Hanger wires that are more than 1 in 6 out of plumb shall have counter-sloping wires.

G. Ceiling grid members shall be attached to not more than 2 adjacent walls. Ceiling grid members shall be at least 1/2 inch free of other walls. If walls run diagonally to ceiling grid system runners, one end of main and cross runners shall be free and a minimum of 1/2 inch clear of wall.

H. At the perimeter of the ceiling area where main or cross runners are not connected to the adjacent wall, provide interconnection between the runners at the free end to prevent lateral spreading. A metal strut or a 16 gage wire with a positive mechanical connection to the runner may be used. Where the perpendicular distance from the wall to the first parallel runner is 12 inches or less, this interlock is not required.

1. Install Compasso Suspension Trim as indicated on Drawings.

I. Provide sets of four 12 gage splayed bracing wires oriented 90 degrees from each other at a spacing of 12 ft by 8 ft. Install vertical compression strut at each set of bracing wires.

J. Compression Struts: 20 gage 4 inch stud. Attach to main runners within 2 inch of cross runner with 2-# 12 self-drilling self-tapping (SDST) screws and to structure with 2-#12 by 2 inch screws at wood or 3/16 inch diameter anchor at concrete/steel. Compression strut shall not replace hanger wire.

K. Provide bracing wires at locations not more than 1/2 the spacings specified herein from each perimeter wall and at the edge of vertical ceiling offsets.

L. The slope of bracing wires shall not exceed 45 degrees from the plane of the ceiling and shall be taut without causing the ceiling to lift. Splices in bracing wires are not permitted. Powder actuated fasteners are not permitted for the attachment of splay wires. Conform to Division 1, General Requirements for testing requirements for fasteners.

M. Fasten hanger wires with not less than 3 tight turns. Fasten bracing wires with 4 tight turns. Make all tight turns within a distance of 1-1/2 inches. Hanger or bracing wire anchors to the structure shall be installed in such a manner that the direction of the wire aligns as closely as possible with the direction of the forces acting on the wire. Wire turns made by machine where both strands have been deformed or bent in wrapping can waive the 1-1/2 inch requirement, but the number of turns shall be maintained and shall be as tight as possible.

N. Separate all ceiling hanging and bracing wires at least 6 inches from unbraced ducts, pipes or conduit. Attach lightweight items, such as single electrical conduit not exceeding 3/4 inch nominal diameter to hanger wires using approved connectors.

O. Attach light fixtures to the ceiling grid runners to resist a horizontal force equal to the weight of the fixtures.

P. Flush or recessed light fixtures and air terminals or services weighing less than 56 pounds may be supported directly on the runners. Install a minimum of two 12 gage slack safety wires attached to the fixture at diagonal corners and anchored to the structure above. All 4 ft x 4 ft light fixtures must have slack safety wires at each corner.

Q. Flush or recessed light fixtures and air terminals or services weighing 56 pounds or more shall be independently supported by not less than 4 taut 12 gage wires each attached to the fixture and to the structure above.

1. The 4 taut 12 gage wires including their attachment to the structure above shall be capable of supporting 4 times the weight of the unit.

R. Support surface mounted light fixtures by at least two positive devices which surround the ceiling runner and which are each supported from the structure above by a 12 gage wire. Spring clips or clamps that connect only to the runner are not acceptable. Provide additional supports when light fixtures are 8 feet or longer.

S. Support pendant mounted light fixtures directly from the structure above with hanger wires or cables passing through each pendant hanger and capable of supporting 4 times the weight of the fixture. Restrain pendant fixtures with aircraft cable to prevent contacting anything within 45-degree swing.

T. Partitions: If non-bearing partitions that extend to and terminate at a suspended ceiling are supported laterally by opposing bracing wires spaced a maximum of 8 ft oc along the top edge of the partition or by other equivalent means, they shall be considered as not adding to the lateral load required to be resisted by the ceiling system.

U. Do not eccentrically load system or produce rotation of runners.

V. Install edge angle at intersection of ceiling and vertical surfaces using longest practical lengths. Miter corners. Provide edge angles at junctions with other interruptions. Where curved obstructions occur, provide preformed closers to match edge molding.

W. Form expansion joints as indicated on drawings.

3.03 TESTING

A. When drilled-in concrete anchors or shot-in anchors are used in reinforced concrete for hanger wires, 1 out of 10 must be field tested for 200 pounds of tension.

B. Test drilled-in expansion-type concrete anchors for bracing wires, 50% bolt in a group must be field tested for 440 pounds in tension.

C. Shot-in anchors in concrete are not permitted for bracing wires.

D. If any shot-in or drilled-in anchors fails, conform to Section 1923A.3.5, California Building Code.

3.04 EXISTING SUSPENSION SYSTEM

A. Preparation
   1. Remove suspension system as necessary to perform the work. Safely store removed units for reinstallation.

B. Reinstalling Removed Suspension System:
   1. Reinstall satisfactory salvaged suspension system or install new matching systems and materials to make ceiling complete.
   2. Limit reinstalled systems and materials to those that are in conditions equal to or better than, adjacent undisturbed systems.
   3. Use existing hangers and hanger attachments where they have been approved. Provide new hangers and hanger attachments where existing hanger and attachments have been removed or are improperly placed or otherwise inappropriate and where there are no existing hangers.

3.05 TOLERANCES

A. Variation from Flat and Level Surface: 1/8 inch in 10 feet.

END OF SECTION

SECTION 09260

GYPSUM BOARD

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Gypsum Board Panels.

B. Vertical wall gypsum board application.

C. Metal channel ceiling framing and horizontal ceiling gypsum board application.

D. Taped and sanded joint treatment.

E. Moisture-resistant backer board for tile application.

1.02 REFERENCES

A. ASTM C36 - Gypsum Wallboard.

B. ASTM C475 - Joint Compound and Joint Tape for Finishing Gypsum Board.

C. ASTM C630 - Water Resistant Gypsum Backing Board.

D. ASTM C840 - Application and Finishing of Gypsum Board.

E. ASTM C1002 - Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases.

F. UL -1997 - Underwriters Laboratories, Inc., Fire Resistance Directory, Volume 1.

G. GA-201 - Gypsum Board for Walls and Ceilings.

H. GA-214 - Levels of Gypsum Board Finish.

I. GA-216 - Application and Finishing of Gypsum Board.

J. GA-600 - Fire Resistance Design Manual.

K. Chapter 7, California Building Code.

L. Chapter 25A, California Building Code.

M. Chapter 19A, California Building Code.

N. DSA, IR M-4, latest Edition.

O. ANSI/TCA 118.4 – Tile Council of America, Latex-Portand Cement Mortar.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show locations, fabrication, and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other units of Work.

C. Samples: For following products:
   1. Trim Accessories: Full-size sample in 12-inch- long length for each trim accessory indicated.
   2. Textured Finishes: Manufacturer's standard size for each textured finish indicated and on same backing indicated for Work.

1.04 QUALITY ASSURANCE

A. Applicator: Company specializing in gypsum board systems work with three years experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat to prevent sagging.

1.06 PROJECT CONDITIONS

A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products of following manufacturers form basis for design and quality intended.
   1. United States Gypsum Corporation, Chicago, IL.
   2. Georgia-Pacific, Atlanta, GA.
   3. Gold Bond Building Products, Charlotte, NC.
   4. National Gypsum Co.

B. Or equal as approved in accordance with Division 1, General Requirements for Substitutions.

2.02 MATERIALS

A. Furring Channels: 25 gage galvanized steel, 7/8 inch deep by 2-9/16 inch wide, 275 pounds per 1,000 feet weight, FHC-25 and CEMCO METAL FURRING CHANNEL CLIPS. Z Type, where required: CEMCO Z-FURRING CHANNEL, 1, 1-1/2, 2 and 3 inch depths.
   1. Furring Channels at Cementitious Backing Board Ceilings: 20 gage, PWC-20.

B. Angles: 1-3/8 inch by 7/8 inch, 24 gage, CEMCO GALVANIZED METAL ANGLES.

C. Runner Channels: Minimum weights, sizes and maximum spans as defined in Table 25A-A, California Building Code, cold-rolled channels as defined therein.

D. Taping, Bedding and Finishing Compound: ASTM C475; compatible with tape and substrate.
   1. USG SHEETROCK Ready-mixed Joint Compound, non-asbestos, vinyl base.
   2. USG SHEETROCK Powder Joint Compound, non-asbestos vinyl base, conventionally drying.
   3. USG SHEETROCK Setting-type Joint Compound, chemical hardening.
   4. USG SHEETROCK Joint Tape, cross fibered paper, PERMA - TITE TAPE, by Perma Glass Mesh Inc., Dover, OH.
   5. Or equal as approved in accordance with Division 1, General Requirements.

E. Hanger Wire: 8 gage for 16 square. feet maximum, galvanized annealed, size of wire in accordance with Table 25A-A, California Building Code.

F. Tie Wire: 18 gage galvanized annealed.

G. Accessories: Corrosive Protective-Coated steel.
   1. Corner Bead: USG No. 103 for joint compounds. No. 800 or 900 for veneer plaster applications.
   2. U-Trims: USG No. 200A for joint compound and 801A for one-coat plaster system and No. 701A for two-coat plaster.
   3. Control Joint: USG Control Joint No. 093.
   4. J-Trim Casings: No. 400, no finishing compound.

H. Fasteners: ASTM C1002 Phillips head, power-driven, nails not permitted.
   1. Type S-12, 16 gage steel studs, minimum penetration 3/8 inch.
   2. Type S, 20 gage steel studs, minimum penetration 3/8 inch.
   3. Type W, wood construction, minimum penetration 5/8 inch.
   4. Type G, gypsum board to gypsum board, minimum penetration 1/2 inch.

I. Bond Coat for Ceramic Tile and Skim Coat: DUROCK Latex Portland Cement Fortified Mortar ANSI/TCA 118.4.

J. Waterproofing Membrane: ASTM D4601, Type I asphalt saturated glass felt.

2.03 BOARD MATERIALS

A. Regular and Foil-Backed Gypsum Board: ASTM C36; 5/8 inch thick, maximum permissible length; ends square cut, tapered round edges, SHEETROCK BRAND SW TAPERED GYPSUM PANELS.

B. Fire-rated Gypsum Board: ASTM C36; fire resistive type, UL rated; 5/8 inch thick, maximum permissible length; ends square cut, tapered round edges, SHEETROCK BRAND TYPE X FIRE CODE "C" GYPSUM PANELS, SW TAPERED.

C. Moisture Resistant Gypsum Board: ASTM C630; 5/8 inch thick, maximum permissible length; ends square cut, tapered edges, SHEETROCK BRAND W/R GYPSUM PANELS, W/R REGULAR GYPSUM PANELS OR W/R FIRE CODE TYPE X GYPSUM PANELS.

D. Cementitious Backer Units: Standard type; 5/8 inch thick; Solid tapered edges, ends square cut, maximum permissible length, DUROCK Brand Cement Board.

PART 3 - EXECUTION

3.01 PREPARATION

A. Verify that site conditions are ready to receive Work.

B. Beginning of installation means acceptance of substrate.

C. Delivery and Storage: Arrange for an adequate supply of materials on the jobsite so that progress of Work will be uninterrupted. Materials and accessories shall be delivered in original containers and bundles, and identified with the manufacturer's name and brand. Store gypsum board on flat, solid supports in dry areas, well protected from the elements.

D. Provide fixtures, anchors, sleeves, inserts and miscellaneous items, and provide openings and chases as necessary. Prior to closing in and finishing of dry wall Work, ascertain that piping, conduit, ductwork and fixtures which are to be concealed and which penetrate gypsum boards are in place, tested and approved.

E. Scaffolding: Construct, erect and maintain in conformance with applicable laws and ordinances.

F. Protection, Patching and Cleaning: Adjacent surfaces of other materials shall be protected from damage. Dry wall surfaces that have been cut out shall be neatly patched. Damaged or defective gypsum board finish shall be replaced. During progress of Work, rubbish droppings and water materials shall be removed.

G. Fire Protection: Where required, the Work shall comply with the requirements for the protection rating indicated in the governing building code.

H. Fire Sprinkler System: In areas where sprinkler heads occur, exercise care when installing drywall work. Do not damage or obstruct the heads in any way.

3.02 CEILING FRAMING INSTALLATION

A. Framing for suspended ceilings and vertical curtain walls between dropped ceilings: Install to provide plumb surfaces with no variation of more than 1/4 inch in 10 feet.

B. Ceilings shall not support material or building components other than grilles light fixtures, small electrical conduits and small ducts.
   1. Small Electrical Conduits: 3/4 inch in diameter or less, feeding electrical fixtures or electrical devices in the ceiling assembly.
   2. Large duct work, plumbing and like Work shall have its own support system and shall not be attached to the ceiling system.
   3. Only gypsum board dead loads shall be supported by cross-furring.

C. Ceiling Support System: Conform to Table 25A-A, California Building Code and DSA, IR M-4, for sizes, types and spacing of ceiling support components.
   1. Main Runners: 1-1/2 inch, 0.475 pound per foot, cold-rolled channels.
   2. Vertical hanger wires are #8 gage and galvanized.
   3. Cross-furring may be 7/8 inch, 25 gage galvanized hat sections at 24 inches maximum on centers.
   4. Main runners, spaced at 3 feet on centers, hanger wires shall be spaced at 4 feet maximum. To use hanger spacing of 4 feet on centers with a main runner spacing of 4 feet on centers, main runners shall be 1-1/2 inch hot-rolled channels weighing 1.12 pounds per foot.

D. Spacing of both hangers and runners: 48 by 48 inches is permissible if following conditions are met:
   1. Vertical hanger wires are 8 gage and galvanized. If ceiling is non-accessible, 12 gage wire may be used.
   2. Main runners are 1-1/2 inch channels, 1.12 pounds per foot minimum, hot rolled.
   3. Cross-furring may be 7/8 inch, 25 gage galvanized hat sections at 24 inches maximum on centers.

E. Hangers: Provide Hanger wires for primary runners within 6 inches of ceiling perimeters.
   1. Hanger wires with ends twisted at least 3 times around itself, shall be saddle tied to primary runner channels.
   2. Primary runner channel shall be crossed with furring channels, saddle tied to runners with one strand of 16 gage or two strands of 18 gage tie wire. Runner channels shall be located not more than 6 inches from parallel boundary walls, or beams; furring channels 2 inches from parallel walls.
   3. Primary runner channels shall be spliced by lapping 12 inches and furring channels shall be spliced by lapping 8 inches. Splices shall be tied at 2 inches from each end with two loops of 16 gage wire.
   4. Hanger wires that are more than 1 in 6 out of plumb shall have counterbraced wires. Wires shall not attach or bend around interfering material such as duct work. Trapeze or equivalent devices shall be used where obstructions interfere with direct suspension. Trapeze suspension shall have a minimum construction of back-to-back 1-1/2 inch cold formed channels for spans up to 6 ft.
   5. Ceiling wires and unbraced ducts, pipes and similar components must be separated.

6. Refer to Division 1, General Requirements for size and testing requirements for concrete expansion anchor bolts and powder actuated fasteners.
7. Fasten hanger wires with not less than three (3) tight turns. Fasten bracing wires with four (4) tight turns. Make all tight turns within distance of 1-1/2 inches. Hanger or bracing wire anchors to structure should be installed in such manner that direction of wire aligns as closely as possible with direction of forces acting on wire.
   a. Wire turns made by machine where both strands have been deformed or bent in wrapping can waive 1-1/2 inch requirement, but number of turns should be maintained, and be as tight as possible.
8. Separate all ceiling hanging and bracing wires at least 6 inches from all unbraced ducts, pipes, conduit. It is acceptable to attach lightweight items, such as single electrical conduit not exceeding 3/4 inch nominal diameter, to hanger wires using connectors acceptable to the Division of the State Architect (DSA).
9. When drilled-in concrete anchors or shot-in anchors are used in reinforced concrete for hanger wires, 1 out of 10 must be field tested for 200 pounds. in tension. When drilled-in anchors are used for bracing wires, 1 out of 2 must be field tested for 440 pounds. in tension. Shot-in anchors in concrete are not permitted for bracing wires. If any shot-in or drilled-in anchor fails, see Section 1923A.3.5, Title 24.
10. Provide trapeze or other supplementary support members at obstructions to typical hanger spacing. Provide additional hangers, struts or braces as required at all ceiling breaks, soffits or discontinuous areas. Hanger wires that are more than 1 in 6 out of plumb are to have counter-sloping wires.

F. Horizontal Support System:
1. Set of 4 splay wires shall be provided for each 8 by 12 feet. First set of splay wires shall be 4 feet from any wall. Wires shall be taut without causing ceiling to lift. Provide vertical compression strut at each set of bracing wires per the following:
   a. Up to 48 inches in length: minimum, 4-inch stud, 20 gage. Attach to main runners within 2 inch of cross runner with 2-#12 self-drilling self-tapping screws and to steel deck structure. At Wood Structure: 2-#12 x 2 inch screws or 3/16 inch diameter expansion anchor at concrete/steel deck. Compression strut shall not replace hanger wire.
   b. Up to 96 inches in length: back brace 4-inch brace stud with 4-inch stud, 20 gage, screw perpedicular to center of brace stud with #10 at 24 inches on center. Attach to main runners within 2 inch of cross runner with 2-#12 self-drilling self-tapping screws and to steel deck structure. At Wood Structure: 2-#12 x 2 inch screws or 3/16 inch diameter expansion anchor at concrete/steel deck. Compression strut shall not replace hanger wire.
   c. And as indicated in drawings.
2. Splay wires shall be No. 12 gage, with 4 tight turns at each end. Powder actuated fasteners shall not be used for attachment of splay wires to supporting structure.
3. Slope of splay wires shall not exceed 45 degrees from the plane of the ceiling and shall be taut. Splices in bracing wires are not to be permitted.

4. Ceiling grid members may be attached to not more than two adjacent walls. Ceiling grid members shall be at least 1/2 inch free of other walls. If walls run diagonally to ceiling grid system runners, one end of main and cross runners should be free, and minimum of 1/2 inch clear of wall.
5. Suspended ceiling systems with an area of 144 square feet or less, and fire rated ceiling systems with area of 96 square feet or less, surrounded by walls that connects directly to structure above, do not require bracing assemblies when attached to at least two adjacent walls.

G. Light Fixture Support:
1. Recessed or drop-in light fixtures shall be supported directly by main runners or by supplemental framing which is supported by main runners.
2. Surface mounted fixtures shall be attached to a main runner with a positive clamping device made of minimum 14 gage metal. Rotational spring catches not allowed.
3. Light fixtures shall be attached to ceiling to resist horizontal force equal to weight of fixtures.
4. Install firestopping envelopes around recessed light fixtures and other electrical devices or boxes that exceed 100 sq. inches in 100 sq. ft where required to maintain designated fire rating of ceiling assembly.

H. Furring Channel Spacing: Furring channels at drywall ceilings shall be spaced at 16 inches on centers maximum.

3.03 GYPSUM BOARD INSTALLATION

A. Install gypsum board in accordance with ASTM C840, GA 201, GA 216 and Section 2511A California Building Code. Conform to DSA, IR M-4.

B. Erect single layer gypsum board vertically or horizontal on vertical framing, attached to studs and framing members with the specified fasteners spaced at 12 inches on centers at top and bottom and 12 inches on centers in the field. Solid backing not required at joints running perpendicular to studs and framing members.
1. In wood framing construction erect gypsum board panels horizontally only.

C. Erect single or double layer fire-rated gypsum board panels in accordance with Table 7-B, California Building Code, Note (a) and GA-600, for one-hour or two hour, fire-rated, non-bearing partitions, steel or wood stud construction.
1. Gypsum board panels installed vertically or horizontally to vertical studs or framing shall be attached at 8 inches on centers at vertical edges and 12 inches on centers in field and at top and bottom. Stagger vertical and horizontal joints 24 inches on centers each side and opposite sides. Where joints are not staggered required minimum 24 inches, solid backing shall be provided. All joints shall be treated except as provided herein.

D. Treat cut edges and holes in moisture-resistant gypsum board with sealant.

E. Place control joints consistent with lines of building spaces as indicated or at maximum of 30 ft on centers.

F. Place corner beads at external corners. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials.

G. Foil-backed gypsum board shall be applied on the inside of exterior walls.

H. Install reveal moldings according to manufacturer's recommendations.

3.04 JOINT TREATMENT

A. Exposed gypsum board in wall areas and ceiling areas shall be cemented, taped and sanded, ready for paint.

B. On installations where two layers of gypsum board are required, only the face layer will require finishing of joints and screwheads.

C. Gypsum wallboard joints in walls may either be exposed or covered with joint tape and joint compound for the portion of the wall above a suspended ceiling, which is part of a fire resistive floor-ceiling or roof-ceiling assembly, as listed in U.L. Fire Resistive Ratings (BXUV), when the following conditions are met:
   1. Vertical joints occur over framing members.
   2. Horizontal joints are staggered 24 inches on opposite sides or covered with 6 inch wide strips of gypsum board attached with 1-1/2 inch laminating screws at 8 inches on centers.
   3. Partition is two-ply system with joints staggered 16 inches or 24 inches.
   4. Partition is not part of a smoke or sound control system.

D. Fire-Rated Partitions: Perimeters of fire-rated partitions shall be caulked with fire-rated sealant as specified in Section 07840, both sides of partition.

E. Sound-Rated Partitions: Perimeters of sound-rated partitions shall be caulked with acoustical sealant as specified in Section 07900, both sides of partition.

F. Moisture-resistant gypsum board shall have all joints cemented, taped and sanded. Edges of moisture resistant faceboard that expose gypsum core shall be job taped before the board is installed.

G. Joints, except where excluded above including internal corners shall be filled and taped. Thin uniform layer of cement, approximately 3 inches wide, shall be applied over joint. Tape shall be cemented over joint and seated into cement, leaving sufficient adhesive under tape to provide proper bond. Internal angles, both horizontal and vertical, shall be reinforced and with tape folded to form straight and true angle. Metal external corners shall be cemented in place. Joints shall be allowed to dry at least 24 hours between each application of cement.

H. Gypsum board finish shall be to following levels as defined by GA-214:
   1. Plenum areas above ceilings - Level 1.
   2. Substrate for tile - Level 2.
   3. Areas receiving heavy textured paint - Level 3.
   4. Areas receiving vinyl wall covering or light textured flat paint - Level 4.

5. All Areas receiving non-textured, flat, egg-shell, gloss or semi-gloss paint - Level 5.
   a. Skim coat required for Level 5. A thin skim coat of joint compound, or a material manufactured especially for this purpose, shall be applied to the entire surface. The surface shall be smooth and free of tool marks and ridges.

3.05 CEMENTITIOUS BACKER BOARD INSTALLATION

A. Thin-Set Tile Application, Wet Areas: Install waterproof membrane behind cement board, seal all edges. Secure membrane to studs with tape or adhesive and immediately apply cement board or staple membrane to back of cement board with 1/2 inch crown, 3/8 inch leg galvanized staples. Extend membrane 2 inches to 3 inches beyond board edges and lap membrane at joints in shingle manner to prevent water penetration.
   1. Wet Areas as defined by Tile Council of America.

B. Pre-cut board to required sizes and make necessary cutouts. Stagger end joints in successive courses. Fasten boards to studs or furring channels with screws spaced 6 inches o.c. Prefill joints with tile-setting mortar and immediately embed tape and level all joints. Apply a 1/8 inch minimum thick skim coat of latex-fortified mortar uniformly over entire surface, apply ceramic tile per Section 09901.

3.06 CEMENTITIOUS BACKER BOARD INSTALLATION AT CEILINGS IN TOILET ROOM CEILINGS

A. In areas where cementitious panels are not scheduled to receive ceramic tile finish, including ceilings, apply 1/16 inch minimum thick, uniform layer of manufacturer's Portland-cement mortar containing dry latex polymers basecoat over entire surface, including taped joints, leaving surface smooth and flat. Allow to cure 24 hours. Trowel apply a 1/16 inch minimum thick uniform layer of manufacturer's acrylic coating exterior finish coat, fine texture, over all base-coated surfaces, in accordance with manufacturer's recommendations. Paint under Section 09901.

3.07 TOLERANCES

A. Maximum Variation from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09310

CERAMIC TILE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Ceramic tile floor using full setting bed application method. Walls and base at shower rooms in locker rooms using full setting bed application.

B. Ceramic tile wall and base at other locations using thinset application method.

C. Related Sections.
   1. Section 09260, Gypsum Board.

1.02 REFERENCES

A. ASTM A185 - Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.

B. ANSI/TCA A108.1 - Portland Cement Mortar.

C. ANSI/TCA A108.5 - Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.

D. ANSI/TCA A108.10 - Installation of Grout in Tile Work.

E. ANSI/TCA A118.1 - Dry-Set Portland Cement Mortar.

F. ANSI/TCA A118.3 - Chemical Resistant Water Cleanable Tile Setting and-Grouting Epoxy.

G. ANSI/TCA A118.4 - Latex-Portland Cement Mortar.

H. ANSI/TCA A118.6 - Ceramic Tile Grouts.

I. ANSI/TCA A118.7 – Polymer Modified Tile Grouts for Tile Installation.

J. ANSI/TCA A118.10 – Waterproof Membranes for Thin-set Ceramic Tile and Dimension Stone Installation.

K. ANSI/TCA A137.1 - Ceramic Tile.

L. ASTM C144 - Aggregate for Masonry Mortar.

M. ASTM C150 - Portland Cements.

N. ASTM C207 - Hydrated Lime for Masonry Purposes.

O. ASTM C373 - Water Absorption, Bulk Density, Apparent Porosity and Apparent Specific Gravity of Fired Whiteware Products.

P. ASTM C1028 - Static Coefficient of Friction.

Q. ASTM D1056 - Flexible Cellular Materials.

R. ASTM C171 - Sheet Materials for Curing Concrete.

S. TCA (Tile Council of America) - Handbook for Ceramic Tile Installation, 2001 Edition.

1.03 SUBMITTALS

A. Product Data: For each type of tile, bond coat, grout, and other products specified.

B. Shop Drawings: Include following:
   1. Tile patterns and locations.
   2. Widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

C. Samples for Verification: Of each item listed below, prepared on Samples of size and construction indicated. Where products involve normal color and texture variations, include Sample sets showing full range of variations expected.
   1. Each type and composition of tile and for each color and texture required, at least 12 inches square, mounted on braced cementitious backer units, and with grouted joints using product complying with specified requirements and approved for completed work in color or colors selected by Architect.
   2. Full-size units of each type of trim and accessory for each color required.
   3. Metal edge strips in 6-inch lengths.

D. Product Certificates: Signed by the manufacturer certifying that products furnished comply with requirements of Standard Grade.

E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names of architects and owners, and other information specified.

F. Tile Test Reports: Indicate and interpret test results for compliance of special-purpose tile with specified requirements.

G. Setting Material Test Reports: Indicate and interpret test results for compliance of tile-setting and -grouting products with specified requirements.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Engage experienced installer who has completed tile installations similar in material, design, and extent to that indicated for this Project and with record of successful in-service performance.

B. Source Limitations for Tile: Obtain each color, grade, finish, type, composition, and variety of tile from one source with resources to provide products from same production run for each contiguous area of consistent quality in appearance and physical properties without delaying Work.

C. Source Limitations for Setting and Grouting Materials: Obtain ingredients of uniform quality for each bond coat, and grout component from single manufacturer and each aggregate from one source or producer.

D. Mockups: Before installing tile, construct mockups for each form of construction and finish required to verify selections made under Sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with following requirements, using materials indicated for completed Work.
   1. Locate mockups in location and of size indicated or, if not indicated, as directed by Architect.
   2. Notify Architect 7 days in advance of dates and times when mockups will be constructed.
   3. Demonstrate proposed range of aesthetic effects and workmanship.
   4. Obtain Architect's approval of mockups before proceeding with final unit of Work.
   5. Maintain mockups during construction in undisturbed condition as standard for judging completed Work.
      a. When directed, demolish and remove mockups from Project site.

E. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1, General Requirements.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site only in cartons which have been grade sealed by manufacturer in accordance with ANSI A137.1 and with grade seals unbroken. Seconds grade seal quality not permitted.

B. Tiles delivered to job or installed in Work which do not fall within specified standards of quality or accepted color range shall be removed from jobsite and properly be replaced with acceptable material.

C. Store and protect products in dry, secure areas.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Do not install volatile materials in a closed, unventilated environment.

B. Maintain 50 degrees F or above during installation of adhesive and grout materials.

C. Shade work from direct sunlight during tile installation as needed to prevent rapid evaporation caused by excessive heat.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products of following manufacturers form basis for design and quality intended.
   1. DAL-Tile, Corona, CA.
   2. American Olean Tile, City of Industry, CA.

B. Or equal as approved in accordance with Division 1, General Requirements for Substitutions.

2.02 TILE

A. Porcelain Ceramic Mosaic Floor Tile: ANSI/TCA A137.1, conforming to following:

1.	Moisture Absorption:	0 to 0.5 percent, (impervious) ASTM C373
2.	Size:	2 x 2 x 1/4 inch
3.	Edge:	Semi-Cushioned
4.	Surface Finish:	Unglazed. For gang shower: Unglazed,1 by 1 inch
5.	Color and Pattern	Refer to Section 09050.
6.	Coefficient of Friction:	ASTM C1028; Minimum 0.6 Dry, 0.8 Wet.

B. Ceramic Wall Tile: ANSI/TCA A137.1, conforming to following:

1.	Moisture Absorption	As permitted by ANSI A137.1.
2.	Size	2 x 2 x 5/16 inch
3.	Edge	Semi-cushioned
4.	Surface Finish	Clear Glaze
5.	Color and Pattern:	Refer to Section 09050.

C. Base: Match wall tile for moisture absorption, surface finish and color; coved bottom.

D. Wainscot Cap: Match wall tile for moisture absorption, surface finish and color, bullnosed top edge.

2.03 BOND COAT

A. ANSI/TCA A118.1 - Dry-Set Portland Cement Mortar.

B. ANSI/TCA A118.4 - Latex Portland Cement Mortar.

2.04 SETTING BED MATERIALS

A. Portland Cement: ASTM C150, Type 1.

B. Lime: ASTM C207, Type S.

C. Sand: ASTM C144.

D. Water: Potable.

2.05 GROUT

A. Grout: ANSI/TCA A118.6, A118.7 – Factory-prepared cementitious type, dry polymer-modified. Un-sanded type for joints 1/8 inches or less and sanded type for joints 1/8 inches and greater. Color as selected by Architect.

B. Grout: Chemical resistant type, consisting of epoxy resin and hardener, ANSI/TCA A118.3, Laticrete, Latapoxy SP-100 Stainless Epoxy Grout and Vertical Grade for walls and floor base or equal in accordance with Division 1, General Requirements. Color as selected by Architect.

C. Grout Sealer (floors): Prosoco Inc., Stand Off SLX 100.

2.06 ACCESSORIES

A. Cleavage Membrane for Floors: NOBLESEAL TS, 30 mil thick, chlorinated polyethylene, manufactured by Noble Co., Grand Haven, MI, or equal as approved in accordance with Division 1, General Requirements for Substitutions.

B. Waterproof Membrane for Shower Receptors and Shower Areas: Membrane for Shower Areas under full mortar bed, Chloraloy CPE #240, 40 mil, thick, chlorinated polyethylene, manufactured by Noble Co, Grand Haven, MI, or equal as approved in accordance with Division 1, General Requirements for Substitutions.

C. Reinforcing Mesh: 2 x 2 inch size weave of 16 GA/16 GA wire size; welded fabric, galvanized, ASTM A185.

D. Metal Lath: 3.4 lbs per sy, galvanized, AQUA MESH B, by Western Metal Lath, La Mirada, CA, or equal as approved in accordance with Division 1, General Requirements for Substitutions, laminated to Grade B, Type 1, Kraft Paper.

E. Curing Paper: Kraft paper conforming to ASTM C171.

F. Walls: Ceramaseal, "Magic Seal" by Bostik, Middleton, MA.

G. Waterproofing Membrane at Vertical Surfaces: ASTM D4601, Type I asphalt saturated glass felt.

H. Edge Strips:
   1. Angle, L-shape, or T-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications.
   2. Acceptable manufacturer: Schluter Systems or approved equivalent.
   3. Product: Reno Series
   4. Material: Solid Brass

I. Cementitious Backer Units: Refer to Section 09260.

2.07 SETTING BED

A. Setting Bed Mix for Floors: One part portland cement, 6 parts damp sand, up to 1/10 part hydrated lime by volume.

B. Scratch and Leveling Coat For Walls: 1-part portland cement, 1/2-part hydrated lime, 4-parts dry sand or 5-parts damp sand, or 1-part portland cement, 3-parts dry sand or 4-parts damp sand, by volume.

C. Setting Bed Mix for Shower Receptors: One part portland cement and 4 parts damp sand by volume. Add waterproofing admixture.

D. Admixture: Mix in accordance with manufacturer's directions.

E. Consistency: When mixed with water, setting bed material shall be workable and allow maximum compaction during tamping.

F. Mixing: Thoroughly mix dry setting bed ingredients before adding water to obtain proper consistency. When machine mixing, add water first. Discard mix when it has reached its initial set.

2.08 EXPANSION JOINT MATERIALS

A. Joint Sealer: ASTM C920
   1. Vertical Joints: One part silicone sealant, non-sag, elongation movements 25/25 percent, Shore A, hardness range 20 -27, 860 Glaziers and Contractor Silicone Sealant
   2. Horizontal Joints: One part silicone, self-leveling, elongation movement 25/25 percent, Shore A, hardness 35, Urexpan NR-201, Traffic-Grade Polyurethane Sealant.
   3. Manufactured by Pecora Corp., Harleysville, PA, or approved equal in accordance with Division 1, General Requirements for substitutions.

B. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

C. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

D. Joint Backing: ASTM D1056; round, closed cell polyethylene foam rod; oversized 25 percent larger than joint width; DENVERFOAM or GREEN-ROD.

E. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application. Apply to bottom of joints that are too shallow to receive foam backer rod.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work. Verify types of materials which may have been in contact with surfaces.

B. Beginning of installation means installer accepts condition of existing substrate.

C. Verify Cementitious Backer Units have been installed per Section 09260 for thin set application on walls.

3.02 PREPARATION

A. Protect surrounding work from damage or disfiguration.

B. Vacuum clean existing substrate and damp clean.

C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

3.03 MIXING

A. Mixing: Mix dryset-portland cement bond coat or latex-portland cement bond coat in accordance with manufacturer's instructions.

B. Use brand of prepackaged dry mix specified by manufacturer.

C. Add dry bond coat mix to amount of latex specified by manufacturer and mix thoroughly to obtain complete and visually uniform wetting of dry bond coat mix. Slake for 15 minutes and remix before using.

D. Proper bond coat consistency is such that when applied with recommended notched trowel to backing, ridges formed in bond coat will not flow or slump.

E. During use, remix mortar occasionally. Additional water or fresh materials shall not be added after initial mixing. Mortar shall not be used after initial set.

3.04 INSTALLATION: SETTING BED AT FLOORS

A. Install setting bed in accordance with TCA Handbook for Ceramic Tile Installation.

B. Install cleavage or waterproof membrane, solvent welded at joints. Clamp membrane to drains. Extend membrane under expansion joints.
   1. At floor slabs on-grade; Do not install cleavage or waterproof membrane at shower receptors.

C. Place wire reinforcing and setting bed over cleavage or waterproof membrane. Lap reinforcing at least one full mesh and support so that reinforcing is approximately in middle of setting bed. Do not butt reinforcing against vertical surfaces.

D. Thickness of Setting Bed: Approximately 1-3/4 inches.
   1. Thickness of setting bed at shower receptors: High point shall be not less than 2 inches not more than 9 inches below top of finished dam and shall have a minimum of 1/4 inch per foot pitch toward drain.

E. Firmly tamp setting bed to levels required.

F. Allow setting bed to cure in accordance with ANSI/TCA A108.1.

3.05 INSTALLATION: THIN SET AT WALLS.

A. Install in accordance with TCA Handbook for Ceramic and ANSI A108.5 and A118.1. Tile Installation for thin-set application

B. At Wet Locations: install waterproof membrane, weld joints and upturn at wall 6 inches. Clamp membrane to drains at floors. Extend membrane under expansion joints.

   1. Bond membrane with manufacturer approved modified thin-set bond coat (acrylic latex portland mortar).

   2. At floor slabs on-grade; Do not install cleavage or waterproof membrane at shower receptors.

3.06 BOND COAT APPLICATION

A. Clean surface thoroughly. Dampen if very dry, but do not saturate.

B. Apply bond coat with flat side of trowel over an area no greater than covered with tile while bond coat remains plastic.

C. Within ten minutes before applying tile and using a notched trowel of type recommended by bond coat manufacturer, comb bond coat obtain even setting bed without scraping backing material.

D. Cover surface uniformly with no bare spot, with sufficient bond coat to ensure a minimum bond coat thickness of 3/32 inch between tile and backing after tile has been beaten into place. Tile shall not be applied to skinned-over bond coat.

3.07 INSTALLATION OF TILE

A. Refer to mortar and latex manufacturers directions.

B. Do not soak tile.

C. Set tile firmly on bond coat over setting bed or cementitious backerboard surfaces with minimum of 95 percent coverage at floors and wet areas. Back-butter ribbed tiles and other tiles in accordance with ANSI/TCA 108.5. Spacers on tile determine joint width between tile. Strings or pegs may be used to space tile that have no spacers. Bring all surfaces to a true plane at proper position or elevation. Thoroughly beat-in all tile with a beating block while bond coat is still plastic. Beating shall fill minimum of 95 percent of entire space between units and setting bed. Eighty percent coverage is permitted for walls in non-wet areas.

D. Lay tile to pattern indicated on Drawings or request tile pattern from Architect. Do not interrupt tile pattern through openings.

E. Place edge strips at exposed tile edges.

F. Cut and fit tile tight to penetrations through tile. Form corners and bases neatly. Align floor, base and wall joints where floor tiles and wall tiles are same width.

G. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight without voids, cracks, excess setting bed mix or excess grout. All inside corners shall be coved. No butted 90 degree intersections permitted. All outside corners shall be bull nose.

H. Sound tile after setting. Replace hollow sounding units.

I. Keep expansion or control joints free of setting bed mix or grout. Apply sealant to joints.

J. Allow tile to set for a minimum of 16 hours prior to grouting.

K. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

L. If tile is face-mounted, remove paper within one hour after tile is set and adjust all tiles that are out of line or level. Use no more water than necessary in removing paper.

3.08 INSTALLATION OF GROUT

A. Remove bond coat from face and edges of tile.

B. Mixing: Refer to manufacturer's directions.

C. Dry blend contents of an entire container of grout prior to mixing with water or latex.

D. Use caution to prevent scratching or damaging tile surfaces.

E. Dampen dry joints prior to grouting. Do not leave puddles of water in joints before grouting.

F. Force maximum amount of grout into joints. Cushion edge tile shall be finished evenly to depth of cushion. Square-edge tile shall be finished flush with surface. Finished joint shall be uniform in color, smooth and without pinholes, voids or low spots.

3.09 CURING

A. Damp-Cure grout for a minimum of 72 hours. Remove and replace improperly cured grout.
   1. Cover with 40-pound kraft paper.
   2. Polyethylene curing membrane not permitted.

3.010 GROUT SEALING

A. Floors: Apply grout sealer after curing, two coats required.

B. Verify that grout is dry, clean and properly cured. Ensure grout has been installed minimum of 10 days prior to sealing.

C. Apply undiluted sealer to grout joints in accordance with manufacturer's instructions and recommendations. Maintain abundance of sealer on joint until porosity has been satisfied.

D. Thoroughly remove excess material; allow to dry minimum 24 hours prior to use.

E. Remove excess sealer which has dried on tile surface.

F. Wall: Seal wall grout, 2 coats required, install per manufacturer's instructions.

3.011 EXPANSION JOINTS

A. Install joints maximum 12 feet oc each direction or as indicated. Install expansion joint over any cold joint or control joint.

B. Expansion joint shall penetrate full depth of setting bed.

C. Do not damage waterproofing membrane.

D. Install sealant in accordance with manufacturer's instructions, using hand pointing tools.

E. Measure joint dimensions and size materials to achieve required width/depth ratios. Minimum width: 3/8 inch.

F. Install joint backing to achieve a neck dimension no greater than 1/3 joint width. Concrete shall be fully cured.

G. Install bond breaker where joint backing is not used. Install removable masking material to maintain clean lines and protect adjoining surfaces.

H. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges. Do no install sealant on wet or damp surfaces.

I. Install sealant free of air pockets, foreign embedded matter, ridges and sags.

J. Tool joints concave, channel shaped or as detailed. Use slicking agent type recommended by manufacturer.

3.012 EDGE STRIP

A. Install according to manufacturer's recommended procedures.

3.013 CLEANING

A. Clean tile work and adjacent surfaces.

3.014 PROTECTION

A. Protect finished installation.

B. Do not permit traffic over finished floor surface.

3.015 REPLACEMENT OF MATERIALS

A. Provide three percent additional tile and trim shape of each type, color, pattern and size used in Work for Owner's use in replacement and maintenance. Package securely to prevent damage and label clearly.

END OF SECTION

SECTION 09511

ACOUSTICAL CEILINGS - LAY-IN

PART 1 GENERAL

1.01 WORK INCLUDED

A. Acoustical panels, lay-in.

1.02 RELATED SECTIONS

A. Section 09130 - Acoustical Suspension Systems.

1.03 REFERENCES

A. ASTM E84 - Surface Burning Characteristics of Building Materials.

B. ASTM E1264 - Acoustic Ceiling Products.

1.04 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacture of ceiling panels with five years minimum experience.

B. Installer: Company with three years minimum experience.

1.05 SUBMITTALS

A. Submit product data for acoustical panels.

B. Submit three samples illustrating material and finish of acoustic units.

C. Submit manufacturer's installation instructions.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Interior wet work shall be completed prior to installation of panels. Windows and doors shall be in place. HVAC systems shall be installed and operable where necessary to maintain a temperature range of 60 to 85 degrees F and maximum 70 percent relative humidity.

1.07 EXTRA STOCK

A. Provide extra quantity of acoustic units in the amount of one box of each type specified.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Products of the following manufacturers form the basis for design and quality intended.
   1. Armstrong World Industries, Fullerton, CA.
   2. USG Interiors, Chicago, IL.
   3. Celotex Corp., Tampa, Fl.

B. Or equal as approved in accordance with Division 1, General Requirements for substitutions.

2.02 MATERIALS

A. Acoustical Panels: Armstrong Fine Fissured
   1. Size: 24 x 48 inches
   2. Thickness: 5/8 inches
   3. Light Reflectance: 0.85
   4. NRC: 0.7
   5. Edge: Square edge.
   6. Surface color: Factory White.

B. Retention Clips: Armstrong #414 Retention Clip or equal. Panels weighing more than 1/2 pound per square foot other than acoustical tile is to be positively attached to the ceiling suspension runners.

2.03 FIRE CLASSIFICATION REQUIREMENTS

A. ASTM E84, all materials shall have a flame spread of less than 25 and a smoke density rating of less than 450.

PART 3 EXECUTION

3.01 INSPECTION

A. Verify that existing conditions are ready to receive work.

B. Verify that layout of hangers will not interfere with installation of acoustic units.

C. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION

A. Fit acoustic units in place, free from damaged edges or other defects detrimental to appearance and function.

B. Where square units are indicated, lay directional patterned units in basket weave pattern. Fit border neatly against abutting surfaces.

C. Install acoustic units level, in uniform plane, and free from twist, warp and dents. Replace damaged or soiled units.

D. Provide for complete accessibility for all units.

E. Install retention-panel clips at gypsum panel ceilings, and at panels weighing less than 1/2 lb. per square foot.

END OF SECTION

SECTION 09651

RESILIENT TILE FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resilient tile flooring.

1.02 REFERENCES

A. ASTM E648 and NFPA 253 - Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.

B. ASTM C1028 - Static Coefficient of Friction 0.5 min per ASTM D2047.

C. UBC Standard 8-1, Test Method for Surface Burning Characteristics for Building Materials.

1.03 FIRE CLASSIFICATION REQUIREMENTS

A. ASTM E648, NFPA 253: Class 1, Critical Radiant Flux Flame Spread Value: Minimum 0.45 watts per sq cm.

B. Flame spread not greater than 25 and smoke density not greater than 450 when tested in accordance with UBC Standard 8-1.

1.04 SUBMITTALS

A. Provide product data on specified products, describing physical and performance characteristics, sizes, patterns and colors available.

B. Submit three samples, 12 x 12 inches in size, illustrating color and pattern for each floor material specified.

C. Submit manufacturer's installation instructions.

D. Submit maintenance procedures and recommended maintenance materials, and suggested schedule for cleaning, stripping and re-waxing.

1.05 WARRANTY

A. Submit under provisions of Division 1, General Requirements.

B. Provide manufacturer's 5 year warranty against defects and wear-through.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Store materials for three days prior to installation in area of installation to achieve temperature stability.

B. Maintain minimum 70 degrees F temperature three days prior to, during and 24 hours after installation of materials.

C. Provide adequate ventilation to carry off volatile fumes.

1.07 EXTRA MATERIALS

A. Provide minimum three percent of all materials furnished for each color and size of materials installed.

PART 2 PRODUCTS

2.01 MANUFACTURERS - TILE FLOORING

A. Products of the following manufacturers form the basis for design and quality intended.
1. Azrock Commercial, San Antonio, TX.
2. Tarkett, Parsippany, NJ.
3. Armstrong Work Industries, Inc., Fullerton , CA.

B. Or equal as approved in accordance with Division 1, General Requirements for Substitutions.

2.02 TILE FLOORING MATERIALS

A. Azrock VC Tile V-873, 1/8 in thick, 12 x 12 inch size, homogeneous composition tile, pattern uniformly dispersed throughout thickness of material, color : Refer to Section 09050.
1. Required Static Load Limit: 75 psi.
2. Coefficient of Friction: ASTM C1028; Minimum .6.

B. Special Patterns as designed by Architect, refer to drawings.

2.03 MANUFACTURERS - REDUCER STRIPS AND ACCESSORIES

A. Products of the following manufacturers form the basis for design and quality intended.
1. Duramax Inc./Johnsonite, Chagrin Falls, OH.
2. The Roppe Co., Fostoria, OH.
3. Mercer Products Co., Inc., Orlando, FL.
4. The Flexco Co., Tuscumbia, AL.
5. AFCO Rubber Corp., North Canton, OH.

B. Or equal as approved in accordance with Division 1, General Requirements for Substitutions.

2.04 REDUCER STRIPS AND ACCESSORIES

A. Reducer Strip: 1/8 inch, vinyl RRS-A, B or C JOHNSONITE.

B. Butting Gage: EG Series, thickness on each side of strip to accommodate type of flooring material to be jointed.

2.05 FILLERS AND ADHESIVES

A. Subfloor Filler: Portland cement compound, Henry 345 "Milkless" Flooring Underlayment.

B. Adhesives: Waterproof; Tarkett FB-1 MULTI-PURPOSE ADHESIVE, in full compliance with California VOC Regulations.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are smooth and flat with maximum variation of 1/8 inch in 10 ft, and are ready to receive Work.

B. Prior to ordering flooring materials, contractor shall conduct calcium chloride "dome" test to verify that concrete floors are dry with maximum moisture vapor emissions of three lbs per 1000 sf in 24 hours, and exhibit negative alkalinity, carbonization or dusting. Apply moisture test in four (4) different areas of each floor location with at least on test for each 1,000 sf. of floor area.

C. Ordering of flooring materials and beginning of installation means acceptance of existing substrate and site conditions.

3.02 PREPARATION

A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with subfloor filler.

B. Apply, trowel and float filler to leave a smooth, flat, hard surface, free of bumps or depressions of any size.

C. Prohibit traffic from area until filler is cured.

D. Vacuum clean substrate.

E. Apply primer as recommended by the materials manufacturer.

3.03 INSTALLATION - TILE MATERIAL

A. Install in accordance with manufacturers' instructions.

B. Mix tile from container to ensure shade variations are consistent.

C. Spread only enough adhesive to permit installation of materials before initial set.

D. Set flooring in place, press with heavy roller to attain full adhesion.

E. Lay flooring with joints parallel to building lines.

F. Install tile to square grid pattern with all joints aligned, with pattern grain alternating with adjacent unit to produce basket weave pattern. Allow minimum 1/2 full size tile width at room or area perimeter, where possible.

G. Terminate flooring at centerline of door at door openings where adjacent floor finish is dissimilar.

H. Install edge strips at unprotected or exposed edges, and where flooring terminates.

I. Scribe flooring to walls, columns, cabinets, floor outlets and other appurtenances to produce tight joints.

J. Install flooring under movable partitions and under open cabinets without interrupting floor pattern.

K. Install edge strips where flooring does not terminate at walls and where indicated. Fit joints tightly.

L. Install wall base per Section 09653.

3.04 PROTECTION

A. Prohibit traffic on floor finish for 48 hours after installation.

3.05 CLEANING

A. Remove excess adhesive from floor, base and wall surfaces without damage.

B. Protection: Cover work with a heavy non-asphaltic non-staining type building paper where subsequent building operations occur. Protect work until completion. Repair or make good any damage to this work and other materials damaged during installation of flooring.

END OF SECTION

SECTION 09653

TOP-SET RESILIENT BASE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resilient base.

1.02 REFERENCES

A. ASTM E648 and NFPA 253 - Critical Radiant Flux of Floor Covering Systems.

B. UBC Standard No. 8-1.

C. FS-SS-W40a - Wall Base, Rubber and Vinyl Plastic.

1.03 FIRE CLASSIFICATION REQUIREMENTS

A. ASTM E648, NFPA 253: Class 1, Critical Radiant Flux Flame Spread Value: minimum 0.45 watts per sq cm.

B. UBC Standard No. 8-1, smoke density less than 450.

1.04 SUBMITTALS

A. Submit product data on specified products and colors available.

B. Submit three 6 inch long samples of base material for each color selected.

C. Submit manufacturer's installation instructions.

D. Submit maintenance procedures and recommended maintenance materials.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Store materials for three days prior to installation in area of installation to achieve temperature stability.

B. Maintain minimum 70 degrees F temperature three days prior to, during and 24 hours after installation of materials.

C. Provide adequate ventilation to carry off volatile fumes.

1.06 REPLACEMENT MATERIALS

A. Provide minimum three percent of all materials furnished for each color and size of materials installed.

PART 2 PRODUCTS

2.01 MANUFACTURERS, RUBBER

A. Burke Flooring Products, City of Commerce, CA.

B. Johnsonite Chagrin Falls, OH.

C. Nora Flooring Systems, Lawrence, MA.

D. Endura Co., Waltham, MA..

E. Musson Rubber Co., Akron, OH.

F. Roppe Corp., Fostoria, OH.

G. Or equal as approved in accordance with Division 1, General Requirements for substitutions.

2.02 BASE MATERIALS

A. Base: Rubber, 1/8 inch gage, standard toe, 4 inches high.
   1. Color: Refer to Section 09050.

B. Base material shall meet FS-SS-W-40a Type I for rubber.

C. Base Accessories: Premolded end stops, internal and external corners of same material, size and color as base.

D. Adhesive: As recommended by the manufacturer and if full compliance with the California VOC regulations.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are smooth and flat with maximum variation of 1/8 inch in 10 ft and are ready to receive Work.

B. Verify that surfaces are finished, ready to receive base installation.

C. Beginning of installation means acceptance of existing substrate and site conditions.

3.02 INSTALLATION - BASE MATERIAL

A. Fit joints tight and vertical. Maintain minimum measurement of 18 inches between joints.

B. At all 90 degree external corners use premolded units only. At corners more or less than 90 degrees, shave a vertical strip down the back side of the material, 1/4 inch wide and not more than 1/2 the thickness at the point of bend. Bend coved toe to required angle. Bond material firmly to wall on both sides of joint to ensure a tight fit with no open void at top.

C. At 90 degree internal corners use premolded units or as an alternate, miter material to exact angle.

D. Install base on solid backing. Bond tight to wall and floor surfaces.

E. Scribe and fit to door frames and other interruptions.

3.03 CLEANING

A. Remove excess adhesive from floor, base and wall surfaces without damage.

B. Protection: Protect work until completion. Repair or make good any damage to this work and other materials damaged during installation of base material.

3.04 SCHEDULE

A. Install at all walls not specified to receive integral base and as scheduled in the finish schedule.

B. Install all rubber bases at all cabinet bases.

END OF SECTION

SECTION 09680

SHEET CARPET

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Broadloom carpeting, glue-down.

B. Accessories

1.02 REFERENCES

A. ASTM E648 and NFPA 253 - Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.

1.03 FIRE CLASSIFICATION REQUIREMENTS

A. ASTM E648, NFPA 253: Class I, Heat Flux Minimum 0.45 watts per sq cm., Smoke Developed: Less than 450.

1.04 SUBMITTALS

A. Submit shop drawings showing seaming plan, method of joining seams and direction of carpet based on field measurements.

B. Submit product data on specified products, describing physical and performance characteristics; sizes, patterns, colors available and method of installation.

C. Submit three samples 12 x 12 inch in size illustrating color and pattern for each carpet material specified.

D. Submit manufacturer's installation instructions.

1.05 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance.

B. Include maintenance procedures, recommended maintenance materials and suggested schedule for cleaning and shampooing.

1.06 QUALITY ASSURANCE

A. Manufacturer: Company specializing in carpet with ten years minimum experience.

B. Installer: Company with three years minimum experience, certified when required by the manufacturer.

C. Regulatory Requirements: Carpet shall have level loop, textured loop, or level-cut/uncut pile texture and maximum pile height of 1/2 inch according to CBC Section 1124B.3.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Store materials in sufficient time prior to installation in area of installation to achieve temperature stability.

B. Maintain minimum 70 degrees F ambient temperature three days prior to, during and 24 hours after installation of materials.

1.08 EXTRA MATERIALS

A. Provide an average of 3 percent in usable size of carpeting of each color specified, not less than 12 inches long by roll width.

1.09 GUARANTEE

A. Provide manufacturers lifetime of Carpet, 10 percent excess wear guarantee, 5 year limited performance guarantee with no edge ravel or delamination.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Bigelow Commercial, Kennesaw, Georgia.

2.02 MATERIALS - CARPET

A. Carpet: Manufactured by Bigelow Commercial
   1. Style: Fairfield II (Style W), Conforming to following criteria:
      a. Construction: Loop Graphic
      b. Pile Fiber: 100% Chromell Nylon
      c. Gauge: 1/10
      d. Stitches Per Inch: 8.3
      e. Pile Height (Tufted): .156 inch.
      f. Average Pile thickness: .111
      g. Yarn Weight (Tufted): 28 oz/sq. yard
      h. Dye Method: Solution Dyed
      i. Density: 9081
      j. Weight Density: 254,270
      k. Width: 12' (3.66m)
      l. Primary Back; Woven Polypropylene
      m. Secondary Back: ActionBac or Euroflex
      n. Approx. Total Weight: 63 oz/sq. yd.
      o. Pattern Repeat: 5/16" W x ¼" L
      p. Performance: Lift Swatch for Information
      q. Warranties: Lift Swatch for Information
   2. Color: Refer to Section 09050.

2.03 MANUFACTURERS - REDUCER STRIPS AND ACCESSORIES

A. Products of the following manufacturers form the basis for design and quality intended.
   1. Duramax Inc./Johnsonite, Chagrin Falls, OH.
   2. The Roppe Co., Fostoria, OH.
   3. Mercer Products Co., Inc. Orlando, FL.
   4. The Flexco Co., Tuscumbia, AL.
   5. AFCO Rubber Corp., North Canton, OH.

B. Or equal as approved in accordance with Division 1, General Requirements for substitutions.

2.04 REDUCER STRIPS AND ACCESSORIES

A. 1/4 inch carpet to 1/8 inch resilient flooring adapter: CTA-A.

B. 1/4 inch carpet to 3/16 inch resilient flooring adapter: CTA-B.

C. 3/16 inch carpet butting gauge: EG-F.

D. 1/4 inch carpet butting gauge: EG-E.

E. Carpet edge guards shall comply with CBC Section 1124B.2.

2.05 FILLER AND ADHESIVE

A. Subfloor Filler: Latex based underlayment acceptable to the manufacturer.

B. Primers and Adhesives: 600 adhesive or Type recommended by Carpet Manufacturer, and in full compliance with California VOC regulations.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are smooth and flat with maximum variation of 1/8 inch in 10 ft, and are ready to receive Work.

B. Prior to ordering flooring materials, contractor shall conduct calcium chloride "dome" test to verify that concrete floors are dry with maximum moisture vapor emissions of three lbs per 1000 sf in 24 hours, and exhibit negative alkalinity, carbonization or dusting. Apply moisture test in four (4) different areas of each floor location with at least one test for each 1,000 sf. of floor area.

C. Ordering of flooring materials and beginning of installation means acceptance of existing substrate and site conditions.

3.02 PREPARATION

A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with subfloor filler.

B. Apply, trowel and float filler to leave a smooth, flat, hard surface, free of bumps or depressions of any size.
   1. Trowel: Proper notch: 1/8 inch.

C. Prohibit traffic from area until filler is cured.

D. Vacuum clean substrate.

E. Apply primer as recommended by the materials manufacturer.

3.03 INSTALLATION - GLUE DOWN

A. Apply carpet and adhesive in accordance with manufacturers' instructions.

B. Lay out rolls of carpet for approval.

C. Verify carpet match before cutting to ensure minimal variation between dye lots.

D. Double cut carpet to allow intended seam and pattern match. Make cuts straight, true and unfrayed. Edge seam carpet where required to prevent fraying.

E. Provide carpet with least number of seams possible for each room. Locate seams in area of least traffic. Install seams in corridors perpendicular to line of traffic.

F. Fit seams straight, not crowded or peaked, free of gaps.

G. Lay carpet on floors with run of pile in same direction as anticipated traffic.

H. Do not change run of pile in any room where carpet is continuous through a wall opening into another room. Locate change of color or pattern between rooms under door centerline.

I. Cut and fit carpet around interruptions. Extend carpets into cabinets which do not contain bottoms.

J. Fit carpet tight to intersection with vertical surfaces without gaps.

K. Install edge guards in lengths as long as possible. Firmly adhere to surfaces with adhesive recommended by the manufacturer.

L. Install in accordance with CBC Section 1124B.3.

3.04 CLEANING

A. Remove excessive adhesive from floor, base and wall surfaces without damage.

B. Clean and vacuum carpet surfaces.

3.05 PROTECTION

A. Prohibit traffic from carpet areas for 24 hours after installation.

END OF SECTION

SECTION 09900

PAINTING

PART 1 GENERAL

1.01 WORK INCLUDED

A. Surface preparation.

B. Prime coat application.

C. Finish coat application.

D. Upon completion of work under this contract, all surfaces within the contract limits and within vision, shall have a painters finish on the interior and exterior except excluded items defined herein. Include all roof mounted mechanical and electrical equipment factory primed or factory finished and in full view.

E. Painting of existing surfaces where indicated on Drawings.

1.02 WORK NOT INCLUDED

A. Surfaces Not To Be Painted:
   1. Prefinished wall, ceiling and floor coverings.
   2. Items with factory-applied final finish except roof-mounted equipment as defined above.
   3. Concealed ducts, pipes and conduit.
   4. Glass, plastic laminate, ceramic tile, anodized aluminum.
   5. Steel items embedded in concrete.
   6. Surfaces specifically scheduled or noted on the drawings not be painted.
   7. Fire-Rated Labels on Doors or Frames.

1.03 REFERENCES

A. AQMD- Air Quality Management District, Local Regulations.

B. ASTM D4442 - Direct Moisture Content Measurement of Wood and Wood-Base Materials.

C. ASTM D4444 - Use and Calibration of Hand-Held Moisture Meters.

1.04 QUALITY ASSURANCE

A. Product Manufacturer: Company specializing in manufacturing quality paint and finish products with ten years experience.

B. Applicator: Company specializing in commercial painting and finishing with five years experience.

1.05 REGULATORY REQUIREMENTS

A. Conform to AQMD, Local Regulations, copies of document are available at Architect's office.

B. Comply with applicable codes and regulations of governmental agencies having jurisdiction including those having jurisdiction over airborne emissions and industrial waste disposal. Where those requirements conflict with this Specification, comply with the more stringent provisions.

1.06 SUBMITTALS

A. Provide product data on all finishing products.

B. Submit three samples 8-1/2 inch x 11 inch in size illustrating range of colors and textures available for each surface finishing product scheduled for selection.

C. Prepare wood samples on type and quality of wood specified.

D. Submit manufacturer's application instructions.

1.07 FIELD SAMPLES

A. Provide field sample panel, illustrating coating color, texture and finish for each color scheduled.

B. Locate as approved by Architect.

C. Approved sample may remain as part of the Work.

D. Do not proceed with coating application until sample panel has been approved.

1.08 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site in sealed and labeled containers.

B. Container labeling to include manufacturer's name, type of paint, brand name, brand code, coverage, surface preparation, drying time, cleanup, color designation and instructions for mixing and reducing.

C. Store paint materials at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in well ventilated area unless permitted otherwise by manufacturer's instructions.

D. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.09 ENVIRONMENTAL REQUIREMENTS

A. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 45 degrees F for 24 hours before, during and 48 hours after application of finishes, unless permitted otherwise by manufacturer's instructions.

B. Do not apply exterior coatings during rain, or when relative humidity is above 50 percent, unless permitted otherwise by manufacturer's instructions.

C. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

D. Minimum Application Temperature for Varnish and transparent Finishes: 65 degrees F for interior or exterior, unless permitted otherwise by manufacturer's instructions.

E. Provide lighting level sufficient to conduct painting operations.

1.10 EXTRA STOCK

A. Provide an extra stock equaling 10 percent of each color, type and gloss of paint used on the Work, but not more than five gallons for each.

B. Label each container with color, texture and room locations in addition to the manufacturer's label.

1.11 GUARANTEE

A. Guarantee the painting work against peeling, fading, cracking, blistering or crazing for a period of two years from the Date of Certified Completion for painting of new surfaces and existing surfaces.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Products of the following manufacturers form the basis for design and quality intended.
   1. Dunn-Edwards Corporation, Los Angeles, CA.
   2. ICI Paints, North America, Los Angeles, CA.
   3. Vista Paints, Fullerton, CA.
   4. Spectra-Tone.

2.02 MATERIALS

A. Coatings: Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.

B. Colors and Glosses: The Architect will select color and hue to be used in the various types of paint specified and will be the sole judge of acceptability of the various glosses obtained from the materials proposed to be used in the Work. During actual painting, the Architect may make minor modifications in tone and shade to adjust for actual surface and lighting conditions encountered.
   1. Colors: Refer to Section 09050.

C. Undercoats and Thinners: Provide undercoat paint produced by the same manufacturer as the finish coat. Use only the thinners recommended by the paint manufacturer and use only to the recommended limits. Insofar as practicable, use undercoat, finish coat and thinner material as parts of a unified system of paint finish.

D. Coatings: Good flow and brushing properties; capable of drying or curing free of streaks or sags.

E. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified of commercial quality.

2.03 APPLICATION EQUIPMENT

A. For application of the approved paint, use only such equipment as is recommended by the manufacturer.

B. Compatibility: Prior to actual use of application equipment, use all means necessary to verify that the proposed equipment is actually compatible with the material to be applied and that the integrity of the finish will not be jeopardized by use of the proposed application equipment.

2.04 FINISHES

A. Refer to schedule at end of Section for surface finish. Notwithstanding product numbers listed in schedule, Contractor shall conform to most recent product numbers as published by the manufacturer.

PART 3 EXECUTION

3.01 INSPECTION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. Measure moisture content of new surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Plaster and Gypsum Wallboard: 12 percent.
   2. Masonry, Concrete and Concrete Unit Masonry: 12 Percent.

3. Interior Located Wood: 15 percent, measured in accordance with ASTM D4442 and ASTM D4444.
4. Exterior Located Wood: 19 percent, measured in accordance with ASTM D4442 and ASTM D4444.

D. Beginning of installation means acceptance of existing surfaces.

3.02 MATERIALS PREPARATION

A. Mix and prepare painting material in accordance with manufacturer's recommendations.

B. Store materials not in actual use in tightly covered containers.

C. Maintain containers used in storage, mixing and application of paint in a clean condition, free from foreign materials and residue.

D. Stir all materials before application to produce a mixture of uniform density and as required during the application of materials. Do not stir into the material any film which may form on the surface. Remove the film and strain the material before using.

3.03 SURFACE PREPARATION

A. Remove electrical plates, hardware, light fixture trim and fittings prior to preparing surfaces or finishing.

B. Correct minor defects and clean surfaces which affect work of this Section.

C. Shellac and seal marks which may bleed through surface finishes.

D. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

E. Insulated Coverings: Remove dirt, grease and oil from canvas and cotton.

F. Gypsum Board Surfaces: Fill minor defects, joints and nail head depressions with spackling compounds. Prime in accordance with primer manufacturer's recommendations.

G. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer as specified in schedule for existing painted surfaces, remove existing paint thoroughly to bear metal and paint per 3.09 or 3.10.

H. Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish: Remove dirt, loose mortar, scale, salt or alkali powder and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering or corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.

I. Plaster Surfaces: Fill hairline cracks, small holes and imperfections with patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

J. Uncoated Steel and Iron Surfaces: Remove grease, scale, dirt and rust. Where heavy coatings of scale are evident, remove by wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts and nuts are similarly cleaned. Prime paint after repairs with Series P10-99 modified alkyd, red color, air dried, by Tnemec or as approved in accordance with Division 1, General Requirements for substitutions.

K. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Spot prime bare steel surfaces to match existing primer.

L. Wood Scheduled to Receive Paint Finish: Remove dust, grit and foreign matter. Seal knots, pitch streaks and sappy sections. Fill nail holes with tinted exterior caulking compound after prime coat has been applied.

M. Wood Doors and Cabinet Work scheduled for field-applied transparent or solid stain finish:
   1. Sand surfaces thoroughly with a 5/0, 180 grit sandpaper.
   2. Apply coatings as specified in the schedule to all surfaces, sides and edges. Avoid streaking or uneven application.

N. Wood Doors Scheduled for Painting: Seal top and bottom edges with primer. Leave labels intact and readable.

3.04 APPLICATION

A. Apply products in accordance with manufacturer's instructions.

B. Do not apply finishes to surfaces that are not dry.

C. Apply each coat to uniform finish. Number of coats specified is a minimum. Additional coats shall be applied at no extra cost, if coatings show evidence of uneven application, uneven pigmentation, brush strokes or otherwise unsatisfactory distribution of material.

D. Under coats shall be lighter and brighter in tint than finish coat.

E. Sand lightly between coats to achieve required finish.

F. Allow applied coat to dry before next coat is applied.

G. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

H. Prime back surfaces of interior and exterior woodwork with primer paint.

I. Prime back surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with mineral spirits.

J. Seal Tops, bottoms and cutouts for hardware and accessories of wood or plastic laminate covered doors.

K. Split paint door frames to match color of walls on each side of opening.

L. 10 percent of walls to receive accent paint.

3.05 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

A. Refer to Section Divisions 15 and 16 for color coding and identification banding requirements of equipment, ductwork, piping and conduit.

B. Paint shop primed equipment.

C. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

D. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are prefinished.

E. Replace identification markings on mechanical or electrical equipment when painted accidentally.

F. Paint interior surfaces of air ducts that are visible through grilles and louvers with one coat of flat black paint, to limit of sight line. Paint dampers exposed behind louvers and grilles to match face panels.

G. Paint exposed conduit and electrical equipment occurring in finished areas.

H. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.

I. Color code equipment, piping, conduit and exposed ductwork in accordance with requirements indicated. Color band and identify with flow arrows names and numbering, using stencils or other approved systems.

J. Replace electrical plates, hardware, light fixture trim and fittings removed prior to finishing.

K. Exterior and interior walls to receive 10% accent paint.

L. Exterior fascia, trims, reveals, and ornamental fences and gates to receive accent paint colors different from field paint color.

3.06 CLEANING

A. As Work proceeds, promptly remove paint where spilled, splashed, or spattered.

B. During progress of Work maintain premises free of unnecessary accumulation of tools, equipment, surplus materials and debris.

C. Collect cotton waste, cloths, and material which may constitute a fire hazard, place in closed metal containers and remove daily from site.

3.07 SCHEDULE - EXTERIOR SURFACES

	Vista	Frazee	Dunn-Edwards	ICI
A. Wood - Semi-Gloss - Acrylic				
1. One Coat	4200II	372	42-9	
2. Two Coats	8400	124	W901	
B. Wood - Stain - Transparent - Acrylic				
1. Two Coats	Olympic Transparent	ZAR	OKON	
C. Wood - Stain - Solid - Acrylic				
1. Two Coats	3000	203	W703	
D. Wood - Clear - Spar Varnish				
1. Three Coats	McCloskey Man O War Spar Marine	948	V101	
E. Concrete - Low Sheen - Acrylic				
1. One Coat	4600II	266	W709	
2. Two Coats	8000	126	W705	
F. Concrete Block - Low Sheen - Acrylic				
1. One Coat	040	262	W305	
2. Two Coats	8000	126	W705	
G. Ferrous - Semi Gloss - Acrylic				
1. One Coat	4510	661	43-5	
2. One Coat	4500	381	42-1	
3. One Coat	8400	124	W901	
H. Ferrous - Factory Primed: Touch-up primer coat in lieu of full primer coat. Finish coats as specified above.				
I. Galvanized and Aluminum - Gloss - Alkyd				
1. One Coat	999 (1 coat)	JASCO	QD43-7	
2. One Coat	Not Req.	661	43-7	
3. One Coat	9000	648	10	
4. One Coat	9000	648	10	
J. Cement Plaster (Stucco) - Flat - Acrylic				
1. One Coat	4600II	266	W709	
2. Two Coats	2000	203	W701	

3.08 SCHEDULE: INTERIOR SURFACES

	Vista	Frazee	Dunn-Edwards	ICI
A. Wood - Semi Gloss - Acrylic				
1. One Coat	188	367	W707	
2. Two Coats	8400	128	W901X	
B. Wood - Stain - Transparent, Non-Yellowing - Semi Gloss - Lacquer				
1. One Coat	VS 200 Series	ZAR	EV108	
2. One Coat	MS 330	765	LQ131	
3. Two Coats	LC 1360	728	LQ133	
C. Concrete, Plaster, Masonry - Eggshell - Acrylic				
1. One Coat	6000	065	W709	
2. Two Coats	6300	022	W440	
D. Gypsum Board - Semi Gloss - Acrylic				
1. One Coat	1100	067	W101	
2. One Coat	8400	061	W420	
3. Two Coats	8400	021	W901	
E. Ferrous - Semi Gloss - Acrylic				
1. One Coat	4510	661	43-5	
2. One Coat	4500	367	E22-1	
3. One Coat	8400	128	W901	

F. Ferrous - Factory Prime: Touch-up primer coat in lieu of full primer coat. Finish coats as specified above.

G. Galvanized and Aluminum - Semi Gloss - Acrylic			
1. One Coat	4500	JASCO	GE123
2. One Coat	4500	661	QD43-7
3. One Coat	8400	128	W901
4. One Coat	8400	128	W901

3.09 SPECIAL COATINGS

A. Exterior metal handrails, guardrails, bollards, ornamental metal fences and gates and exterior stairs, total 5.5 to 8.5 mil thickness, as recommended by the manufacturer:

	Ameron	Tnemec	Sherwin Williams
1. Unprimed or shop primed - Ferrous - Semi Gloss - Polyurethane			
a. One Coat	Amercoat 385	50-330	B67
b. One Coat	Amershield S/G	75	B65-200
2. Galvanized or Aluminum - Semi Gloss - Polyurethane			
a. One Coat	Amerlock 400	P-66	B67
b. One Coat	Amershield S/G	75	B65-200

3. All Exterior Metal: Preparation in accordance with SSPC-3.
4. Solvent wash and etch galvanized, solvent wash aluminum.
   a. Alternate to above, One Coat Ameron PSX 700 at 5 mils DFT (No Known Equal).

END OF SECTION

SECTION 10115

MARKERBOARDS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Markerboard

B. Trim, chalkrail and accessories.

1.02 REFERENCES

A. ANSI A208.1 - Mat Formed Wood Particleboard.

B. ASTM A526 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.

C. ASTM B209 - Aluminum-Alloy Sheet and Plate.

D. ASTM B221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.

E. PEI - Porcelain Enamel Institute - Performance Specifications for Porcelain Enamel Chalkboards.

F. ASTM A424 - Sheet Steel for Porcelain Enameling.

G. ANSI A135.4 - Basic Hardboard.

1.03 SUBMITTALS

A. Shop drawings indicating, wall elevations, dimensions and joint locations between panels.

B. Provide product data on trim and accessories.

C. Three samples illustrating materials and finish, color and texture of markerboard.

D. Include maintenance information on regular cleaning, stain removal and removal of damaged components.

1.04 WARRANTY

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

B. Markerboard Warranty: Submit written warranty executed by manufacturer agreeing to replace markerboards that do not retain their original writing and erasing qualities, become slick and shiny, or exhibit crazing, cracking, or flaking within specified warranty period, provided manufacturer's written instructions for handling, installation, protection, and maintenance have been followed.

C. Warranty Period: Life of building.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products of following manufacturers form basis for design and quality intended.
   1. ABC School Equipment, Inc., Corona, CA.
   2. Tri-Best Visual Display Products, Rancho Cucamonga, CA.

B. Or equal as approved in accordance with Division 1, General Requirements for Substitutions.

2.02 MATERIALS

A. Sheet Steel: ASTM A424, minimum 28 gage. 16 by 5 feet panel size: without joints.

B. Sheet Steel: ASTM A526, galvanized to G60 designation.

C. Aluminum Sheet: ASTM B209, 6063 alloy, T52 temper.

D. Aluminum Extrusions: ASTM B221, 6061 alloy, temper.

E. Particle Board: ANSI A208.1; wood chips or shavings set with waterproof resin binder, sanded faces.

F. Adhesives: Type recommended by manufacturer. Waterproof type.

G. Hardboard: ANSI A135.4, tempered, smooth.

2.03 ACCESSORIES

A. Map Supports: Formed aluminum roller brackets, sliding type to fit map rail.

B. Provide instructions for markerboard cleaning on metal plate attached to perimeter frame near chalkrail.

C. Manufacturer's standard support clip, hangers, and accessories for markerboards to function properly.

2.04 FABRICATION - MARKERBOARDS

A. Outer Face Sheet: ASTM A424, steel, 28 gage thick, with vitreous porcelain enamel finish. P3 ceramic steel or approved equal.

B. Core: ANSI A208.1, particle board; 1/2 inch thick or ANSI A135.4 hardboard (2 layers).

C. Backing Surface: ASTM B209, aluminum sheet, 0.015 inch thick, or ASTM A526, 26 gage galvanized steel.

D. Sizes: Refer to Drawings for sizes, locations and quantities.

E. Frame: aluminum frame.

2.05 FRAME AND TRIM

A. Frame: Extruded aluminum, AX Series, except with galvanized steel or aluminum backing, concealed fasteners:
   1. Display Rail: 1 inch with cork insert, full length of markerboard.
   2. Head and Side Trims: C-18 Aluminum.
   3. Mullion Trim: Butt joints.

B. Chalkrail: Extruded aluminum, manufacturer's standard profile; one piece, full length of markerboard; attached end closures; concealed fasteners.

C. Provide two map supports and two roller brackets for each markerboard unit. One flag holder per room.

2.06 FINISHES

A. Porcelain Enamel: Glass fired enamel in accordance with PEI Type A. Color Light Gray (P-3) (#6101 L.).

B. Aluminum Frame and Accessories: Anodized to clear natural finish.

PART 3 - EXECUTION

3.01 INSPECTION

A. Verify that surfaces and internal wall blocking are ready to receive Work and dimensions are as indicated on shop drawings.

B. Beginning of installation means acceptance of substrate construction.

3.02 INSTALLATION

A. Install markerboards in accordance with manufacturer's instructions.

B. Establish bottom of frame perimeter at 24 inches for Kindergarten (26 inches 1st to 3rd Grades), (30 inches 4th to 6th Grade) (34 inches 7th to 9th Grades) (37 inches 10th Grade and higher) above finished floor or as approved by Architect.

C. Secure units level and plumb.

D. Where markerboard adjoins tackboard or chalkboard, join panels with batten joint.

E. NO holes in markerboard permitted.

3.03 CLEANING

A. Clean markerboard surfaces and aluminum in accordance with manufacturer's instructions.

B. Cover markerboard surfaces with protective cover, taped to frame.

C. Remove protective cover at Date of Notice of Completion.

END OF SECTION

SECTION 10165

TOILET COMPARTMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Solid Plastic (HPDE) Toilet Compartments.

B. Overhead Braced enclosures.

C. Urinal screens.

D. Attachment hardware.

1.02 REFERENCES

A. CAS/CAR - California Accessibility Statutes and California Accessibility Regulations, January 2003 and 2001 CBC.

B. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.

C. Chapter 8, UBC.

D. ASTM A 666 - Annealed or Cold-Worked Austentic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

E. ASTM B221 - Aluminum Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components, hardware, and profiles, and finishes.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
   1. Show locations of cutouts for compartment-mounted toilet accessories.
   2. Show locations of reinforcements for compartment-mounted grab bars.

C. Samples for Verification: Of each type of color and finish required for units, prepared on 6-inch square Samples of same thickness and material indicated for Work.
   1. Three samples illustrating panel colors and patterns.
   2. Sample of each type of hardware.

D. Manufacturer's installation instructions.

1.04 REGULATORY REQUIREMENTS

A. Conform to CAS/CAR for provisions for physically disabled.

1.05 FIELD MEASUREMENTS

A. Verify field measurements are as indicated on shop drawings.

PART 2 - PRODUCTS

2.01 SOLID PLASTIC (HPDE) UNITS

A. Manufacturers
   1. Products of following manufacturers form basis for design and quality intended.
      a. Santana Products, Inc., Scranton, PA.
   2. Or equal as approved in accordance with Division 1, General Requirements for substitutions.

B. Materials
   1. Solid Plastic (HPDE): Homogeneous color throughout, scratch resistant, manufacturer's standard surface finish.
   2. Stainless Steel: ASTM A 666; Type 304.
   3. Aluminum: ASTM B221, 6453-T5 Alloy.

C. Components
   1. Hardware: Continuous hinges, stainless steel, through-bolted to doors and pilasters with one-way sex bolts, cam-action.
   2. Door Strike and Keeper: Anodized extruded aluminum with wrap-around flanges. Bumper: Vinyl.
   3. Latch: Anodized extruded aluminum, with housing, slide bolt and button. Latch at accessible compartments shall be sliding type only.
   4. Accessories: Coat hook/bumper, door pull and wall stop.
   5. Pilaster Shoes: Minimum 3 inches high, 20 gage, Type 304 stainless steel with polished or satin finish.
   6. Wall Brackets: Continuous, stirrup type anodized extruded aluminum.
   7. Headrail: Anti-grip anodized extruded aluminum with stainless steel bracket.
   8. Wall Bumper: Stainless Steel wall bumper with rubber tip at outswing doors.
   9. Heat-Sinc Strips: Provide Aluminum heat-sinc strips under all partitions, manufacturer's standard product. Fasten to the bottom of partitions with anti-theft stainless steel screws.
   10. Door Handles at Accessible Compartments: Provide loop or U-shaped handle immediately below latch both faces on both sides of doors.

D. Fabrication
   1. Fabricate partitions by assembling from single sheet of solid plastic, with rounded and polished edges.
   2. Thickness of Doors, Panels and Pilasters: 1 inch.
   3. Clear Width of doors (when opened at 90-degree) at compartments for disabled: 34 inches for side entry. 32 inches for front entry.
   4. Door and Panel height: 55 inches mounted 14 inches above floor.

E. Finishes
   1. Plastic Finish: Refer to Section 09050.
   2. Stainless Steel Surfaces: No. 4 satin or polished.
   3. Aluminum: Clear natural or satin anodized, black anodized at slide bolts.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that openings are ready to receive work.

B. Verify field measurements are as indicated on shop drawings.

C. Verify correct location of built-in framing, anchorage, bracing and plumbing fixtures.

D. Beginning of installation means installer accepts existing conditions.

3.02 ERECTION

A. Erect in accordance with manufacturer's instructions.

B. Install partition components secure, plumb and level.

C. Attach panel brackets securely to walls, floors or ceilings using appropriate anchor devices. Expansion anchors at floor shall be stainless steel or other corrosion resistant type approved by Architect.

D. Attach panels and pilasters to brackets with tamper proof torx head through bolts and nuts.

E. Anchor urinal screen panels to walls with continuous angle brackets.

F. Provide 1/2 inch space between wall surface and panels or pilasters.

G. Conceal floor fastenings with 4 inches high stainless steel, one-piece pilaster shoes.

H. Equip each door with continuous hinges and sliding door latch.

I. Install door strike keeper on each pilaster in alignment with sliding door latch.

J. Equip each door with one coat hook and bumper, maximum 44 inches above finish floor and one sliding latch with door strike and keeper with door bumper on pilaster in alignment with sliding door latch.

K. Equip doors at compartments for the disabled with self-closing outswinging doors. Hinges shall operate at maximum 5 lbs. force. Provide loop or u-shaped handle immediately below latch both faces of wheelchair accessible doors. Height of Door Latch: 36 inches above floor, Pulls: 34 inches.

3.03 ERECTION TOLERANCES

A. Maximum Variation From Plumb or Level: 1/8 inch.

B. Maximum Misplacement From Intended Position: 1/8 inch.

3.04 ADJUSTING

A. Adjust and align door hardware to uniform clearance at vertical edges of doors. Clearance space not to exceed 3/16 inch.

B. Adjust door hinges so that free movement is attained and will locate in-swinging doors in partial open position when unlatched. Return out-swinging doors to closed position.

3.05 CLEANING

A. Remove protective coverings.

B. Clean surfaces and hardware.

3.06 PROTECTION OF FINISHED WORK

A. Field touch-up of finished surfaces will not be permitted. Replace damaged components.

END OF SECTION

SECTION 10430

PARKING AREA SIGNS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Traffic entry warning signs.

B. Parking space signs.

C. Fire Lane Law Signs.

1.02 REFERENCES

A. CAS/CAR - California Accessibility Statutes and California Accessibility Regulations, January 2003 and 2001 CBC Sections 1129B.5.

B. ASTM A53 - Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.

C. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

D. FED-STD-595B - Colors used in Government Procurement.

E. California Vehicle Code.

F. ASTM D4956-01a – Reflective Sheeting for Traffic Controls.

G. ASTM B209-96 Aluminum and Aluminum-Alloy Sheet and Plate.

H. MUTCD - Department of Transportation, Manual for Uniform Traffic Control Devices.

1.03 SUBMITTALS

A. Product data listing sign styles, lettering and locations and overall dimensions of each sign.

B. Three samples illustrating full size sample sign, of type, style and color specified.

1.04 REGULATORY REQUIREMENTS

A. Conform to CAS/CAR for accessibility provisions.

1.05 DELIVERY, STORAGE AND HANDLING

A. Store and protect products.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products of following manufacturers form basis for design and quality intended.
   1. Western Highway Products, Inc, Stanton, CA.

B. Or equal in accordance with Division1, General Requirements for Substitutions.

2.02 CONSTRUCTION

A. Post mounted and wall mounted signs shall be fabricated from aluminum .080 - .063 inches thick, Alloy 5052-H32 or 5053-H38, screened on reflective sheeting Type 2, 3M engineer grade.

B. Mount signs to posts with minimum two 3/16 inch diameter round head bolts with tamperproof nuts, galvanized.

C. Posts:
   1. 2 inch diameter galvanized steel pipe weighing minimum of 3.65 pounds per foot and conforming to ASTM A53 Schedule 40.

D. Comply with Transportation, Manual for Uniform Traffic Control Devices.

2.03 TRAFFIC ENTRY WARNING SIGNS

A. Single post mount, not less than 17 by 22 inches with white reflectorized copy on blue background conforming to No. 15090, FED-STD 595b, one inch high letters shall read: "Unauthorized vehicles parked in designated accessible spaces not displaying distinguishing placards or license plates issued for persons with disabilities may be towed away at owner's expense. Towed vehicles may be reclaimed at: (909) 384-5742, ***Insert address and telephone number as indicated on Drawings, blank line on sign not permitted.***

B. All lettering shall be in permanent fabrication of sign.

C. Position sign in conspicuous location immediately adjacent to each entrance to off-street parking facility or immediately adjacent to and visible from each stall or space.

D. Sign shall be mounted 36 inches maximum from bottom of sign to adjacent finish grade or ground or 80 inches to pedestrian way or sidewalk, or as indicated on Drawings.

E. Comply with Transportation, Manual for Uniform Traffic Control Devices.

2.04 PARKING STALL SIGNS

A. Single post mount, not less than 70 square inches with white reflectorized copy on blue background conforming to No. 15090, FED-STD 595B. Sign shall display profile view of wheelchair with occupant in white on blue background.

B. Position one sign at end of each parking space designated for disabled usage.

C. One in every eight spaces, but not less than one, also shall display a "Van Accessible" sign below symbol of accessibility.

D. Sign shall be mounted 80 inches from bottom of sign to finish grade of parking space or centered on wall at interior end of parking space at minimum height of 36 inches above parking space, finished grade, ground or sidewalk, or as indicated on Drawings.

E. Comply with Transportation, Manual for Uniform Traffic Control Devices.

2.05 FIRE LANE SIGNS

A. Single post mount, 6 feet, 8 inches from bottom of sign to finish grade.

B. Fire Lane Law Sign shall be 24 inches wide by 18 inches high with white and black letters fabricated with sign in contrasting color design. Coordinate with owner for telephone numbers, blank lines not permitted. Sign shall read:

TRAFFIC AND PARKING LAWS ENFORCED

THIS PROPERTY SUBJECT TO ALL REGULATIONS AND CONTROLS PROVIDED BY THE CITY OF SAN BERNARDINO ORDINANCES AND CVC 22500.1 VIOLATORS WLL BE TOWED AT OWNERS EXPENSE, CITY OF SAN BERNARDINO POLICE DEPARTMENT (909) 384-5742.

C. "NO PARKING – FIRE LANE -- CVC22500.1". Sign shall be 12 inches wide by 18 inches high with white background, red border. Lettering to be red 1 inch high on white background and white where there is red background.

D. Comply with Transportation, Manual for Uniform Traffic Control Devices.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work.

B. Beginning of installation means installer accepts existing surfaces.

3.02 INSTALLATION

A. Set posts in 2500 pounds per square inch concrete base, minimum 12-inch diameter and 18 inches deep. Signs set in asphalt-concrete paved surfaces or concrete sidewalks shall be mounted in core drilled holes minimum 8 inch diameter, 18 inches deep with top of base flush to finish. Signs mounted to walls shall be attached firmly with appropriate expansion anchors or bolting, adhesive not permitted. Seal all holes watertight.

B. Clean and polish.

END OF SECTION

SECTION 10440

SIGNS - RESTROOMS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Plastic signs at restrooms to match existing.

1.02 REFERENCES

A. CAS/CAR - California Accessibility Statutes and California Accessibility Regulations, January 2003 and 2001 CBC. California Building Code, Sections 1103.2.4, 1115B.5, and 1117B.5.1.

B. ASTM D4802 - Poly (Methyl Methacrylate) Acrylic Plastic Sheet.

1.03 SUBMITTALS

A. Shop drawings listing sign styles, lettering and locations and overall dimensions of each sign.

B. Two samples illustrating full size sample sign, of type, style and color specified including method of attachment. If accepted, samples may be installed in project.

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site and protect from damage. Store until immediately prior to Notice of Completion.

1.05 PRE-INSTALLATION CONFERENCE

A. Notify Architect when signs are ready for installation. Arrange for conference at job site. Do not proceed with installation until Architect's approval of specific locations and methods of attachment has been obtained.

1.06 REGULATORY REQUIREMENTS

A. Conform to CAS/CAR and Section 1117B.5.2 and 1103.2.4 CBC for accessibility provisions.

B. CAS/CAR SIGNAGE REQUIREMENTS:
   1. Letters and numbers shall have width-to-height ratio of between 3:5 and 1:1 and stroke width-to-height of between 1:5 and 1:10.
   2. Characters and symbols shall contrast in color or image with either light letters on dark background or dark letters on light background, and shall be raised minimum 1/32 inch.

3. Letters and numbers on permanent room identification signs shall be raised minimum 1/32 inch, and shall be sans-sarif (without serif).
4. Upper case letters shall be accompanied by California Contracted Grade 2 Braille tactile identification. Dots shall be 1/10 inch (2.54 mm) on centers in each cell with 2/10 inch (5.08 mm) space between cells. Dots shall be raised minimum of 1/40 inch (0.635 mm) above background with rounded edges. Reference Sections 1117B.5.6, 1117B.5.2. and 1103.2.4.
5. Minimum height for raised characters or symbols: 5/8 inch. Maximum Height: 2 inches. Tactile Symbols: 1/4 inch minimum stroke width.
6. Pictographs shall be accompanied by equivalent verbal description directly below.
7. Room identification signs shall be located on wall adjacent to latch side of door or nearest adjacent wall, minimum 4 inches and maximum 12 inches from edge of door, centered 60 inches above floor. Mounting location shall be determined so that person may approach within 3 inches of signage without encountering protruding objects or standing within swing of door. Reference Section 1117B.5.9.
8. Conform to all other CAS/CAR requirements including finishes and contrasts.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products of following manufacturers form basis for design and quality intended.
   1. ASI Sign Systems, Inc., Dallas, TX.
   2. Mohawk Sign Systems, Inc., Schenectady, NY.
   3. A.R.K. Ramos Signage Systems, Oklahoma City, OK.
   4. Vomar Products, Inc.

B. Or equal in accordance with Division 1, General Requirements.

2.02 RESTROOM SIGNAGE

A. Material: ASTM D4802; laminated acrylic plastic.

B. Male Restroom Signage:
   1. Doorways leading to male restrooms shall be identified by equilateral triangle 1/4 inch thick with edges 12 inches long, with vertex pointing upward, upon which appears a male pictogram and the word “MEN” below the pictogram in contrasting color. Sign shall be mounted in center of door 60 inches from finish floor to center of sign.
   2. Room shall be further identified by rectangular room identification sign 1/4 inch thick, 4 inches high upon which appears the word "MEN" in contrasting color, 2 inches high, minimum 1/32 inch thick, fully tactile, accompanied by Braille indicator immediately below on same sign. Sign shall be located on wall on latch side of door, 60 inches from finish floor to center of sign, minimum 4 inches and maximum 12 inches from edge of door or on nearest adjacent wall.
   3. A sign with the International Accessibility Symbol shall appear above the room identification sign. Sign shall be 1/4 inch thick, 6 by 6 inches in size, 4-1/2 inches high in contrasting color.

a. For remodel and modernization projects include a male pictogram sign next to the International Accessibility Symbol.

C. Female Restroom Signage:
1. Doorways leading to female restrooms shall be identified by circle 1/4 inch thick 12 inches in diameter circle upon which appears a female pictogram and the word "WOMEN" below the pictogram in contrasting color. Sign shall be mounted in center of door, 60 inches from finish floor to center of sign.
2. Room shall be further identified by rectangular room identification sign 1/4 inch thick, 4 inches high upon which appears word "WOMEN" in contrasting color, 2 inches high, minimum 1/32 inches thick, fully tactile, accompanied by Braille indicator immediately below, on same sign. Sign shall be located on latch side of door, 60 inches from finish floor to center of sign, minimum 4 inches and maximum 12 inches from edge of door or on nearest adjacent wall.
3. Sign with International Accessibility Symbol shall appear above room identification sign. Sign shall be 1/4 inch thick, 6 by 6 inches in size, 4-1/2 inches high in contrasting color.
   a. For remodel and modernization projects include a female pictogram sign next to the International Accessibility Symbol.

D. Unisex Restroom Signage:
1. Doorways leading to unisex restrooms shall be identified by circle 1/4 inch thick, 12 inches in diameter with 1/4 inch thick triangle superimposed on circle and within 12 inch diameter total 1/2 inch thick at triangle and a female and male pictogram, in contrasting color. Sign shall be mounted in center of door 60 inches from finish floor to center of sign.
2. Room shall be further identified by rectangular room identification sign 1/4 inch thick, 4 inches high upon which appears word "RESTROOM" in contrasting color, 2 inches high, minimum 1/32 inch thick, fully tactile, accompanied by Braille indicator immediately below, on same sign, sign shall be located on wall on latch side of door, 60 inches from finish floor to center of sign, minimum 4 inches and maximum 12 inches from edge of door, or on nearest adjacent wall.
3. A sign with the International Symbol of Accessibility and female and male pictogram shall appear above room identification sign. Sign shall be 1/4 inch thick, 6 by 6 inches in size, 4-1/2 inches high in contrasting color.
   a. For remodel and modernization projects include both a female and male pictogram sign next to the International Accessibility Symbol.

E. Sign colors to match paint color as selected by Architect.

F. Lettering Type Style: Helvetica Regular, uppercase letters only.

G. Polished edges, all signs.

H. Fabricate sign so that raised letter cannot be peeled off.

I. Substitute "BOYS" or "GIRLS" where appropriate.

J. Field Color: Match paint Dunn-Edwards Norfolk Brown #79. Font Color: Match paint Dunn-Edwards Bone White #SP-427.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive Work.

B. Beginning of installation means installer accepts existing surfaces.

3.02 INSTALLATION

A. Install with four (4) stainless steel, spanner head tamper resistant screws, and silicone adhesive with zero clearance between plastic and face of substrate. Double face adhesive tape not permitted

B. Install signs only after surfaces are finished, in center of door, or on wall adjacent to latch side as specified herein.

C. Clean and polish.

END OF SECTION

SECTION 10441

IDENTIFICATION SIGNS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Plastic signs to match existing.

B. Path of Travel signs.

1.02 REFERENCES

A. CAS/CAR - California Accessibility Statutes and California Accessibility Regulations, January 2003 and 2001 CBC. California Building Code Sections 1115B.5 and 1117B.5.

B. Chapters 10, 11, Sections 1117B.5 and 1103.2.4. Chapter 30, California Building Code.

C. Chapter 3, Title 19, CCR.

D. ASTM D4802 - Poly (Methyl Methacrylate) Acrylic Plastic Sheet).

E. Uniform Building Code Standard 10-2.

1.03 SUBMITTALS

A. Shop drawings listing sign styles, lettering and locations and overall dimensions of each sign.

B. Three samples illustrating full size sample sign, of type, style and color specified including method of attachment. If accepted, samples may be installed in Project.

C. Manufacturer's installation instructions.

1.04 QUALITY ASSURANCE

A. Regulatory Requirements
   1. Conform to CAS/CAR for accessibility provisions.
   2. CAS/CAR SIGNAGE REQUIREMENTS:
      a. Letters and numbers shall have width-to-height ratio of between 3 to 5 and 1 to 1 and stroke width-to-height of between 1 to 5 and 1 to 10.
      b. Characters and symbols shall contrast in color or image with either light letters on dark background or dark letters on light background.
      c. Letters and numbers on permanent room identification signs shall be raised minimum 1/32 inch, without serif.

d. Upper case letters shall be accompanied by California Contracted Grade 2 Braille tactile identification. Dots shall be 1/10 inch (2.54 mm) on centers in each cell with 2/10 inch (5.08 mm) space between cells. Dots shall be raised a minimum of 1/40 inch (0.635 mm) above the background and with rounded edges.
e. Minimum height for raised characters or symbols: 5/8 inch. Maximum Height: 2 inches. Tactile Symbols: 1/4 inch minimum stroke width.
f. Pictographs shall be accompanied by equivalent verbal description directly below.
g. Room identification signs shall be located on wall adjacent to latch side of door or nearest adjacent wall, minimum 4 inches and maximum 12 inches from edge of door, centered 60 inches above floor. Mounting location shall be determined so that person may approach within 3 inches of signage without encountering protruding objects or standing within swing of door.
h. Conform to all other CAS/CAR requirements including finishes and contrasts.

B. Pre-Installation Conference
1. Notify Architect when signs are ready for installation. Arrange for conference at site. Do not proceed with installation until Architect's approval of specific locations and methods of attachment has been obtained.
2. Provide signs from one manufacturer, unless otherwise approved.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site and protect from damage. Store until immediately prior to Notice of Completion.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Plastic Signs
1. Acrylic Plastic Sheet: ASTM D4802, clear, 1/4 inch thick.
2. Fasteners: Stainless steel screws, clear silicone adhesive, as specified in Section 07900.

2.02 ROOM IDENTIFICATION SIGNAGE

A. Provide room identification signs. Install on wall adjacent to door, on latch side, centered 60 inches above floor, 4 inches minimum and 12 inches maximum from edge of door or nearest adjacent wall.

B. Material: Laminated acrylic plastic 1/4 inch thick, colors as selected by Architect.
1. Upper Layer: Non-glare clear acrylic, 1/8 inch thick.
2. Lower Layer: Opaque Acrylic, 1/8 inch thick.
3. Polished edges.

C. Type Required: Two inches high; minimum 8 inches long, surface application, 7/8 inch high letters, minimum 1/32 inch thick, fully tactile, with BRAILLE indicator.

1. Provide one sign with up to 13 letters for each door.
2. Provide one sign with up to 3 numerals for each door.

D. Lettering Type Style: Helvetica Medium.

E. Colors:
1. Field Color: Match Dunn Edwards Norfolk Brown #79.
2. Font Color: Match Dunn Edwards Bone White SP-427.

2.03 OCCUPANT LOAD SIGNS

A. Provide maximum occupancy load signs. Install near main exits of following areas:
1. Assembly rooms.
2. Classrooms over occupant load of 50.

B. Material: Laminated plastic, 1/4 inch thick, colors as selected by Architect.
1. Upper Layer: Non-glare clear acrylic 1/8 inch thick.
2. Lower Layer: Opaque acrylic, 1/8 inch thick.
3. Polished edges.

C. Type Required: 4 inches high, minimum 8 inches long, sub-surface application, 7/8 inch high letters, 1 inch high numerals.

D. Lettering Type Style: Manufacturer's option. Sign to read: MAXIMUM OCCUPANCY LOAD XXX.

E. Obtain occupant load number (XXX) from Architect.

F. Conform to Section 1003.2.2 California Building Code.

2.04 ACCESSIBILITY ENTRANCE SIGNS AND PATH OF TRAVEL SIGNS

A. Provide at each accessible building entrance an International Symbol of Accessibility sign with text reading, "This facility accessible by persons with disabilities", and with additional directional signs, manufacturer's standard, approved by Architect. Sign shall be visible to persons along approaching pedestrian ways.

B. Provide directional signs at every junction along the Path of Travel with arrow indicators and International Sign of Accessibility, Section 1117B.5.7.

C. Conform to Sections 1117B.5.1 through 1117B.5.7 California Building Code.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive Work.

B. Beginning of installation means installer accepts existing surfaces.

3.02 INSTALLATION

A. Install with four (4) stainless steel, spanner head tamper resistant screws, and silicone adhesive with zero clearance between plastic and face of substrate. Double face adhesive tape not permitted.

B. Install signs only after surfaces are finished.

C. Clean and polish.

END OF SECTION

SECTION 10442

SELF-ILLUMINATING EXIT SIGNAGE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Self-Illuminating Exit signage.

1.02 REFERENCES

A. California Building Code 2001.

1.03 SUBMITTALS

A. Shop drawings listing sign styles, lettering and locations and overall dimensions of each sign.

B. Two samples illustrating full size sample sign, of type, style and color specified including method of attachment. If accepted, samples may be installed in project.

C. Manufacturer's installation instructions.

1.04 QUALITY ASSURANCE

A. Pre-installation Conference: Notify Architect when signs are ready for installation. Arrange for conference at site. Do not proceed with installation until Architect's approval of specific locations and methods of attachment has been obtained.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site and protect from damage. Store until immediately prior to Notice of Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products of following manufacturers form basis for design and quality intended.
   1. Active Safety, Murray, UT.
   2. Self-Powered Lighting Inc., Elmsford, NY.
   3. Isolite Corporation, Wayne, PA.

B. Or equal as approved in accordance with Division 1, General Requirements for substitutions.

2.02 EMERGENCY EXIT SIGNS

A. Self Illuminating Exit Signs:
   1. Series 18.000, door kickplate, stencil face, aluminum, powder-coated color as selected, sized to fit door, minimum 10 inches high.
   2. Series 16.000 Green letters, stenciled aluminum face plate with photo-luminescent text, brushed aluminum finish, wall, ceiling and flag mountings, 7 by 13 inches, single face, one type of sign at each exit door.
   3. Series 13.100 Red letters, aluminum extrusion with self-illuminating coating, snap mount on wall and T-bar ceiling attachment with hanging cables, 7 by 13 inches, with field applied arrows.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work.

B. Beginning of installation means installer accepts existing surfaces.

3.02 INSTALLATION

A. Install with four (4) stainless steel, spanner head tamper resistant screws, and clear silicone adhesive with zero clearance between plastic and face of substrate. Double face adhesive tape not permitted.

B. Install signs only after surfaces are finished, in locations indicated.

C. Install at 60 inches above finish floor on strike side of door and as indicated in drawings.

D. Floor level signs: Install not less than 6 inches or more than 8 inches above finish floor to the bottom of sign. Install the closest edge of sign within 4 inches of door frame.

E. Clean and polish.

END OF SECTION

SECTION 10443

EXIT SIGNAGE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Exit signage.

1.02 REFERENCES

A. CAS/CAR - California Accessibility Statutes and California Accessibility Regulations, January 2003 and 2001 California Building Code.

B. ADAAG - American with Disabilities Act Accessibility Guidelines for Buildings and Facilities.

1.03 SUBMITTALS

A. Shop drawings listing sign styles, lettering and locations and overall dimensions of each sign.

B. Two samples illustrating full size sample sign, of type, style and color specified including method of attachment. If accepted, samples may be installed in project.

C. Manufacturer's installation instructions.

1.04 QUALITY ASSURANCE

A. Regulatory Requirements for Exit Signs
   1. Conform to CAS/CAR for accessibility provisions.
   2. Signage Requirements
      a. Proportions: Letters and numbers shall have width-to-height ratio of between 3:5 and 1:1 and stroke width-to-height of between 1:10 and 1:5, 1117B.5.3.
         All letters measured must be uppercase. After choosing typestyle to test, begin by printing the letters I, X, and O at 1 inch height. Place template's 1:1 square over the X or O, whichever is narrower. If the character is not wider than 1 inch, or narrower than the 3:5 rectangle, the proportions are correct. Use the 1:5 rectangle to determine if the stroke of the I is too broad, and the 1:10 rectangle to see if it is too narrow. If all the tests are passed, the typestyle is compliant with proportion code.
      b. Finish and contrast: Characters, symbols and their background shall have a non-glare finish. Characters and symbols shall contrast with their background, 70% minimum, either light characters on a dark background or dark characters on a light background, 1117B5.2.

c. Braille
   1) Print the Braille equivalent messages in California Contracted Grade 2, Braille.
   2) 6 dots (2 columns of 3 dots) form a cell. Dots shall be 1/10 inch (2.54 mm) on center each way in a cell. Dots shall be raised a minimum of 1/40 inch (0.635 mm) above the background (CBC 1117B.5.6) and shall be rounded or domed California Braille dots, each distinct and separate.
   3) Provide 2/10 inch (5.08 mm) space between cells, measured from the trailing edge of the second column of dots in the preceding cell to the leading edge of the first column of dots in the succeeding cell.

d. Characters and symbols shall contrast in color or image with either light letters on dark background or dark letters on light background, and shall be raised minimum 1/32 inch.

e. Minimum height for raised characters or symbols: 5/8 inch minimum and 2 inches maximum, uppercase.

B. Pre-installation Conference: Notify Architect when signs are ready for installation. Arrange for conference at site. Do not proceed with installation until Architect's approval of specific locations and methods of attachment has been obtained.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site and protect from damage. Store until immediately prior to Notice of Completion.

PART 2 - PRODUCTS

2.01 TACTILE EXIT SIGNS

A. Conform to Sections 1003.2.8.6 CBC, 1117B.5.1 California Access Regulations (CAR) and Policy Number 98-06.
   1. Mfg: By Emedco, Buffalo, NY; All State Sign and Plague, Deer Park, NY. Or equal.

B. Install sign at each exit door as conditions required in Section 1003.2.8.6.1 CAR.
   1. Each grade-level exterior exit door, with the word: “EXIT”.
   2. Each grade-level exterior exit door exit enclosure/passageway with the words: “EXIT ROUTE”.
   3. Each exit door from interior to corridor/passageway: “EXIT ROUTE”
   4. Each exit door through horizontal exit: “TO EXIT”.
   5. At stairs with the words: “EXIT STAIR DOWN” or “EXIT STAIR UP”.

C. At ramps with the words: “EXIT RAMP DOWN” or “EXIT RAMPUP.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work.

B. Beginning of installation means installer accepts existing surfaces.

3.02 INSTALLATION

A. Install with vandal resistant stainless steel screws and clear silicone adhesive with zero clearance between material and face of substrate.

B. Install signs only after surfaces are finished at exit locations.

C. Low and High level mountings as indicated on Drawings and comply requirements of Section 1003.2.8.6, CBC.

D. Floor level signs: Install not less than 6 inches or more than 8 inches above finish floor to the bottom of sign. Install the closest edge of sign within 4 inches of door frame.

E. Clean and polish.

END OF SECTION

SECTION 10475

MISCELLANEOUS SPECIALTIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Miscellaneous specialty items applicable to Work and not specified under individual technical sections.

1.02 SUBMITTALS

A. Shop drawings and product data for all components, hardware and accessories under provisions of Division 1, General Requirements. Show construction and fabrications details, procedures, layout and erection diagrams, anchorages and pertinent information for specified specialty item.

B. Samples sufficiently sized to illustrate clearly all sizes, available colors, materials, patterns and finishes.

C. Manufacturer's installation instructions and maintenance recommendations under provisions of Division 1, General Requirements.

1.03 FIELD MEASUREMENTS

A. Verify site conditions. Obtain accurate dimensions of openings, levels, locations and arrangements of embedded and concealed anchorages. Report discrepancies between drawings and field dimensions to Architect before commencing work.

PART 2 - PRODUCTS

A. ASSISTIVE LISTENING SYSTEM (ADA)
   1. Provide complete operational system and install to meet ADA requirements, CBC Section 1104B.2. Include following: (Min. required 4% of seating not less than 2)
      a. System: SZI 1015-T master transmitter/emitter combination system, Single Channel System AudioLink Personal Listening System, by SENNHEISER, Old Lyme, Connecticut.
      b. Receivers: RI 250 10 sets.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install equipment specialties according to manufacturer's recommended procedures.

END OF SECTION

SECTION 10520

FIRE EXTINGUISHERS AND CABINETS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Fire extinguishers and Brackets.

1.02 REFERENCES

A. CFC - California Fire Code, Section 1002.

B. UFC - Uniform Fire Code Standard No. 10-1.

C. California Code of Regulations Title 19, Chapter 3.

1.03 QUALITY ASSURANCE

A. Conform to CFC and UFC requirements for extinguishers.

1.04 SUBMITTALS

A. Product data showing physical dimensions, operational features, color and finish, anchorage details, rough-in measurements, location and details.

B. Manufacturer's installation instructions.

C. Manufacturer's operation and maintenance data. Include test, refill or recharge schedules, procedures and recertification requirements including requirements applicable to the Work.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Do not install extinguishers when ambient temperatures may cause freezing.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products of following manufacturers form basis for design and quality intended.
   1. Ansul Incorporated, Marinette, WI.

B. Or equal as approved in accordance with Division 1, General Requirements for substitutions.

2.02 EXTINGUISHERS

A. ABC Multi-Purpose Dry Chemical: Product: Sentry Series, Ansul, Inc.
   1. Red glossy polyester coated steel cylinder with pressure gage and nozzle.
   2. Size: 5 lbs.
   3. Class: 2A:10B:C

B. Wet Chemical - Kitchen use; Product: K-Guard, Ansul, Inc.
   1. NFPA 10, Class K fires, 30B:C.
   2. Size: 6 liters.
   3. Stainless steel cylinder with pressure gage, hose and wand.
   4. 2 per kitchen.
   5. Provide heavy duty vehicle, box type bracket to fit size of fire extinguisher unit.

2.03 MOUNTING BRACKETS

A. Manufacturer's standard steel, designed to secure extinguisher, of sizes required for types and capacities of extinguishers indicated, with plated or baked-enamel finish.

B. Provide brackets for extinguishers not located in cabinets sized for unit.

PART 3 - EXECUTION

3.01 INSPECTION

A. Verify mounting brackets are correctly sized and located.

B. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION

A. Mount brackets to a height to yield 48 inches maximum to handle of fire extinguisher where no cabinets are indicated.

B. Secure rigidly in place.

C. Install one portable fire extinguisher at each classroom and as noted on drawings.

END OF SECTION

SECTION 10800

TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Toilet and bath accessories.

B. Grab bars in washrooms and toilets.

C. Attachment hardware.

1.02 REFERENCES

A. CAS/CAR - California Accessibility Statutes and California Accessibility Regulations, January 2003 and 2001 CBC.

B. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.

C. ASTM A269 - Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

D. ASTM A1008/A1008M - Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

1.03 SUBMITTALS

A. Product data on accessories describing size, finish, details of function, attachment methods.

B. Manufacturer's installation instructions.

1.04 REGULATORY REQUIREMENTS

A. Conform to CAS/CAR for accessibility provisions.

B. Conform to Section 1118B California Building Code.

1.05 KEYING

A. Supply two keys for each accessory to Owner.

B. Master key all accessories.

C. Accessories shall be from a single manufacturer to facilitate keying.

1.06 SEQUENCING AND SCHEDULING

A. Coordinate the Work of this Section with the placement of internal wall reinforcement to receive anchor attachments.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products of one of the following manufacturers form the basis for design and quality intended.
   1. Bobrick Washroom Equipment, Inc., North Hollywood, CA.
   2. Waxie Sanitary Supply, Ontario, CA.
   3. Gamco, Durant, OK.
   4. Bradley Corporation, Ontario, CA.

B. Or equal as approved in accordance with Division 1, General Requirements for Substitutions.

2.02 MATERIALS - TOILET AND BATH ACCESSORIES

A. Sheet Steel: ASTM A1008.

B. Stainless Steel Sheet: ASTM A167, Type 304.

C. Tubing: ASTM A269, stainless steel.

D. Fasteners, Screws and Bolts: Stainless steel or chrome, tamperproof.

2.03 MATERIALS - GRAB BARS

A. Tubing: ASTM A269; stainless steel, mandrel bent, uniform diameter at curves.
   1. Size: 1-1/2 inch diameter.
   2. Wall Thickness: 18 gage.
   3. Configuration and Length: As indicated on Drawings.
   4. Design Strength: Withstand minimum 250 lb. point load in any direction at any point on the bar without damage or permanent set in accordance with CAS/CAR.
   5. Wall Clearance: 1-1/2 inches and 1-1/2 inches clear to any adjacent toilet room accessory at DP water closet locations.

B. Flanges: ASTM A167; stainless steel plate, heliarc welded.
   1. Size: 3 inch diameter.
   2. Thickness: 11 gage with 2 mounting screws for concealed anchors.

C. Cover Plate: ASTM A167; 22 gage 3-1/4 inch dia. snap-cover over mounting flange.

D. Fasteners: stainless steel, tamperproof, minimum two #14 stainless steel screws x length required for secure attachment to backing plate.

2.04 FABRICATION

A. Weld and grind smooth joints and miters of fabricated components.

B. Form exposed surfaces from single sheet of stock, free of joints.

C. Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.

D. Back paint components where contact is made with building finishes to prevent electrolysis.

E. Shop assemble components and package complete with anchors and fittings.

F. Provide steel adapters and anchor components for installation.

2.05 FACTORY FINISHING

A. Stainless Steel: No. 4 satin luster finish.

2.06 GRAB BAR FINISH

A. Type 304 satin luster. Provide slip resistant knurled or peened gripping surface at wet areas.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that site conditions are ready to receive Work.

B. Beginning of installation means acceptance of existing conditions.

3.02 PREPARATION

A. Deliver inserts and rough-in frames to site at appropriate time for building-in.

B. Provide templates and rough-in measurements as required.

C. Verify exact location of accessories for installation.

3.03 INSTALLATION

A. Install fixtures, accessories and items in accordance with manufacturers' instructions.

B. Install plumb and level, securely and rigidly anchored to backing. Mounting heights and locations as indicated on the Drawings.

C. Where ceramic wainscot occurs, provide stainless steel closure angles flush to perimeter of all wall-mounted accessories. Seal visible cracks with silicone sealant as specified in Section 07900.

D. ADA Compliant toilet accessories:
   1. Mount heights according to CBC Section 1115B.9.2 and 1118B.
   2. Toilet paper and feminine napkin disposals located on grab bar side of accessible toilet room or stall shall not project more than 3 inches from finished wall surface nor be located closer than 1-1/2 inches clear of tangent of grab bar, DSA Policy 99-07.

3.04 SCHEDULE

A. Refer to Toilet Accessories Standards at the end of this section.

END OF SECTION

SAN BERNARDINO CITY
UNIFIED SCHOOL DISTRICT
777 North "F" Street
San Bernardino, CA 92410

TOILET ACCESSORIES STANDARDS

LEGEND:

B	Bobrick	(R)	Recessed
W	Waxie	(PM)	Partition Mounted
PDC	Pinnacle Dryer Corp.	---	None
AC	***Accessible Compliant***	N/A	Not applicable

TOILETS / ROOMS	Toilet Tissue dispenser	For staff at all schools; Combo: Napkin Disposal /Toilet Tissue Dispenser (Use recessed at ***AC***)	For Middle & High School students only; Napkin Dispenser Vendor	Seat Cover Dispenser	Soap Dispenser	Paper Towel Dispenser (cannot encroached into req'd. floor clr.)	Waste Receptacles (Verify depth of wall)	Hand Dryer	Grab Bars at ***AC*** only	Framed Mirror
Multi-Boys	***B3888 (R) or B386 (PM)***	N/A	N/A	W851595	W380910	---	---	**PDC-R10**	***B6806***	B1556
Multi-Girls	---	***B3094.60 (R) Or B35701 (PM)***	B3500X2	W851595	W380910	---	---	**PDC-R10**	***B6806***	B1556
Single-Boys	***B3888 (R) or B386 (PM)***	N/A	N/A	W851595	W380910	---	---	**PDC-R10**	***B6806***	B1556
Single-Girls	---	***B3094.60 (R) Or B35701 (PM)***	B3500X2	W851595	W380910	---	---	**PDC-R10**	***B6806***	B1556
Elementary	***B3888 (R) or B386 (PM)***	N/A	N/A	W851595	W380910	---	---	**PDC-R10**	***B6806***	B1556
Kindergarten	***B3888 (R) or B386 (PM)***	N/A	N/A	W851595	W380910	B262	B525 Or B367	---	***B6806***	B1556
(Nurse) Student Unisex	---	***B3094.60 (R) Or B35701 (PM)***	B3500X2	W851595	W380910	B262	B525 Or B367	---	***B6806***	B1556
Staff: Multi-Men	***B3888 (R) or B386 (PM)***	N/A	N/A	W851595	W380143	B262	B525 Or B367	---	***B6806***	B290
Staff: Multi-Women	---	***B3094.60 (R) Or B35701 (PM)***	B3500X2	W851595	W380143	B262	B525 Or B367	---	***B6806***	B290
Staff: Single-Men	***B3888 (R) or B386 (PM)***	N/A	N/A	W851595	W380143	B262	B525 Or B367	---	***B6806***	B290
Staff: Single-Women	---	***B3094.60 (R) Or B35701 (PM)***	B3500X2	W851595	W380143	B262	B525 Or B367	---	***B6806***	B290
Staff-Unisex	---	***B3094.60 (R) Or B35701 (PM)***	B3500X2	W851595	W380143	B262	B525 Or B367	---	***B6806***	B290
Staff Lounge	N/A	N/A	N/A	N/A	W380143	B262	N/A	N/A	N/A	N/A
Classroom Sink	N/A	N/A	N/A	N/A	W380910	B262	N/A	N/A	N/A	N/A
Lab Sink	N/A	N/A	N/A	N/A	W380910	B262	N/A	N/A	N/A	N/A
Janitor	N/A	N/A	N/A	N/A	W380910	B262	N/A	N/A	N/A	N/A

Other Accessories: Robe Hook B2116; Robe Hook at toilet partition *B212*; Mop Rack B239-34"; Folding shower Seat B5191; Shower Curtain Rod B6107; shower Curtain Hook B204-1; Shower Curtain B204-2; Un-framed mirrors per Spec Sec 08800

NOTE:

1) Use recessed seat cover dispenser B301 when required.
2) Provide grab bar anchoring per manufacturer recommendation.
3) Provide Lav Guard at accessible lavatories.
4) Do not provide robe hook at Elementary & Kindergarten schools

Revision No.	Description	Date	Approved By
1	District Approval	09/22/2004	

HMC

10800attach5
12/21/07

SECTION 14420

WHEELCHAIR LIFTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Wheelchair lift system.

B. Controls, motors and safety devices.

C. Accessories.

D. Related Division 16, Electrical.

1.02 REFERENCES

A. CAS/CAR - California Accessibility Statutes and California Accessibility Regulations, January 2003, and 2001 California Building Code.

B. ASME A18.1-2003/A17.1 – Safety Standard for Platform Lifts and Stairway Chair lifts/Safety Code for Elevators and Escalators.

C. 2001 California Building Code, Part 2, Chapter 11B, Sections 1116B.2 thru 1116B.3.3.

D. 2001 California Building Code, Title 24, Part 7, Article 7-15, Section 7-3093 through 7-3094.5.

E. Title 8, Division 01, Elevator Safety Orders, Article 15, Section 3094.2.

1.03 SYSTEM DESCRIPTION

A. Vertical wheelchair platform lifting device consisting of a machine tower with lifting platform to provide lifting height.

B. Minimum Requirements:
   1. Capacity: 750 pounds with minimum factor of safety of 5.
   2. Maximum travel: 53 inches.
   3. Platform Size: 36 by 56 inches. 60 x 60 inches clear landing at each level. Slip resistant surface.
   4. Controls, pit/floor mount, refer to drawings:
      a. Landing Controls: Directional paddle switch (single operation type, continuous pressure type) Emergency Stop switch and signaling device, conforming to Section 7-3094.2(o)1. and 2. Flush mount at top and lower landing gate frame. Install at 42" AFF, per CBC Section 1110A.1.9 and Access Policies 98-01. At Exterior locations, cal/send controls shall be waterproof.

b. Platform Controls: Directional paddle switch (single operation type, continuous pressure type.). EMERGENCY STOP switch and signaling device, meeting requirements of Section 7-3094.2(o)1. and 2. and 2000.10f.

c. Call/send controls and access at lower and upper landings:

i Minimum 24 inches away from any moving part of platform and runway, or lift equipped with fold-down automatic transition, but within line sight of platform.

ii Within reach range of the required 30" x 48" clear space and at 48" maximum AFF.

d. Key Operation: On/off key switches, provide locking ability for security reasons, switch must remain unlocked during business hours or any regular school function, CESCC Section 7-3094.2(r). Provide manual disconnect per NEC and Section 7-3094.2(d).

5. Rated Speed: 18 - 21 feet per minute.
6. Safety Devices: Grounded electrical system. Up and down limit switches, slip-resistant floor surface, electrically interlocked gates, electro-mechanical over-speed brakes, emergency stop switches, manual lowering device, for emergency lowering see Items 9 and 13. Slack rope safety device and hydraulic flow control valve.
7. 42-inch high platform guard panels and gate 36-inch wide, gate at Straight-Thru lift, self closing, per Section 1133B.2.
8. [Ramp and Landing: Provide a concrete ramp and landing in front of lift, 48 by 50 inches, flush to lift platform. Level landing shall have a ramp with slope of 8.3% max. and side flares at 12.5%.

   a. No ramp at pit construction.]
9. Drive Mechanism: 1:2 Roped Hydraulic, 3/4 HP, full time 24V Battery Operation and dual stage AC Smart Charger System, battery backup power for emergency exit from platform for min. 5 trips up and down, Section 1116B.3.2.
10. Grab rails mounted on guard panel tower side at 33 in. center.
11. Provide platform safety pan cover and shut-off.
12. Mounted sign per Title 8, Section 3094.2(i).

    a. Accessibility Signs at Accessible Lift and at Locations Not Visible from Room:

       1) Acrylic Sign: 6" x 6" x ¼" overall thickness.

       2) International Symbol of Accessibility: Provide International Symbol of Accessibility signs with test reading "Accessible Lift", at each lift level location, one at each level.

       3) Additional sign with test to include:

          a) Lift shall not be used to transport materials or equipment.

          b) Maximum lift capacity 750 lbs.

          c) In case of emergency call (telephone number).

             11) Request telephone number from District.
13. Provide re-leveling device per Section 7-3094.2(c) 1.
14. Provide smooth and solid platform enclosure, Rule 2000 ASME A17.1.
15. 42 inches high self-closing gates at top and lower landings with manufacturer's Mechanical Interlock standard and electrical contacts provided at top landing. Provide both mechanical interlocks and electrical contacts to allow platform ascent/descent only when gates/doors are closed and locked.

16. Lift Platform Safety Sensors: Provide platform underpanel equipped with obstruction sensitive cut-out safety, Rule 2000.1b.
    Provide integral platform lighting, automatically activated during travel and at least 8 seconds after platform arrives at the landing.

1.04 SUBMITTALS

A. Shop Drawings.

B. Product Data: Provide complete data illustrating materials, controls, operations and maintenance recommendations.

C. Inspection request.

1.05 REGULATORY REQUIREMENTS

A. Conform to requirements of CAS/CAR for provisions for accessibility.

B. 2001 California Building Code, Chapter 11, Sections 1110A, 11B, Section 1116B, Elevators and Special Access (Wheelchair) Lifts and Chapter 16A, Section 1632A.

C. 2001 California Building Code, Section 7-3094, Vertical and Inclined Platform (Wheelchair) Lifts and Inclined Stairway Chairlifts.

D. ASME A18.1-2003/A17.1 – Safety Standard for Platform Lifts and Stairway Chair lifts/Safety Code for Elevators and Escalators.

1.06 FIELD MEASUREMENTS

A. Verify field measurements.

1.07 WARRANTY

A. Provide under Provisions of Division 01, General Requirements.

B. Provide one (1) year limited warranty on basic unit and electrical system and a two year warranty on drive-train components.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products of the following manufacturers form the basis for design and quality intended.
    1. Lift-U, Division of Hogan Manufacturing.
    2. ThyssenKrupp Access, Grandview, MO.
    3. Concord Elevator/Ricon Corp, Panorama City, CA.
    4. The National Wheel-O-Vator Co., Inc., Roanoke, IL.
    5. Garaventa (Canada) Ltd. Surrey, BC, Canada.
    6. Lift-Avator, Lockport, New York.

B. Or equal as approved in accordance with Division 01, General Requirements for Substitutions.

2.02 MATERIAL

A. Machine Tower: 14 gauge steel sheet.

B. Guide Rail: 3" by 2" by 1/8" ASTM A500 grade B steel tubing.

C. Base Frame: 2" by 2" by 1/4" structural steel tubing and angle.

D. Lift Weldment: 3/8" hot rolled steel plate and 2" by 2" by 1/4" wall structural steel tubing.

E. Side Guard Panels: 18 gauge galvanealed steel sheet in 1" by 2" by 14 gauge steel tubing frame.

F. Front Access Panel: 20 gauge galvanealed steel sheet.

G. Platform: 11 gauge steel plate.

H. Access Ramp: 11 gauge steel plate.

2.03 ACCESSORIES

A. Reaching Device: Provide reaching device or wand attached to a chain on the side opposite the controls to allow disabled persons to reach control. DSA Policy 95-05 rev. 7-1-00.
   1. Wand: ¼ inch diameter, aluminum rod, satin finish, 24 inch long with anti-slip grip on one end, dulled point rubber tip. Drill hole to accept 24 inches long stainless steel bead chain.
   2. Provide holder bracket, sleeve design. Aluminum or stainless steel and mount to prevent reaching device from touching floor and store reaching device in vertical position. Install with self-tapping #10 cadmium screws.

2.04 SIGNS

A. In accordance with Section 10440.

2.05 FINISH

A. Electrostatically applied powder coat finish. Color: As selected by Architect from manufacturer's standard colors.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify site conditions.

B. Verify that concrete level landing and ramp and surrounding building components are installed and of correct dimensions.

C. Confirm electrical power is of correct characteristics.

3.02 INSTALLATION

A. Install system and components in strict accordance with manufacturer's recommendations.

B. Install wheelchair lift anchorage to withstand forces in accordance with Section 1632A, 2001 CBC.

C. Install equipment to preclude vibration excessive noise level.

D. Connect equipment to building utilities.

E. Install reaching device.

F. Install signs.

3.03 FIELD QUALITY CONTROL

A. Field Inspection and Testing: Performed by manufacturer's representative. Tests shall meet the requirements of ASME A17.1.

B. Provide inspection for accessible wheelchair lift per 2001 State Elevator/Conveying System requirements.

3.04 ADJUSTING

A. Adjust work to provide smooth acceleration, deceleration and travel.

B. Adjust leveling feature at landings to within 1/4 inch from flush.

3.05 CLEANING

A. Remove protective coverings from finish surfaces.

B. Clean all surfaces and components.

END OF SECTION

SECTION 15400

PLUMBING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Furnish all tools, labors, fixtures, equipment, appliances and materials to perform all operations in connection with the Plumbing Work, complete as indicated and specified.

B. Work Included: Principal items of work included, but are not limited to the following:

1. Sanitary sewer systems consisting of connection to existing on-site soil and waste piping from plumbing fixtures installed in existing location.

2. Potable cold water system consisting of piping and connections to plumbing fixtures and piping and connections to existing water inside the building.

3. Potable hot water supply system consisting of hot water piping and connections to plumbing fixtures and existing potable hot water inside the building.

4. Install plumbing fixtures specified and rough-in and connecting fixtures under other Section of the Specifications.

5. Condensate drainage piping and connections to heating and air conditioning equipment as required.

6. Fuel gas system consisting of piping and connections to on-site gas main, fixtures and air conditioning gas-fired equipment.

C. Work not Included:

1. Formed concrete work for equipment foundation and pedestals.

2. Electrical Work: Disconnect switches, conduit and wiring for all equipment requiring electrical connections.

3. Painting.

4. Miscellaneous equipment furnished by Owner or other Sections of the Specifications, except that rough-in and plumbing connections for the equipment shall be made under this Section of the Specifications.

1.02 SUBMITTALS

A. Contractor shall submit in accordance with the submittal schedule specified in Section 01600, a list of materials, equipment, appliances and fixtures giving complete information

as to the proposed 2.01, "Mechanical Materials and Equipment of Equal Manufacturer". Substitutions shall comply with Section 01600.

B. No equipment shall be ordered without shop drawings approved by the Architect. Any item ordered without approval are at the Contractor's own risk.

C. Orders for all materials, equipment, appliances and fixtures shall be placed with sufficient time to be received at the job site prior to installation time.

D. Summary of Submittals:

1. Six (6) complete brochures on materials and equipment

2. Sterilization certificates.

3. Test data.

4. Operating and maintenance brochures and valve charts.

5. Letter that Owner has been completely instructed in the operation and maintenance of all mechanical equipment.

6. Guarantees.

1.03 SITE INSPECTION

A. Contractor will be held responsible that he has examined the premises and understands the conditions under which he will be obligated to operate in performing his part of the Contract. No allowances will be made subsequently on behalf of the Contractor for any error through negligence on his part.

1.04 DRAWINGS AND SPECIFICATIONS

A. These specifications are intended to cover labor, materials and standards of mechanical workmanship to be employed in the work shown on drawings, and items called for in these Specifications are intended to supplement one another and any part of the work that is mentioned or represented in both. Large scale drawings shall take precedence over small scale drawings. The omission from specifications or drawings of any minor details of construction, installation, materials or essentials specialties, shall not relieve Contractor from furnishing same in place, complete.

B. Interpretation of Drawings and Specifications

1. Architect will interpret meaning of any part of drawings and specifications about which any misunderstanding may arise and his decision will be final.

2. Should there appear to be an error or discrepancy in or between the Drawings and/or the Specifications, refer the matter to the Architect for adjustment before proceeding with work. Should the Contractor proceed with work without referring the matter to the Architect, he does so at his own risk.

1.05 PERMITS, FEES, AND INSPECTIONS

A. Apply and pay for all necessary permits and fees required by any of the legally constituted public authorities having jurisdiction. Arrange and pay for all required inspections or examinations unless specifically otherwise noted.

B. Any expenses incurred in securing permits and any fees or charges paid for by Contractor shall become part of this Contract.

C. Excavation, backfilling and repaving in connection with work is part of this Contract and shall be done as directed and under the supervision of proper authorities.

1.06 QUALITY OF MATERIALS AND WORKMANSHIP

A. Unless otherwise specifically provided elsewhere in the Specifications, materials, equipment and articles incorporated in the work covered under this Section of the Specifications, shall be new, of best grade, and latest products as listed in printed catalog data of latest date. Each article of its kind shall be standard product of a single manufacturer.

B. Workmanship shall be of the best quality and competent mechanics skilled in their trades shall be employed. Furnish the service of an experienced Superintendent, who will be constantly in on erection of the work, together with necessary journeyman, helpers and laborers required to properly unload, construct, connect and test these systems.

C. Architect shall have the right to accept or reject materials and/or workmanship and determine when Contractor has complied with requirements herein specified.

1.07 REGULATIONS AND CODES

A. Install work materials in full accordance with the latest published editions of the California Building Code. National Fire Protection Association Numbers 13, 14 and 20 with all applicable state codes and regulations including Industrial Safety Orders, Health and Safety Code, State Fire Marshal's regulations and with other prevailing rules and regulations. When drawings or specifications call for grades different than required by governing codes, provide and install the larger size or higher grade; but nothing in these drawings or specifications is to be construed to permit work in violation of governing codes.

1.08 RECORD DRAWINGS

A. Provide and keep up-to-date a complete as-built set of blue line prints, which shall be corrected daily to show every change from original drawings and specifications, size and kind of equipment and runs of all pipe, pipe elevations, etc. Prints for this purpose may be

obtained from the Architect. This set of drawings shall be kept on-site and shall be used only as a record set. On completion of work, furnish a completed, up-to-date set of record drawings to the Architect. Conform to Section 01700.

1.09 LOCATION AND ACCESSIBILITY

A. Contractor shall fully inform himself regarding peculiarities and limitations of the spaces available for installation of work and materials furnished and installed under this Section of the Specifications. Drawings indicate desired locations and arrangement of piping, equipment and other items and are to be followed as closely as possible. Work specified and not clearly defined by drawings shall be installed and arranged in a manner approved by the Architect. In the event changes in indicted locations and arrangements are deemed necessary by the Architect, they shall be made by the Contractor without additional charges provided the change is ordered before work is installed and no extra materials are required.

1.10 CLEANING OF EQUIPMENT, MATERIALS AND PREMISES

A. Clean equipment and materials thoroughly. Leave surfaces to be painted smooth and clean, ready for painters. Clean entire premises of unused materials, rubbish, debris, grease spots and dirt. Remove, clean and replace pipe line strainers after system has been in operation for a period of thirty (30) calendar days.

PART 2 - PRODUCTS

2.01 MECHANICAL MATERIALS AND EQUIPMENT OF EQUAL MANUFACTURER

A. In addition to manufacturers specified, the following shall also be considered equal, provided corresponding models meet specification requirements. The equivalent equipment names herein shall be submitted to the Architect for approval.

1. Cleanouts: Zurn, Josam, J.R. Smith

2. Valves: Stockham, Milwaukee, Nibco

3. Pipe Hangers and Supports: Grinnell, Tolco

4. Insulation: O.C. Fiberglass, Gustin-Bacon.

5. Drains: J.R. Smith, Josam, Zurn.

6. Plumbing Fixtures Trim: T & S Faucet, Chicago, Delta, Zurn, Moen.

7. Plumbing Fixtures: American-Standard, Eljer, Crane, Kohler, Elkay, Just, Ceco.

2.02 MATERIALS

A. Pipe and Fittings:

1. Sanitary Waste and Vent Inside Building:

   a. 2-1/2" and Smaller: 6" above ground, C1SP1 301-90 no-hub service weight coated cast iron soil pipe and no hub couples or Schedule 40 ASTM A53 galvanized pipe and coated cast iron fittings. No galvanized pipe for urinal waste.

   b. 3" and Larger: C1SP1 301-90 no-hub service weight coated cast iron soil pipe and no hub couplings.

2. Potable Cold Water and Hot Water - Above Ground:

   Type "L" , ASTM B88 hard drawn copper tubing with wrought copper fittings ASSI/ASME B16.22. Piping below ground shall be Type K.

3. Natural Fuel Gas: Schedule 40 black steel ERN pipe, ASTM A53 with 150 pound WOG black malleable iron screwed fittings ANSI/ASME B16.3. Piping shall be wrapped below ground in accordance with NFPA standards.

B. Union and Gaskets:

1. Unions for Steel Pipe: Walworth screwed malleable iron ground seat, 250# Class.

2. Unions for Copper Tubing: Anaconda #1633 or 1733.

3. Gasket : 1/6" Garlock #7022.

C. Materials for Joints:

1. Threaded Compound: Type "Untye" for general use and Acorn #3500 for cleanouts.

2. No-Hub Joints - 4" and Smaller: Heavy gauge stainless steel complete with two bands and neoprene gasket.

3. Solder:

   a. Water Piping Above Ground: Mueller Streamline #95 with non-corrosive paste type solder flux.

   b. Water Piping Below Ground: "Silfos".

D. Cleanouts:

1. General: Cleanouts on cast iron soil pipe shall be iron body with extra-heavy bronze plugs screwed into caulking ferrules. Where cleanouts occur in finished interior walls, provide plates and frames for flush mounting, with exposed parts smooth polished chrome plated. Exposed parts of floor cleanouts in finished rooms shall be diamond tread, non-slip polished nickel bronze and in unfinished rooms and outside paved

areas, cast iron. Floor cleanouts shall have adjustable watertight top.

2. Interior:

   a. Plastered and/or Drywall Type for Cast Iron Pipe: Smith #FIG. 4558S

   b. Wall Type for Cast Iron Pipe: Smith # FIG. 4512 W/ FIG.4730

   c. Tile Wall Type for Cast Iron Pipe: Smith # FIG. 4558S:NB stainless steel

   d. Floor Level Type in Finished Rooms: Smith # Fig. 4053 W/ no-hub end.

   e. Floor Level Type in Unfinished Rooms: Smith # Fig. 4233L w/ no-hub end.

E. Valves: Valves shall be of the same manufacturer or following numbers of the equivalent by comparator chart of approved manufacturers. All valves shall be gate type unless otherwise noted or specified. Provide adapters for valves in copper tubing where necessary.

1. Gate Valves: NIBCO T-113 or S-13

2. Globe Valves:NIBCO T-211 OR S-211

3. Check Valves: NIBCO T-413 OR S-413

4. Balancing Cocks: Rockwell Fig. 1416 screwed.

5. Gas Cocks:
   a. Rockwell Fig. 142 or Fig. 143.

   b. Mc Donald 10596

6. Stops:

Chicago	
Straight	45-LK
Angle	442-LK
Partition	770-LK

F. Pipe Sleeves:

1. Concrete Walls or Floors: "Adjust-to-crete" or Paramount. For fire rated walls and floors use Dow Corning 3-6548 RTV foam to fill annular space.

2. Under Walks, Building or Other Structures: Terra Cotta or Fibre.

G. Pipe Hangers:

1. Hangers shall be complete with threaded steel rods, sound and electrolysis isolators as required and hereinafter specified.

a. 2-1/2" and Smaller for Water, Waste and Vent Piping: Grinnell Fig. 104.

b. Concrete Inserts: Grinnell Fig. 281.

H. Access Boxes and Panels:

1. Access panels in Plaster Walls or Ceilings: Smith Fig. 4760AK 12"x12" minimum size. Door and frame shall be prime coated steel.

2. Access Panels in Walls and Inaccessible Ceilings: Shall be the responsibility of and provided under this Section as indicated on the drawings and required by these Specifications

3. Access Panels in Ceramic Tile Walls: Smith Fig. 4762AK, cover and frame suitable size for purpose intended, but in no case shall be less than 12"x12"

I. Pipe Flashing:

1. Sanitary Vents: Stoneman #S1100-5R with one-piece lead flashing and counter flashing sleeve.

2. Miscellaneous Piping: Stoneman #S1000-4 with one-piece lead flashing and counter flashing sleeve.

J. Floor, Wall and Ceiling Plates: Beaton and Cadwell #10 polished chrome plated steel with locking device.

K. Sound and Electrolysis Isolation: Stoneman "Trisolators" of size as required.

L. Dielectric Unions: Epco nut type or flange type union with insulators and gaskets to suit service requirements.

M. Water Hammer Arrestors: Precision Plumbing Products, sized in accordance with Plumbing Drainage Institute Standards.

N. Insulation - Potable Hot Water:

1. Concealed Piping:

a. Hot water piping shall be provided with 1" thick minimum Manville Flame-Safe (VB) pipe insulation. Insulation shall be applied after piping has been installed, tested, approved and after pipes are in a dry and clean condition. Provide Childer's aluminum jacketing to piping insulation exposed to weather. Secure jacketing as recommended by manufacturer.

b. Condensate drainage piping above ceiling shall be provided with 1" thick "Armaflex" pipe insulation. Insulation shall be applied similar to hot water piping.

c. Fittings and valve bodies shall be covered with Manville #375 insulating

cement worked on it two applications and furnished with adjoining insulation. Provide formed aluminum covers to fittings and valve bodies exposed to the weather.

d. Insulation and Covering on Pipe and Tubing: Insulation and covering on pipe and tubing shall have a flame spread rating not to exceed 25 and a smoke density not to exceed 50 when tested in accordance with U.B.C. Standard #42-1.

2.03 PLUMBING FIXTURES

A. Plumbing fixtures trim, exposed supplies and 17 gauge "P" traps shall be brass with polished chrome plated finish unless otherwise specified. Exposed wastes between trap and wall may be galvanized steel nipples with polished chrome plated brass casing. Concealed wastes may be galvanized steel pipe and concealed traps may be rough brass. Individual loose key stops, or, if so specified, screw driver stops, shall be provided for all supplies and unless integral with valves of faucets, or unless otherwise approved by the Architect shall be mounted under this fixture. All wastes shall be separately trapped. Exposed supplies and wastes to wall shall be provided with polished chrome plated cast brass wall escutcheons.

B. Wall Hung Fixtures:

1. Fixtures specified with hanger or supporting arms shall have hangers or arms securely mounted on a 1/4" thick X 8" wide steel wall plate which shall extend at least one stud beyond the first and last fixture mounting points, Concealed are assembled shall be attached to plates by four 3/8" x 1-1/4" steel bolts, nuts, hangers and exposed by 5/16" minimum full thread steel studs and jam nuts. Plates shall be drilled and tapped at the time of fixture installation.

2. Wall plates shall be recessed flush with studs and shall be securely attached to each stud crossed. In wood stud construction the plate shall be attached to each stud with 3/8" steel carriage bolts which shall extend through the center of the stud and be secured on the opposite side with steel washers and nuts.

C. Where drains are specified with clamping collars, carefully cut the waterproof membranes to fit the drain, then anchor between drain and collar with rustproof bolts.

D. Type: Refer to plumbing fixture schedule on plumbing drawings for fixture types.

PART 3 - EXECUTION

3.01 MANUFACTURER'S DIRECTIONS: Where manufacturers of articles used in this Contract furnish directions covering points of installation not shown on drawings or herein specified, such directions shall be followed.

3.02 EXCAVATION AND BACKFILLING: Excavation and backfilling required for any Mechanical Work shall be under this Section of the Specifications and shall conform to the requirements of California Plumbing Code.

3.03 OPENINGS, SUPPORTS AND CUTTING AND PATCHING: Contractor shall provide all openings and supports and shall do all cutting and patching which may be required for installation of work under this Section of the Specifications. Patching shall be of the same materials, workmanship, and finish and shall accurately match all surrounding construction. Where pipes are to pass through or interfere with any structural member, or where notching, boring, cutting or patching of the structure is necessary, the work shall be done as approved by the Architect.

3.04 GENERAL INSTALLATION

A. Piping:

1. Pipe runs shall be straight and true. Springing or forcing piping into place will not be permitted. Piping shall be installed in such a manner as to prevent any due strain on the equipment.

2. Joints shall be smooth and unobstructed inside and cut pipe ends shall be thoroughly reamed to remove all burrs.

3. Pipe runs and connections shall be carefully made to insure unrestricted flow, eliminate air pockets and permit complete drainage of the system.

4. Piping shall be concealed in finished portions of the building except as otherwise directed.

5. Piping shall be installed to clear beams, unless sleeving is indicated. The Contractor shall constantly check the work of other Sections so as to prevent any interference with this installation.

6. Exposed plated, polished or enameled connections from equipment, shall be made with special care, showing no tool marks or threads and shall be supported by neat plated hangers with round screws of same material and finish.

7. The ends and openings of all pipe and fitting shall be capped or plugged immediately to exclude dirt until equipment is installed and final connections are made.

8. Pipe size reduction shall be made with reducing fittings. No bushing shall be used unless specifically authorized.

9. Closed nipples shall not be used.

10. Floor, wall and ceiling plates shall be installed at all points where pipes pierce the finished surface.

11. A union shall be installed on one side of each shut-off valve, at both sides of automatic valves, at equipment connections and elsewhere as indicated or required.

12. Rough-in shall proceed as rapidly as the general construction of the building will permit and shall be completed and tested before lathing, plastering or other finish work is started. Work shall be fitted to the available space and shall be accurately roughed-in.

13. Branch hot water piping in walls running to plumbing fixtures need to be insulated, but shall not be touching any other piping or steel studs in walls unless provided with trisolators or approved insulating materials.

14. Water piping shall be graded and valved so as to provide for the complete drainage and control of the system.

15. Soil, waste and water piping shall be installed in such a manner as to prevent any unusual noise from the flow of water under normal conditions.

16. Shut-off valves shall be provided where indicated on the drawings, where required for adequate control of the system and for isolation of fixture group.

17. Except where location makes the use obvious, all valves shall be labeled with securely attached metal tags.

18. Connections between two dissimilar metal pipes shall be made with dielectric unions.

19. Sanitary vents shall be grouped together wherever possible.

20. Buried pipes shall have a minimum coverage of 18" unless otherwise indicated, or if this coverage cannot be obtained and if approved by the Architect, shall be encased in concrete.

21. Gas piping trapped by change of grade shall be provided with drip legs.

22. Refer to California Plumbing Code for other installation requirements.

B. Pipe Joints: Screwed joints shall be made with a minimum amount of compound applied to the male thread only.

C. Hangers and Bracing:

1. Unless otherwise indicated horizontal pipe runs shall be firmly held in place by approved steel and iron hangers, supports and/or pipe rests.

2. Hanger rod shall be suspended from approval brackets, clamps or clips. Inserts shall be installed with 1/3" steel reinforcing rods passing through the holes provided for this purpose.

3. Pipe runs, except buried piping, shall be installed and so hung or supported that they may expand or contract freely without strain to pipe or equipment.

4. Horizontal steel piping shall have hangers or supports every 10' except that piping under 1" in diameter shall have hangers or supports every 8' unless otherwise hereinafter specified.

5. Horizontal copper tubing 2" and over shall have hangers every 10'-0", 1" to 1-1/2" every 8' and 1/2" to 3/4" every 6'.

6. Horizontal cast iron no-hub piping shall have hangers or supports on each side of mechanical joints.

7. Vertical piping shall be supported at floor and at ceiling with wrought iron pipe clamps.

8. Branches from all lines 6' in length or longer shall have separated hangers or supports.

9. Provide sound and electrolysis isolators at all hangers and supports for cold domestic water lines. Where space limitations will not permit the use of manufactured items, the Contractor shall install support insolation as otherwise approved.

10. Pipes hall be support and braced per section 1632A.6 part 2 title 24 and DSA pre-applied No. R-0010. The SMACNA " Guideline for seismic restraint of mechanical system and plumbing piping systems.

D. Cleanouts:

1. Cleanouts shall be installed where indicated on the drawings and as required by code. All shall be accessible with extensions to grade, to outside of buildings, or to floor above as indicated on the drawings.

2. When waterproofing membrane is used in the floor, the membrane shall be brought to the cleanout without puncturing and shall be permanently anchored to the integral anchoring flange by means of a heavy cast iron clamping collar and rustproof bolts.

3. Cleanout covers shall be set flush with the finished wall, floor or grade and shall be securely anchored by means of integral lugs and bolts. Where surfacing materials are specified, it is the Contractor's responsibility to ascertain the thickness and to set the cleanout top so that the finished floor will be smooth.

E. Access Boxes and Panels:

1. Valve boxes shall be provided for valves located below grade unless otherwise indicated and for outside cleanouts in paved areas which extend to grade.

2. Metal access panels of suitable size and type hereinafter specified shall be provided for all valves and shock absorbers located in concealed pipe runs.

3. All access boxes and panels shall be set flush with the finished wall and shall have the door or plate removed during construction, or be otherwise suitable protected.

F. Wrapping for Buried Steel Piping:

1. Unless otherwise hereinafter specified, steel pipe for installation below ground with the exception of pipe conduit shall be shop coated and wrapped by an approved pipe coating applicator as follows:

   1 coat of asphalt primer
   2 coats of hot asphalt
   1 layer of 15 lb. felt
   1 coat of hot asphalt
   1 layer of Kraft paper

2. All coated pipe delivered to the job site shall be accompanied by applicator's affidavit certifying that the pipe has been given high voltage holiday detector test and that the pipe was free of holidays when shipped from the applicator's yard. One copy of each affidavit shall be submitted to the Architect.

3. A similar wrapping for made-up fittings and couplings shall be applied in the field. All field applications shall be then tested for holidays by an approved method in the presence of the Inspector.

4. Wrapped piping shall be handled in a particularly careful manner to avoid injury. Any questionable pipe wrapping may be rejected and the Contractor may be required to retest same.

G. Sterilization: Each unit of the water supply and distribution system shall be sterilized with chlorine gas or liquid hypochlorite before acceptance for operation. Work shall be done by an approved application laboratory. Unless otherwise required by local ordinances sterilization shall conform to the following:

1. Materials:

   a. Liquid Chlorine: U.S. Army Specification #4-1

   b. Hypochlorite: Liquid shall conform to Federal Specifications #O-B-441A Rev. A and Amendment 1, Grade D.

2. Methods: The amount of chlorine shall provide a dosage of not less than 50 parts per million.

a. The chlorinating materials shall be introduced into the lines and distribution system in a manner approved by the Architect.

b. After a contact period of not less than 24 hours during which period the chlorine residual shall be maintained at not less than 50 parts per million, the system shall be flushed out with clean water until the residual content is not greater than 0.2 parts per million.

c. Flush the entire system including all hose bibbs, fixture outlets, dead ends and other points where stagnant water tends to collect.

d. All valves in lines being sterilized shall be opened and closed several times during

the contact period.

3.05 TESTS

A. The Contractor shall perform all tests to the approval of the Architect. All tests shall be made in the presence of the Architect and at a time suitable to him.

B. Contractor shall furnish necessary labor and equipment for testing the tightness of all parts of the work. Cost of such test and replacing and/or repairing any damage resulting therefrom shall be borne by the Contractor.

C. Hydrostatic test shall be made by completely filling the piping system with water and eliminating all accumulations of air so that leakage, no matter how small, will be apparent on the test gauge immediately. Pressure shall be maintained until all pipe under has been examined, but in no case for less than one hour.

1. Sanitary Sewer System: 5 psig.

2. Cold and Hot Water Systems: 125 psig.

D. Fuel gas piping tested for 60 psig air pressure.

3.06 DAMAGE FROM LEAKS: Contractor shall be responsible for damage to any part of the premises caused by leaks or breaks in pipe, fixtures or equipment furnished and installed under these Specifications for a period of one (1) year from date of substantial completion.

3.07 GUARANTEE: In addition to guarantees required in General Conditions, certificates which guarantee equipment one (1) year after date of "Substantial Completion" shall be delivered to the Owner.

END OF SECTION
SECTION 15400

SECTION 15800

HEATING, VENTILATING AND AIR CONDITIONING

Requirements of Division I apply to work of this Section.

PART 1 - GENERAL

1.01 DESCRIPTION: Furnish all labor, materials, tools, appliances, equipment and transportation necessary for the remodeling of existing heating and ventilating system, complete as indicated and specified principal items of work include but are not limited to the following:

A. Work Included:

1. Complete replacement of existing air distribution system for building as indicated.

2. Air distribution system consisting of ductwork, insulation, registers, and grilles.

B. Work Not Included:

1. Electrical work except as specified in this Section.

2. Concrete work except as specified in this Section.

3. Painting.

1.02 ELECTRICAL WORK

A. Under Electrical Section:

1. Conduit for line voltage wiring for all equipment and devices as indicated on the drawings or specified herein.

2. Line and low voltage wiring for all equipment devices as indicated on the drawings or specified herein.

3. Furnishing and installing disconnect switches.

4. Installing all electrical devices such as starters, relays. etc., all when specifically indicated on the drawings and furnishing all such devices.

5. Responsibility for asking for clarification at time of bidding for all discrepancies between Mechanical and Electrical work.

B. Under Mechanical Sections:

1. Furnishing all electrical devices necessary for Mechanical Works (except disconnects) unless otherwise specifically indicated otherwise.

2. Furnishing and installing all additional wiring, conduit and electrical devices required due to substitution of mechanical equipment. Additional work required of the Electrical Section due to substitutions shall be paid for under this Section.

3. Responsibility for asking for clarification for all discrepancies between Mechanical and Electrical work.

C. Responsibility for the proper operation of automatic electrical controls and equipment of electric power driven equipment furnished under this Section of the Specifications, is included in the Mechanical Section of the Specifications.

1.03 SUBMITTALS:

A. Contractor shall submit within thirty-five (35) calendar days after the Subcontract is signed, a list of materials, equipment, appliances and fixtures giving complete information as to the proposed items. Five (5) copies of said list shall be submitted. Refer to Paragraph 2.01 (Mechanical Materials and Equipment of Equal Manufacturer).Substitutions shall comply with Section 01600.

B. No equipment shall be ordered without shop drawings approved by the Architect. Any items ordered without approval are at the Contractor's own risk.

C. Orders for all materials, equipment, appliances and fixtures shall be placed with sufficient time to be received at the job site prior to the installation time.

1.04 DRAWINGS AND SPECIFICATIONS:

A. The specifications are intended to cover all labor, materials and standards of mechanical workmanship to be employed in the work shown on the drawings, called for in these specifications, or reasonably implied by the terms of same. The drawings and specifications are intended to supplement one another and any part of the work that is mentioned in one and not represented in the other, shall be done the same as if it has been mentioned or represented in both. The omissions from the specifications or drawings of any minor detail of construction, installation, materials or essentials shall not relieve the Contractor from furnishing the same in place, complete.

B. Interpretation of Drawings and Specifications:

1. The Architect will interpret the meaning of any part of the drawings and specifications about which any misunderstanding may arise and his decision shall be final.

2. Should there appear to be any error or discrepancy in or between the drawings and/or specifications, the Contractor shall refer the matter to the Architect for adjustment before proceeding with the work. Should the Contractor proceed with the work without so referring the matter, he does so on his own responsibility.

1.05 QUALITY OF MATERIALS AND WORKMANSHIP:

A. Unless otherwise specifically provided elsewhere in the specifications, all materials, equipment and articles incorporated in the work covered under this Section of the

Specifications shall be new, of best grade and the latest products as listed in printed catalog data of a single manufacturer.

B. Unless otherwise specified herein, specified reference in the specifications to materials, appliances, fixtures and equipment by name, make and model or catalog number shall be interpreted as establishing a standard of quality.

C. All workmanship shall be of the best quality and competent mechanics skilled in their trades shall be employed. The Contractor shall furnish the service of an experienced Superintendent who will constantly be in charge of the erection of the work, together with all necessary journeymen, helpers and laborers required to properly unload, construct, connect and test these systems.

D. The Architect shall have the right to accept or reject materials and/or workmanship and determine when the Contractor has complied with the requirements herein specified.

1.06 LOCATIONS AND ACCESSIBILITY: The Contractor shall fully inform himself regarding any and all peculiarities and limitations of the spaces available for installation of all work and materials furnished and installed under this Section of the Specifications. The drawings indicate the desired location and arrangement of piping, equipment and other items and are to be followed as closely as possible. Work specified and not clearly defined by the drawings shall be installed and arranged in a manner approved by the Architect. In the event changes in the indicated locations and arrangement are deemed necessary by the Architect, they shall be made by the Contractor without additional charges provided the change is ordered before the work is installed and no extra materials are required.

1.07 REGULATIONS AND CODES: All work and materials shall be installed in full accordance with the latest published editions of the Uniform Mechanical Code and with all applicable State Codes and Regulations, including Industrial Safety Orders, Health and Safety Code, State Fire Marshal's regulations and with prevailing rules and regulations pertaining to the moving parts or otherwise hazardous locations. Nothing in these drawings or specifications is to be construed to permit work in violation of the governing codes.

1.08 RECORD DRAWINGS: Provide and keep up-to-date a complete as-built set of blue line prints, which shall be corrected daily to show every change from original drawings and specifications, size and kind of equipment and runs of all ductwork, etc. Prints for this purpose may be obtained from the Architect. This set of drawings shall be kept on site and shall be used only as a record set. Conform to Section 01700.

1.09 SUMMARY OF SUBMITTALS:

A. Six (6) brochures on Materials and Equipment complete.

B. Operating and Maintenance Brochures.

C. Letter endorsed by Owner that Owner has been completely instructed on Operation and Maintenance of all Mechanical Work.

D. Test data.

E. Control diagrams.

F. Guarantees.

PART 2 - PRODUCTS:

2.01 MATERIALS

A. Mechanical materials and Equipment of Equal Manufacturer:

1. In addition to the manufacturers specified, the following shall also be considered equal, provided corresponding models meet specification requirements. The equivalent equipment named herein shall be submitted to the Architect for approval under provisions of Section 01600 only.

2. Thermometer: Palmer, Trerice, Mueller.

3. Insulation: O.C. Fiberglass, SCG.

4. Solders: Silos, Easy-flo.

5. Access Panels: Zurn, Josam, Milcor, Acorn.

6. Diffusers, Registers, Grilles: Barber-Colman, Metal-Aire, Tutle Bailey.

7. Air Filters: FARR, AFF. Shall be CSFM listed.

8. Temperature Controls: Honeywell, Andover.

9. Combination Fire/Smoke damper: Pottorf, Ruskin, Air Balance Inc.

B. Ductwork:

1. Layout: Drawings are in part diagrammatic and are intended to convey scope of work and indicated the general arrangement of equipment, ducts and piping. Contractor shall follow drawings in laying out the work, consult general construction drawings to familiarize with all the conditions affecting the work and shall verify spaces in which the work will be installed. Where job conditions require reasonable changes in indicated locations and arrangement, make such changes in accordance with the General Conditions Section.

2. Description: Includes sheet metal plenums, housing, ductwork, manually operated dampers, equipment connection and fire dampers.

3. Materials: All sheet metal fabricated or galvanized steel, except supports, bar or angle reinforcing, damper rods, which shall be uncoated, mild steel, painted with one (1) coat of primer and (1) additional coat of aluminum paint conforming with the Painting Section.

4. Duct Construction: Gauges, transverse joints, spacing of joints and immediate bracing shall be as tabulated below and as required by the California Mechanical Code:

Round Ducts- Diameter in Inches	Rectangular Ducts- Max. Side in Inches	Min. Thickness U.S. Gauges
Up to 14	Up to 12	26
15 to 23	13 to 30	24
24 to 37	31 to 54	22
	55 to 84	20

C. Flat surfaces shall be crimped diagonally regardless of size. Longitudinal joints in all duct sized may be flat lock joints. Transverse joints and Intermediate bracing shall be constructed of galvanized sheet metal and/or galvanized structural angles.

D. Lock joints shall be hammered to make them airtight and shall be riveted at each corner. The inside of the duct shall present a smooth surface to the flow of air.

1. All changes in the sizes of duct shall increase gradually with a slope of not more than one foot in five feet where possible, but not more than one foot in three feet in any event.

2. Turns shall be made with a throat radius of not less than the duct width.

3. All horizontal ductwork shall be strongly supported with galvanized hangers at not greater than five feet spacing.

4. Plenums shall be made of 18 gauge galvanized sheet steel reinforced on a maximum of 30" center by 1-1/2"x1-1/2"x1/8" galvanized angles.

5. Plenums access door shall be galvanized sheet steel doors and frame properly reinforced to prevent breathing. Door shall be of the same gauge as the duct or casing shall have a 1/2" celotex core with galvanized sheet steel on both sides. Each door shall be hung on piano hinges and with one or more catches which are operable from both sides and similar to Ventfabris, Inc. #260 Ventlock latch. All doors shall be left hung open against air pressure and shall be fitted with felt to insure air tightness.

6. Flexible connections for air duct shall be 16 oz. airtight "Ventglas LA: non-combustible fabric with fire retardant neoprene coating on the outside. Flexible connections shall be attached to the ductwork by lock seam and shall not be more than 6" long. Flexible connections shall be provided where required or indicated on the drawings. Coating flame spread 0-25, smoke density 0-50.

7. Round Flexible Duct: Shall be a factory fabricated, assembly consisting of zinc-coated, carbon spring steel helix, wrapped with a one inch (1") thick fiberglass insulation. Assembly shall be sheathed with a vapor barrier jacket, installed in strict accordance with the manufacturer's instructions. Assembly shall be U.L. labeled and meet Class I requirements of NFPA 90-A requiring flame spread rating of 25 or less and smoke developed rating 50 or less. "Glassflex" Type and SL-181 or approved equal by "Thermaflex", or "Casco".

8. Inspections doors shall be installed in ductwork on downstream side of each motorized damper. Inspection doors shall be airtight and shall be insulated with 1: thick insulation, hinged and latched.

E. Turning Vanes:

1. Vanes with both dimensions less than 48": Barber-Colman "Airturns" without splicing.

2. Vanes with either dimension greater than 48": Double thickness airfoil vanes of approved patterns.

F. Joint Taping: All transverse joints shall be taped with 6" wide, 6 oz. canvas saturated with Arabol. Additional coats of Arabol shall be to make ductwork completely airtight.

G. Dampers:

1. Balancing dampers shall be installed in each branch duct and in each main duct to provide for complete air balancing. Each volume damper shall be fitted with bearings and with an adjusting device having a locking mechanism. On Concealed, inaccessible ductwork or exposed in the finished spaces provide concealed damper regulators.

2. Duct 17" and Less: Balancing dampers where neither dimension of the duct exceeds 17" may be of the job fabricated "butterfly" type consisting of a blade constructed of 18 ga. galvanized steel securely riveted or welded as its center axis to a square operating rod.

3. Ducts 18" and Larger: Balancing dampers where either dimension exceeds 18" shall be Air Factors, Inc., Model #MD-16.

4. Fire Dampers: Fusible link type, manufactured in accordance with State Fire Marshal and local requirements and provided in accordance with ordinances having jurisdiction and elsewhere as indicated. Suitable access of servicing the dampers shall be provided. Testing: Conform to special conditions.

5. Concealed Damper Regulator: Young Regulator Company #3091 Young concealed air-split regulator, Drawing #1196.

H. Insulation:

1. Concealed Supply and Return Ducts: Shall be provided with Owens/Corning fiberglass foil-faced duct wrap insulation, 3/4 lb. per cubic foot density, 1-1/2" thickness. The insulation shall be firmly wrapped around the duct with a 2" minimum lap on all joints and shall be secured with 16 ga. soft annealed galvanized wire spaced at 12" O.C. Ductwork with sides 30" and larger shall be provided with mechanical fasteners spaces at 18" O.C. in both directions. Insulation shall have a flame spread of not more than 25 and smoke density not exceeding 50 when tested as a composite including material tapes and adhesives.

2. Ductwork and Plenums on Roof and as Indicated Sound Lining: Shall be provided with Owens/Corning Fiberglass Aeroflex duct liner, 3 lb. per cubic foot density, 1-1/2" thick, complying with N.B.F.U. Pamphlet 90-A requirements. The insulation applied to the inside of the ducts and to the surface with Foster 81-99 "Safetee Duct Fas" fire retardant adhesive. Longitudinal joints shall be formed in corners of the duct or plenums only. Joints shall be tightly butted together and sized with fire retardant adhesive. The insulation shall be secured with adhered mechanical fasteners in addition to the adhesive. Fasteners shall be spaced at 18" O.C. in both directions.

I. Duct Accessories:

1. Duct and Plenum Thermometers: 3-1/2" dial chromium plated case, extended brass union connections, 30 degree to 180 degree range , 1% of scale range accuracy, adjustable mounting direct or with armored capillary tube for convenient mounting. Thermometers shall be installed in supply air plenums at HVAC units. Thermometers shall be located for ease of reading from enclosure floor and accessibility. Capillary tube shall be securely supported.

J. Air Distribution Equipment:

1. Air distribution equipment shall be of sizes and capacities as indicated on the drawings.

2. Air distribution equipment installed in the ceiling shall be furnished in baked off-white finish.

3. Air distribution equipment installed in walls shall be furnished with finish color selected by the Architect. Submit paint sample for approval.

4. One coat of black paint will be applied to the visible ductwork and in back of all distribution equipment under Section 09900.

5. Supply Air Ceiling Diffusers: Anemostat Model RMD-S with volume control.

6. Supply Air Wall Registers: Anemostat Model 2250 with volume control.

7. Return Air Wall or Ceiling Registers or Exhaust Registers: Anemostat Model 3250 with volume control.

8. Extractor: Barber-Colman "Deflectors".

9. Return and Exhaust Air Grilles: Anemostat Model S1H.

2.02 COMBINATION FIRE/SMOKE DAMPER.

A. Each Combination Fire and Smoke Damper shall meet all requirements specified elsewhere for fire dampers and additionally shall include an operating shaft which, when rotated 90 degrees, causes damper to operate between closed and open. Operating shaft and damper combination shall be suitable for linking to and operation by any standard electric damper operator having sufficient torque characteristics.

B. Each Combination Fire and Smoke Damper shall be furnished complete with factory sleeve of length and gauge required for satisfactory installation and damper operator factory installed on exterior of sleeve and properly linked to damper operating shaft. Actuators shall be 120 volt electric, and shall be of the spring return fail closed type that will close damper upon power interruption. Damper operators shall be UL listed as Fire Damper Operators and bear the appropriate UL Fire Damper Operator label.

C. All Wiring or piping material and labor required to interconnect the Combination Fire and Smoke Dampers with smoke detection and/or alarm systems shall be furnished by other trades and contractors as detailed elsewhere in the specifications.

2.03 ELECTRICAL WIRING

All line voltage wiring and conduit and conduit for low voltage wiring is to be furnished by the Electrical Subcontractor. Provide diagrams and information for the proper connection and operation of all equipment furnished under this section that requires electrical connections. All low voltage (24V) wiring shall be furnished and installed by the Mechanical Contractor, and shall conform to the N.E.C. requirements for control wiring.

2.04 OPERATING INSTRUCTIONS AND MAINTENANCE BROCHURES

A. Furnish and install, as directed, copies of the control systems as they have been installed, and a typewritten description of the control system. These items are to be turned over to the Owner's Representative.

B. Upon completion of the work, carefully prepared four (4) brochures containing all necessary maintenance and operating instructions for all the equipment furnished under this section of the equipment must be included in these brochures and shall be obtained from the manufacturer of the equipment. In addition, each brochure shall contain a copy of the control diagrams and a description of the control systems, as well as a copy of the test and balance report.

C. At all time of final acceptance of the work arrange to have a competent representative present. At the time of these inspections he shall give verbal instructions to the Owner's operating personnel. Instructions shall include the function and operation of each piece of equipment and the method of making adjustments to the equipment.

D. The foregoing diagrams, descriptions, brochures and instructions must be completed and turned over to the Owner's Representative before final acceptance of the work.

2.05 GUARANTEE

A. Furnish a written guarantee that all materials and equipment furnished and installed under this section of the specifications is guaranteed for a period of one (1) year, after the date of filing of the Notice of Completion, against any defective workmanship and materials. Such defects shall be remedied promptly upon notice from the Owner or upon their becoming apparent.

B. Furnish all manufacturer's equipment guarantees to the Owner.

C. These guarantee requirements must be submitted to the Owner as a pre-requisite to final payment.

PART 3 - EXECUTION

3.01 MANUFACTURER'S DIRECTIONS: In all cases where the manufacturers of articles used in this Contract furnish directions covering points not shown on the drawings or herein specified, such directions shall be followed.

3.02 OPENINGS AND SUPPORTS: The contractor shall provide all openings and supports which may be required for the installation of the work under this Section of Specifications. Where pipes are to pass through or interfere with any structural member, or where notching, boring or cutting of the structure is necessary, the work shall be done as approved by the Architect and the DSA. Two plates in bearing partition shall not be cut or notched.

3.03 EXCAVATION AND BACKFILLING: Excavation and backfilling required for any Mechanical Work shall be under this Section and shall conform to the requirements of Section 02225.

3.04 INSTALLATION:

A. All air distribution equipment locations shall be coordinated with the lighting fixtures and ceiling construction. See architectural plans.

B. Turning vanes shall be installed at all right angel sharp turn ducts.

C. Fire dampers in supply air ducts, return air ducts and exhaust air ducts shall have fusible links with melting temperature 50 degrees F above the maximum normal operating temperature. Fire dampers shall be provided with adequate access. conditions.

D. Ductwork connected to louvered openings shall be adapted to the size of these openings.

3.05 QUIETNESS: Piping, ductwork and equipment shall be arranged and supported so that vibration is at a minimum and is not carried to the building structure.

3.06 INITIAL LUBRICATION, ADJUSTING AND FILLING SYSTEM: Before operation of any mechanical system, all bearings shall be lubricated and belts, pulleys and other moving parts shall be checked for alignment and tolerance in accordance with the manufacturers operating instruction. All piping and liquid systems shall be filled with operating fluids.

3.07 EQUIPMENT IDENTIFICATION:

A. All air conditioning equipment, automatic valves, indicators and controllers and other control items, installed shall be properly identified in accordance with Section 09900.

B. Identification shall be made laminated engraved bakelite nameplates with 1/4" high letters.

C. Nomenclature shall be as indicated on the drawings and/or approved by the Architect.

3.08 SYSTEM BALANCING:

A. Balancing of supply, return, exhaust or outside air quantities shall be made of an independent air balancing AABC member agency to the approval of the Architect.

B. Balancing data in report form shall be submitted for air flow at each outlet, outside air, exhaust air, return air, total supply air, fan R.P.M., fan static pressures and temperature and any other data deemed necessary to show that proper adjustment has been made.

C. Tests shall be witnessed by Owner's Representative and submittal data signed by Owner's Representative before final inspection.

D. Air Balancing Agency shall verify that dampers have been installed for adequate air balancing and that excessive air noise in the ductwork will not prevail. Duct joints shall be repaired as required.

3.09 OPERATING AND MAINTENANCE: System shall be placed in operation and regulated and adjusted to the approval of the Architect. Contractor shall instruct Owner's personnel in all equipment operation. Instruction period shall not be less than 24 hours total. Contractor shall incorporate in the operating and maintenance instruction the following directives:

A. Oil motor bearing every month.

B. Check fire dampers for melting links every month.

C. Clean outside air louvers and screens every month.

D. Check fan belts every month.

E. Check and/or replace media on all filters every (2) months.

F. Check temperature controls for calibration every (6) months.

3.10 OPERATION AND MAINTENANCE INSTRUCTIONS: Operating and maintenance instructions for the equipment specified in this Section shall be delivered to the Architect in accordance with Section 01700. The Owner's Representative who will operate the system shall be fully instructed by the Contractor about operation and maintenance of the system. One additional set of approved instructions and one set of control diagrams shall be framed behind glass and mounted in Electrical Room. The control diagrams shall be submitted to the Architect for approval prior to mounting.

3.11 CLEANING OF EQUIPMENT, MATERIALS AND PREMISES: All equipment and materials shall be thoroughly cleaned. Surfaces to be painted shall be left smooth and clean, ready for painters. The entire premises shall be cleaned and unused materials, rubbish, debris, grease spots, and dirt to the approval of the Architect.

3.12 GUARANTEE: Submit guarantees as required under Section 01700. Equipment and workmanship shall be guaranteed for a period of one (1) year from substantial completion.

END OF SECTION

SECTION 16010

BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 SCOPE

A. This section supplements all sections of this division and shall apply to all phases of work hereinafter specified, shown on the drawings, or required to provide a complete installation of electrical systems for the Project. The work required under this division is not limited to the electrical specifications and drawings. Refer to all bid documents including Site, Architectural, Structural, and Mechanical documents which may designate Work to be accomplished. The intent of the Specifications is to provide a complete and operable electrical system, which shall include all documents, which are a part of the Contract.

1. Work included: Furnish all labor, material, tools, equipment, facilities, transportation, skilled supervision necessary for, and incidental to, performing operations in connection with furnishing, delivery, and installation of the work in this division complete as shown or noted on the Drawings and specified herein.

B. Related Work Specified Elsewhere:

1. Refer to all sections in the general contract conditions, Contract Requirements and Division 1, General Requirements.

C. Work Installed but Furnished by Others:

1. The electrical work includes the installation or connection of certain materials and equipment furnished by others. Verify installation details. Foundations for apparatus and equipment will be furnished by others unless otherwise noted or detailed.

1.02 GENERAL REQUIREMENTS

A. Guarantee See General Conditions:

1. Except as may be specified under other Sections in the specification, guarantee equipment furnished under the specifications for a period of one year, except for equipment required to have a longer guarantee period, from date of final completion. Guarantee all work against defective workmanship, material, and improper installation. Upon notification of failure, correct deficiency immediately and without additional cost to the Owner.
2. Standard warranty of manufacturer shall apply for replacement of parts after expiration of the above period. Manufacturer shall furnish replacement parts to the Owner or his service agency as approved. Furnish to the Owner, through the Architect, printed manufacturer's

warranties complete with material included and expiration dates, upon completion of project. Conform to Section 01700.

B. Equipment Safety: All electrical materials and equipment shall be new and shall be listed by Underwriter's Laboratories and bear their label, or listed and certified by a nationally recognized testing authority where UL does not have an approval. Custom made equipment must have complete test data submitted by the manufacturer attesting to its safety.

C. Codes and Regulations:

1. Design, manufacturer, testing and method of installation of all apparatus and materials furnished under the requirements of these specifications shall conform to the latest publications or standard rules of the following:

   a. Institute of Electrical and Electronic Engineers - IEEE
   b. National Electrical Manufacturers' Association - NEMA
   c. Underwriters' Laboratories, Inc. - UL
   d. National Fire Protection Association - NFPA
   e. American Society for Testing and Materials - ASTM
   f. American National Standards Institute - ANSI
   g. California Electrical Code – CEC, Title 24, Part 3
   h. California Code of Regulations, Title 8, Subchapter 5
   i. California Building Code-CBC, Title 24 Parts 1 &2
   j. State & Municipal Codes in Force in the Specific Project Area
   k. Occupational Safety & Health Administration – OSHA
   l. California State Fire Marshal - Division of the State Architect
   m. California Fire Code- CFC, Title 24 Part 9

2. The term "Code", when used within the specifications, shall refer to the Publications, Standards, ordinances and codes, listed above. In the case where the codes have different levels of requirements the most stringent rules shall apply.

D. Requirements of Regulatory Agencies:

1. Codes, Permits, and Fees: Where the Contract Documents exceed minimum requirements, the Contract Documents take precedence. Where code conflicts occur, the most stringent shall apply. The most stringent condition shall be as interpreted by the Engineer.

   a. Comply with all requirements for permits, licenses, fees and Code. Permits, licenses, fees, inspections and arrangements required for the Work shall be obtained by the Contractor at his expense, unless otherwise specified.
   b. Comply with the requirements of the applicable utility companies serving the Project. Make all arrangements with the utility companies for proper coordination of the Work.

E. Shop Drawings:

1. See Section 01300 for additional requirements.

2. Time Schedules for Submission and Ordering: The Contractor shall prepare, review and coordinate his schedule of submissions carefully, determining the necessary lead time for preparing, submitting, checking, ordering and delivery of materials and equipment for timely arrival. The Contractor shall be responsible for conformance with the overall construction schedule.
3. Submittals will be checked for general compliance with specifications only. The Contractor shall be responsible for deviations from the drawings or specifications and for errors or omissions of any sort in submittals.
4. Submit a complete list of materials and equipment proposed for the job, including manufacturers names and catalog numbers.
5. Shop drawings shall be submitted in completed groups of materials (i.e., lighting fixtures or switchgear). The Contractor shall add and sign the following paragraph on equipment and materials submitted for review. "It is hereby certified that the (equipment) (material) shown and marked in this submittal is that proposed to be incorporated into the project; is in compliance with the Contract Drawings and specifications and can be installed in the allocated spaces". Failure to add the above written statement for compliance will result in return of submittals without review.

    a. Bind catalog cuts, plate numbers, descriptive bulletins and drawings, 11" x 17" or smaller, in sets with covers neatly showing titles.
    b. The Contractor shall verify dimensions of equipment and be satisfied as to Code compliance for fit prior to submitting shop drawings for approval.
    c. Where current limiting devices are specified, submit technical data to substantiate adequate protection of equipment cascaded downstream. Submittals shall not be reviewed unless supporting calculations and data are submitted therewith.
    d. Include complete catalog information such as construction, ratings, insulation systems, as applicable.
    e. For any material specified to meet UL or trade standards, furnish the manufacturers or vendor's certification that the material furnished for the work does in fact equal or exceed such specifications.
    f. Reference listings to the specifications' Sections and Article to which each is applicable.
    g. Equipment Floor Plans: After approval of material is secured prepare a floor plan of each electrical and communication equipment space, room or yard, drawn to scale at 1/2 inch equals 1 foot and submit for approval in the same manner as for shop drawings. The layout drawings shall be exact scale.

6. Contractor shall prepare coordinated drawings when required by Section 01300.

F. Interpretations: Requests for interpretations of drawings and specifications must be made by the Contractor through the Architect. Any such requests made by equipment manufacturers or suppliers will be referred to the Contractor.

G. Standard of Quality

1. The contract Drawings and Specifications establish the "MINIMUM STANDARD OF QUALITY" each product and/or system must meet to be considered acceptable.

H. Submit comprehensive material list, shop drawings and complete technical data for the following equipment and materials as applicable for the project:

1. General Requirements:

a. Main service and distribution switchboards.
b. Panelboards.
c. Conduits
d. Conductors, include all selected insulation types.
e. Fuses
f. Disconnect switches.
g. Pullboxes, manholes and handholes.
h. Standard lighting fixtures, specially fabricated fixtures, ballasts and lamps, with samples and sample of standard finish available (where requested).
i. Control devices, standard and special receptacles, switches, outlets and finish device plates.
j. Cabinets for signal and telephone system, special terminals and cabinets. Include all cabinet dimensions.
k. Fire alarm system.
l. Integrated Communication Systems.
m. Data/telephone cables, devices and terminations.

I. Utility Service:

1. Should any major modifications to the work indicated be necessary to comply with the utilities requirements, notify the Architect.

J. Record Drawings:

1. Contract shall keep daily updated written/drawn as-built drawings at the job site for the duration of construction as outlined in the Contract Closeout Section 01700. In addition to requirements noted in the Contract Closeout, at the end of construction, the Contractor shall transmit all written as-built information on to Compact Disc electronic drawings using AutoCAD release 14 format and shall submit the electronic drawings to the Architect along with the written as-built drawings for comparison and review. Missed information or errors shall be completed by the Contractor within 30 days of notice of corrections.

K. Work Responsibilities:

1. The drawings indicate diagrammatically the desired locations or arrangement of conduit runs, outlets, junction boxes and equipment and are to be followed. Execute the work so as to secure the best possible installation in the available space and to overcome local difficulties due to space limitations. The Contractor is responsible for the correct placing of his work. Where conflicts occur in plans and/or specifications, the most stringent application shall apply and shall be part of the base bid.
2. Locations shown on architectural plan or on wall elevations shall take precedence over electrical plan locations, but where a major conflict is evident, notify the Architect.
3. In the event minor changes in the indicated locations or arrangement are necessary due to developed conditions in the building construction or rearrangement of furnishings or equipment or due to interference with other trades, such changes shall be made without extra cost.
4. Verify dimensions and the correct location of Owner-Furnished equipment before proceeding with the roughing-in of connections.
5. All scaled and figured dimensions are approximate of typical equipment of the class indicated. Before proceeding with work carefully check and verify dimensions and sizes with the drawings to see that the furnished equipment will fit into the spaces provided without violation of applicable Codes.
6. Should any changes to the work indicated on the drawings or described in the specifications be necessary in order to comply with the above requirements, notify the Architect.
7. Contractor shall be responsible for coordination of coordinated drawings when required by the Architect.
8. Replace or repair, without additional compensation any work which does not comply with or which is installed in violation of any of these requirements. Maintain continuity of all existing systems not specifically indicated to be modified. No electrical, alarm or communication system shall be disconnected, abandoned or left inoperable unless approved by the District. Any and all existing systems affected by construction shall be modified as required to repair back to original condition at no additional cost to the District.

L. Installation General: For special requirements, refer to specific equipment under these requirements.

1. Unless otherwise specified elsewhere in the specifications, do all excavating necessary for the proper installation of the electrical work.
2. Locations of Openings: Locate chases, shafts and openings required for the installation of the electrical work during framing of the structure. Do any additional cutting and patching required. Cutting or drilling in any structural member is prohibited without approval of the Architect. Furnish all access panels to make all boxes, connections and devices accessible as required by CEC.
3. Location of Sleeves: Where conduits pass through concrete walls, suspended slabs or metal deck floors, install sleeves of adequate size to permit installation of conduit. Sleeves shall be installed prior to pouring of concrete and shall have ends flush with the wall or extend 2 inches above floor surfaces. Verify locations.

4. Type of Sleeves: Sleeves shall be steel pipe.
5. Finish Around Sleeves: Rough edges shall be finished smooth. Space between conduit and sleeves where conduit passes through exterior walls shall be sealed to permit movement of conduit, but prevent entrance of water. Space between conduit and sleeves where conduit passes through fire rated interior walls and slabs shall be sealed with approved materials to provide a fire barrier conforming to the requirements of the governing authorities having jurisdiction, using UL Approved Firestopping Systems.
6. Wherever conduit extends through roof, install flashings in accordance with drawings and details.
7. Contractor shall be responsible for cutting and patching which may be required for the proper installation of the electrical work.
8. Protect work, materials and equipment cause whatever and provide adequate and proper storage facilities during the progress of the work. Storage outdoors shall be weather protected and shall include space heaters to prevent condensation. Provide for the safety and good condition of all work until final acceptance of the work. Replace all damaged or defective work, materials and equipment before requesting final acceptance.
9. Conduit and Equipment to be Installed: Clean thoroughly to remove plaster, spattered paint, cement and dirt on both exterior and interior. All underground conduit shall be mandrelled prior to pulling wire.
10. Conduit and Equipment to be Painted: Clean conduit exposed to view in completed structure by removing plaster and dirt. Remove grease, oil and similar material from conduit and equipment by wiping with clean rags and suitable solvents in preparation for paint.
11. Items with Factory Finish: Remove cement, plaster, grease and oil, and leave surfaces, including cracks and corners, clean and polished. Touch up scratched or bare spots to match finish.
12. Site Cleaning: Remove from site all packing cartons, scrap materials and other rubbish on a weekly basis. Vacuum out all cabinets, switchgear and panels prior to pulling any conductors.
13. Electrical equipment and materials exposed to public and in finished areas shall be finish-painted after installation in accordance with the Painting Section. All exposed screw-type fasteners, exterior, or interior in restrooms, shall be vandal-resistant spanner type; include tool.

M. Excavation, Cutting and Patching:

1. Excavating, trenching and backfilling required for the work of this Division in accordance with the applicable requirements of Division 2. Excavating and backfilling connected with electrical work, repaving cuts and providing and maintaining protective measures for the electrical work excavation required by the governing authorities having jurisdiction shall be performed as a part of the work of this Division.
2. Verify openings indicated on the drawings. Provide all cutting, patching and reinforcement of the construction of the building as required to install electrical work.

N. Tests

1. Equipment and systems for which the National Electrical Testing Association (NETA) has an approved or recommended procedure, shall be tested in accordance with that procedure. Test values shall equal values recommended by NETA. Copies of test reports shall be submitted as required under shop drawing submittals.
2. Resistance to ground tests shall be accomplished by a qualified independent testing firm to measure resistance to ground at grounding electrodes. Make tests before slabs or affected areas are poured in order that corrective measures, if required, may be taken. Submit a report showing the results of these measurements. If the resistances exceed values specified elsewhere or NETA test procedure recommendations, perform corrective measures required to reduce resistance to acceptable values.
3. Prior to energizing any motor, measure the service voltage for phase balance and report if unbalance exceeds 1% from mean.
4. Measure the three-phase voltage at no load and at maximum load conditions and submit to the engineer a report showing the results of these measurements.
5. Upon completion of the work and adjustment of all equipment, conduct an operating test. Conduct the test in the presence of an authorized representative of the Architect. Demonstrate system and equipment to operate in accordance with requirements of the Contract Documents and to be free from electrical and mechanical defects. Provide systems free from short circuits and grounds and show an insulation resistance between phase conductors and ground not less than the requirements of the governing electric code. Test circuits for proper neutral connection.
6. Complete tests prior to final inspection of project, including corrective work based on the results of the tests.
7. Perform special tests on systems and equipment as specified herein using personnel qualified to perform such tests.

O. Protection: Protect finish parts of the materials and equipment against damage during the progress of the work and until final completion and acceptance. Cover materials and equipment in storage and during construction in such a manner that no finished surfaces will be damaged or marred. Keep moving parts clean, dry and lubricated.

P. Cleaning Up:

1. Upon completion of the work and at various time during the progress of the work, remove from the building all surplus materials, rubbish and debris resulting from the work of this Division.
2. Thoroughly clean switchgear including busses, apparatus, exposed conduit, metal work including the exterior and interior, and accessories for the work of this Division, of cement, plaster and other deleterious materials; remove grease and oil spots with cleaning solvent; carefully wipe surfaces and scrape cracks and corners clean.
3. Thoroughly polish chromium or plated work. Remove dirt and stains from lighting fixtures.
4. Leave the entire installation in a clean condition.

Q. Completion:

1. The work will not be reviewed for final acceptance until operating and maintenance data, manufacturer's literature, panel directories and nameplates specified herein have been approved and properly posted or installed and final cleaning of equipment and premises has been completed.
2. When the installation is complete and adjustments have been made, operate the system for a period of one week, during which time demonstrate that systems are completed and operating in conformance with the specifications.

R. Operating and Maintenance Data: Submit complete and at one time, prior to acceptance of the installation, 4 copies of manufacturer's instructions for operation and maintenance of electrical equipment, including replacement parts lists. As specified in Section 01700.

S. Inspection and Acceptance Procedures: The Architect will submit observation reports periodically during the construction phase detailing Contract deficiencies. The Contractor is responsible for making corrections immediately. Notice of Completion of the project will not be made until all items have been corrected.

T. Final Completion of Electrical Systems:

1. Prior to Final Completion of operating electrical systems, the Contractor shall:

   a. Provide materials of the type and quality specified and as necessary for proper operation, tested and ready for use.
   b. Deliver to the Architect, the Record Drawings.
   c. Furnish the required Operating and Maintenance Data/Manuals.
   d. Clean up of the project pertaining to this Division of the work.
   e. After installation has been completed and adjustments made, operate the system for a period of one week, during which time, demonstrate to the Architect that systems are complete and operating in conformance with Contract Documents.
   f. Conduct tests required and as specified in this Division and submit test reports and corrective actions taken.
   g. Submission of warranties and guarantees.

2. Final Completion of Work Shall be Contingent On:

   a. Contractor replacing defective materials and workmanship.
   b. Upon completion of work and adjustments made, Contractor shall conduct an operating test for each system for approval at such time as Architect directs. Conduct test in presence of authorized representative of Architect and demonstrate that systems and equipment do operate in accordance with requirements of the Contract Documents and are free from electrical and mechanical defects.
   c. Contractor shall provide the necessary training programs and instructions to the Owner's representative. Number of hours shall be a

minimum of four (4) hours for each system or days as required under separate Sections of these Specifications. Complete operation and maintenance manuals shall be provided at least two (2) weeks prior to training.

d. Submit copies of manufacturer's instructions and maintenance of electrical equipment including replacement parts lists. Each set shall include one set of shop drawings of equipment installed.

e. Submittal of all as-built information as noted in paragraph J above.

U. Submittals for Change Orders: When changes are made during the construction phase, deletions and additions shall be presented in a manner that will indicate the cost of each item of material and corresponding labor. Markup shall be then added in accordance with the requirements of the General Conditions as modified by the Supplementary Conditions.

V. The Contractor at a time convenient to the Owner shall provide instruction to the Owner's operating personnel in the proper operation and maintenance of all equipment and systems. The instructors shall have received factory training and shall be thoroughly familiar with the equipment installed. The operating personnel shall receive the number of days instruction as indicated in other sections.

PART 2 - PRODUCTS

Not Used

PART3 - EXECUTION

Not Used

END OF SECTION

SECTION 16111

CONDUIT

PART 1: GENERAL

1.01 SECTION INCLUDES

A. Rigid metal conduit and fittings.

B. Intermediate metal conduit and fittings.

C. Electrical metallic tubing and fittings.

D. Flexible metal conduit and fittings.

E. Non-metallic conduit and fittings.

F. Intermediate metal conduit and fittings.

1.02 REFERENCES

A. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.

B. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.

C. ANSI/NEMA FB 1 - Fittings and Supports for Conduit and Cable Assemblies.

D. ANSI/NFPA 70 - National Electrical Code.

E. FS-WW-C-563 - Electrical Metallic Tubing.

F. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Electrical Metallic Tubing.

G. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

H. FS-WW-C-581 - Specification for Galvanized Rigid Conduit.

I. FS-WW-C-566 - Specification for Flexible Metal Conduit.

J. FS-WC-1094A - Electrical Non-Metallic Conduit.

K. NEMA-TC-2 - Electrical Plastic Tubing and Conduit.

1.03 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, protect, and handle Products to site under provisions of Section 016010.

B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

C. Protect PVC conduit from sunlight.

1.04 PROJECT CONDITIONS

A. Verify that field measurements are as shown on Drawings.

B. Verify routing and termination locations of conduit prior to rough in.

C. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

PART 2: PRODUCTS

2.01 CONDUIT REQUIREMENTS

A. Minimum Size: 1/2 inch for above ground and 3/4 inch minimum for underground installations unless otherwise specified.

B. Conduit Installation Schedule:

1. Underground conduit more than five feet from foundation wall shall be concrete encased non-metallic PVC Schedule 40 heavy wall rigid conduit.

2. Underground conduit within five feet of foundation wall or under four inch minimum concrete floor slab shall be PVC coated rigid steel conduit or concrete encased non-metallic PVC Schedule 40 heavy wall rigid conduit.

3. Underground conduit for utility company service shall be as directed by the servicing utility (City of Burbank).

4. Conduit installed in concrete or masonry, exposed outdoor locations, damp locations, hazardous locations, or where subject to mechanical injury shall be galvanized rigid steel or intermediate metal conduit.

5. Conduit installed in concealed dry interior locations such as walls or ceiling of the building shall be electrical metallic tubing.

6. Conduit installed in exposed dry interior locations above eight feet shall be electrical metallic tubing.

7. Conduit installed to supply power to all mechanical equipment and rotating electric equipment shall be waterproof flexible steel conduit. Conduit shall be 12" minimum in length for 2" conduit and smaller; 18" minimum length for conduit larger than 2". Conduit shall be 36" maximum in length.

8. Flexible steel conduit shall be used for lighting fixture connection only, no lengths exceeding 6'-0" shall be permitted.

9. All conduit risers through concrete slab including elbows shall be PVC coated galvanized rigid steel.

2.02 METAL CONDUIT

A. Rigid Steel Conduit: Galvanized rigid steel; ANSI C80.1: Federal Spec. WW-C-581. Standard weight that is not dipped, galvanized, electro galvanized or sheradized, both inside and out, with threaded connections and couplings is not permitted.

2.03 PVC COATED METAL CONDUIT

A. Description: NEMA RN 1; rigid steel conduit with external PVC coating, 20-mil thick, and internal galvanized surface.

B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; threaded type, material to match conduit.

2.04 FLEXIBLE METAL CONDUIT

A. Description: Conduit - FS-WW-C-566; Steel, manufactured from single strap standard weight steel, galvanized on all four sides prior to conduit fabrication. Lightweight flexible steel conduit and aluminum flexible conduit are not acceptable. Include ground conductor in all runs.

B. Fittings: ANSI/NEMA FB 1; Die-cast fittings of the type that screw into the inside of the conduit with threaded edges at 90° to the fitting body.

2.05 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

A. Description: Interlocked steel construction with moisture and oil-proof PVC jacket.

B. Fittings: ANSI/NEMA FB 1: liquid tight; integral insulated throat; provisions for ground continuity.

2.6 ELECTRICAL METALLIC TUBING (EMT)

A. Description: ANSI C80.3; galvanized tubing; Federal Spec. WW-C-563.

B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel rain tight, compression, steel locking ring type with integral insulated throat.

2.07 NONMETALLIC CONDUIT

A. Description: NEMA TC 2; Federal Spec. WC-1094A; Schedule 40 PVC.

B. Fittings and Conduit Bodies: NEMA TC 3 to match conduit.

2.08 INNERDUCT, MULTI-CHAMBER

A. Drawing and spec reference: As indicated on drawings.

B. Construction:

1. Multi-Chamber Inner duct shall be installed within Conduit per manufacturer's recommendation, and as described elsewhere herein.

2. Shall provide independent interior chambers each with a capacity equal to a trade size conduit referenced above.

C. Approvals:

1. ASTM D2239 (1985) Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter.

D. Acceptable, subject to the above:

1. Aeroquip FoDuct System (800) 445-2192: (Design Basis) Provide in combinations to meet scheduled requirement.

a. 3ID1 - Provide one(1) FoDuct PE5004 3 chamber inner duct in one-half of a 4" diameter conduit.

b. 2ID1.25 - Provide one (1) FoDuct PE5007 2 chamber inner duct in one-half of a 4" diameter conduit.

2. North Supply Multi-Guard Multi-Cell Conduit.

3. Approved equal by Tamaqua.

E. Acceptable - Independent Inner Duct runs in conduit - Multiple runs of single chamber inner duct may be provided in lieu of single, multiple chamber inner duct provided above. Contractor bears burden of selected inner duct quantity to provide an exact match of cross-sectional area of each chamber of multi-chamber assembly.

1. Allied.

2. Approved equal.

2.09 CONDUIT SUPPORTS

A. Conduit clamps, straps, and supports: Steel or malleable iron, two-hole straps.

PART 3: EXECUTION

3.01 CONDUIT SIZING, ARRANGEMENT AND SUPPORT

A. The size of the conduits for the various circuits shall be as indicated on the drawings and as required by Code for the size and number of conductors to be pulled therein. Where fill is not shown on drawings, size conduit for conductor type installed or for Type THW conductors, whichever is larger; 1/2 inch minimum size. Open ends shall be capped with approved manufactured conduit seals as soon as installed and kept capped until ready to pull in conductors. Where running thread connections are necessary, only approved manufactured conduit unions shall be used. Do not embed aluminum conduit in concrete or masonry construction, nor electrical metallic tubing through slabs on grade. Do not install any conduit within any concrete slab.

B. Arrange conduit to maintain headroom and present a neat appearance.

C. Route exposed conduit and conduit above accessible ceilings parallel and perpendicular to walls and adjacent piping.

D. Maintain minimum 6-inch clearance between conduit and piping. Maintain 12-inch clearance between conduit and heat sources such as flues, steam pipes, and heating appliances.

E. Arrange conduit supports to prevent distortion of alignment by wire pulling operations. Fasten conduit using galvanized straps, lay-in adjustable hangers, clevis hangers, or bolted split stamped galvanized hangers. Maintain 12" distance minimum between main conduit runners and ceiling system grid.

F. Group conduit in parallel runs where practical and use conduit rack constructed of steel channel with conduit straps or clamps. Provide space for 25 percent additional conduit.

G. Do not fasten conduit with wire or perforated pipe straps. Remove all wire used for temporary conduit support during construction, before conductors are pulled.

H. Support conduits 1 inch and larger with pipe clamps either suspended from structural slabs with a rod with adjustable pipe ring, or mounted on wall from channel supports. Attach to concrete by expansion anchors. Powder actuated fastening devices are not permitted. Where two or more conduits 1-1/2 inch and larger or where 3 or more 3/4 inch conduits are suspended from ceiling, use trapeze type hanger from rods.

I. Firmly support and fasten conduit in place. Support rigid metal conduit and electrical metallic tubing at maximum intervals of 10 feet and within 12 inches of every outlet box, cabinet and fitting. Support flexible metal conduit at maximum intervals of 4 feet and within 12 inch of every outlet box and fitting except for lengths of not over 2 feet at connections where flexibility is required.

J. Secure exposed conduit runs of concrete, plaster or other construction in place with cast conduit clamps affixed with expansion anchors or cadmium plated machine or lag screws.

K. Do not strap or fasten rigid or electrical metallic tubing to mechanical equipment or to equipment subject to vibration or mounted on shock absorbing bases, including sprinkler or pneumatic pipe or tubing.

L. Provide independent support for conduit rising from floor for motor connection if over 18 inches above floor. Do not attach to motors, ductwork or mechanical equipment.

M. Conduits which are installed above suspended ceilings shall not be secured to ceiling support wires. Support electrical, communication conduits and fixtures independent of ceiling suspension systems.

N. Exposed conduits to view shall be installed parallel to and perpendicular to the building structure.

O. Tag empty conduits at each accessible end with a permanent tag identifying the purpose of the conduit and the location of the other end. In wet, corrosive outdoor or underground locations, use brass, bronze, or copper 16 gage tags or lead tags secured to conduit ends with #16 or larger galvanized wire. Inscribe on the tags with steel punch dies clear and complete identifying information.

P. Bends:

1. Raceways for Sound System, Telephone System, LAN, and Video System cables shall be designed for the installation of Fiber Optic cable.

2. All bends or elbows shall have a minimum radius as follows:

Conduit Size (inches)	Min. Radius (inches)
3/4	12
1	12
1-1/4	18
1-1/2	
2	24
2-1/2	24

Conduit Size (inches)	Min. Radius (inches)
3	36
3-1/2	36
4	48
5	48
6	48

3. Use factory ells at conduit bends 1-1/4" and larger. Alternative method: Use of precision conduit bending machine equivalent to Greenlee 'One Shot' or 'Smart Bender'.

4. Boxes where the cable changes direction shall be large enough to allow cables in the box to have a 12" minimum radius.

5. Make bends and offsets so the inside diameter is not effectively reduced. Make bends in parallel or banked runs from the same center line so that the bends are parallel.

3.02 CONDUIT INSTALLATION

A. Cut conduit square using a saw or pipe cutter; de-burr cut ends.

B. Bring conduit to the shoulder of fittings and couplings and fasten securely.

C. Use conduit hubs or sealing locknuts for fastening conduit to cast boxes, and for fastening conduit to sheet metal boxes in damp or wet locations.

D. Install no more than the equivalent of three 90-degree bends between boxes. Keep bends and offsets in conduit runs to an absolute minimum. For the serving utilities, make large radius bends to meet their requirements. Replace deformed, flattened or kinked conduit.

E. Use conduit bodies to make sharp changes in direction, as around beams.

F. Use hydraulic one-shot conduit bender or factory elbows for bends in conduit larger than 2-inch size.

G. Avoid moisture traps where possible; where unavoidable, provide junction box with drain fitting at conduit low point.

H. Use suitable conduit caps to protect installed conduit against entrance of dirt and moisture.

I. Provide No. 12 AWG insulated conductor or suitable pull string or rope in empty conduit, except sleeves and nipples.

J. Install expansion-deflection joints where conduit crosses building expansion or seismic joints and between building and walkway covers.

K. Where conduit penetrates fire-rated walls and floors, provide mechanical firestop fittings with UL listed fire rating equal to wall or floor rating.

L. Route conduit through roof openings for piping and ductwork where possible; otherwise, route through roof jack with pitch pocket.

M. Do not install conduit in slabs above grade.

N. PVC conduit shall not be used in any locations above grade.

O. From each panel or cabinet which is flush mounted in wall, stub from top of the panel a minimum of 5-3/4 inch conduits to the nearest accessible ceiling space or other accessible location and cap for future use unless noted otherwise on the drawings.

P. Flexible steel conduit is permitted in concealed dry interior locations at lighting fixture connections only. No length shall exceed 6'-0".

Q. Seal conduit from exterior outlets at first interior junction to prevent moisture from entering the building through the conduit.

R. Use insulating fittings on conduits where entering pullboxes, junction boxes, outlet boxes, cabinets and similar enclosures, and for signal and telephone conduits terminated in cabinets or backboards.

S. Conduit risers and ell's through concrete shall be PVC wrapped GRC.

3.03 UNDERGROUND DUCTBANK INSTALLATION

A. Install top of duct bank minimum 24 inches below finished grade. Adjust depth to avoid interference with gravity flow systems of any kind. Maintain minimum 12-inch clearance between duct bank and any gravity flow system.

B. Duct lines shall have a continuous slope downward toward manholes and away from buildings with a pitch of not less than 4 inches in 100 feet. Changes in direction of runs exceeding a total of 10 degrees, either vertical or horizontal, shall be accomplished by long sweep bends having a minimum radius of curvature of 25 feet, except that manufactured bends may be used at ends of short runs of 100 feet or less, and then only at or close to the end of run.

C. Terminate conduit in end bell at manhole and pullbox entries.

D. Use suitable separators and chairs installed not greater than 4 feet on centers. Band conduit together with suitable banding devices. Securely anchor conduit to prevent movement during concrete or slurry placement.

E. Provide minimum 3 inch concrete cover at bottom, top, and sides of duct bank. Refer to Trenching section for additional information.

F. Encase non-metallic primary and secondary feeders, telephone, fire alarm communications and data conduit installed underground 2 inches or larger in a concrete or slurry duct bank unless noted otherwise in the Contract Documents. Space the external surfaces of conduit within a bank a minimum of 3 inches apart except that sound, telephone, data and intercommunication circuits contained within non-metallic conduit shall have a minimum separation of 12 inches from any light or power circuits that parallel them within a bank. Use appropriate manufactured plastic spacers to insure the minimum required concrete or slurry coverage. All concrete or slurry duct power banks shall contain a pigment in the concrete mix. Refer to Section 02225, Trenching.

G. Numbers and sizes of ducts shall be as indicated. Depending on the contour of the finished grade, the high-point may be at a terminal, a manhole, a handhole, or between manholes or handholes. Manufactured steel 90-degree duct bends shall be used only for pole or equipment risers, unless specifically indicated as acceptable. The minimum manufactured bend radius shall be 18 inches for ducts of less than 3-inch diameter, and 36 inches for ducts 3 inches in diameter 48 inches for ducts or greater in diameter unless noted otherwise in the Contract Documents. Long sweep bends having a minimum radius of 25 feet shall be used for a change of direction of more than 5 degrees, horizontally or vertically. Both curved and straight sections shall be used to form long sweep bends as required, but the maximum curve used shall be 30 degrees and manufactured bends shall be used. Ducts shall be provided with end bells whenever duct lines terminate in manholes, pullboxes or handholes. Duct line markers shall be provided at the ends of long duct line stubouts or for other ducts whose locations are indeterminate because of duct curvature or terminations at completely below-grade structures. In lieu of markers, a 5-mil brightly colored plastic tape not less than 3 inches in width and suitably inscribed at not more than 10 feet on centers with a continuous metallic backing and a corrosion resistant 1-mil metallic foil core to permit easy location of the duct line, shall be placed approximately 12 inches below finished grade levels of such lines.

H. Ducts shall be kept clean of concrete or slurry, dirt or foreign substances during construction. Field cuts requiring tapers shall be made with proper tools and match factory tapers. After a duct line is completed, a standard flexible mandrel shall be used for cleaning followed by a brush with stiff bristles. Mandrels shall be at least 12 inches long and have diameters 1/4 inch less than the inside diameter of the duct being cleaned. Pneumatic rodding may be used to draw in lead wires. A coupling recommended by the duct manufacturer shall be used whenever an existing duct is connected to a duct of different material or shape. Ducts shall be stored to avoid warping and deterioration with ends sufficiently plugged to prevent entry of any water or solid substances. Ducts shall be thoroughly cleaned before being laid. Plastic ducts shall be stored on a flat surface and protected from the direct rays of the sun.

END OF SECTION

SECTION 16117

MANHOLES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Prefabricated concrete manholes.

B. Manhole accessories.

1.2 RELATED SECTIONS

A. Section 02300 – Earthwork.

B. Section 15430 – Plumbing Specialties.

C. Section 16111 – Conduit: Underground duct bank.

D. Section 16130 – Boxes: Underground boxes and handholes.

E. Section 16450 – Secondary Grounding.

1.3 REFERENCES

A. AASHO H-20 – Standard Specification for Highway Bridges.

B. ANSI/ASTM A153 – Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

C. ANSI/ASTM A569 – Steel, Sheet and Strip, Carbon (.015 Maximum Percent), Hot-Rolled, Commercial Quality.

D. ASTM A48 – Gray Iron Casting.

E. ASTM A123 – Zinc (Hot-Galvanized) Coating on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strips.

1.4 QUALITY ASSURANCE

A. Manufacturer: Company specializing in precast concrete structures with three years documented experience.

PART 2 - PRODUCTS

2.1 MANUFACTURERS – PRECAST CONCRETE MANHOLES

A. Brooks.

B. Quikset.

2.2 PRECAST CONCRETE MANHOLES

A. Precast Concrete: Air-entrained, 2000 psi compressive strength at 28 days.

B. Reinforcing: AASHO H-20; highway loading.

C. Construction: In modular sections with tongue and groove joints.

D. Manhole Shape: Rectangular.

E. Include 36 inch diameter grooved opening in top section.

F. Necking and Shaft Sections: 30 inch diameter clear opening.

G. Inlcude 12 inch drain opening and 2 one inch ground rod openings in base section.

H. Window for Duct Entry: Sized as required for the type and amount of ducts entering manhole. Larger size window shall be provided where specifically noted on the drawings. The contractor shall coordinate window dimensions with the manhole manufacturer prior to ordering manhole. Refer to underground duct bank product and installation specifications for additional requirements.

I. Include cable pulling irons opposite each duct entry window.

J. Include inserts for cable racks.

K. Include precast manhole steps at 16 inches on center.

2.3 MANUFACTURERS – MANHOLE ACCESSORIES

A. Brooks.

B. Quikset.

2.4 MANHOLE ACCESSORIES

A. Manhole Frames and Covers: ASTM A48; Class 30B gray cast iron, machine finished with flat bearing surfaces. Cover marking as indicated on drawings or as directed by Architect.

B. Sump Covers: ASTM A48; Class 30B gray cast iron.

C. Pulling Irons: 7/8 inch diameter steel bar forming a triangle of 9 inches per side when set. Galvanize to ANSI/ASTM A153 for irregular shaped articles.

D. Cable Rack Inserts: Steel channel insert with minimum load rating of 800 pounds, length to match cable rack channel.

E. Cable Rack Channel: 4 x 1-1/2 x 3/16 inch steel channel wall bracket, 48 inch length, with cable rack arm mounting slots on 8 inch centers.

F. Cable Racks: ANSI/ASTIM A569; steel channel, 2-1/2 x 14 inches, with high-glazed wet-process porcelain insulators.

G. Manhole steps: Cast iron, suitable for manhole shape and construction.

PART 3 - EXECUTION

3.1 PREPARATION

A. Excavate, install base material, and compact base material in accordance with manufacturer's instructions.

3.2 INSTALLTION – PRECAST CONCRETE MANHOLES

A. Install and seal precast sections in accordance with manufacturer's instructions.

B. Use precast neck and shaft sections to bring manhole entrance to proper elevation.

C. Install manholes plumb.

D. Set the top of each manhole to finished elevation.

E. Minimum depth of manhole shall be 6' – 0".

3.3 INSTALLATION – MANHOLE ACCESSORIES

A. Install drains in manholes, and connect to site drainage system 4 inch pipe terminating in 1/3 cu yd crushed gravel bed.

B. Install one 3/4" x 10' copper clad steel ground rod at each manhole with top protruding 4" above manhole floor. All non-current carrying metal parts in manholes, including metallic sheaths of cables, shall be connected to the ground rod by a bare copper ground conductor.

C. Waterproof exterior surfaces, joints, and interruptions of manholes after concrete has cured 28 days minimum.

D. Attach cable racks to inserts after manhole installation is complete.

3.4 INTERFACE WITH SECTION 16195

A. All cable, wire, fiber, etc., routed through manholes shall be permanently identified with full description of cable system, feed point, termination point, etc. (i.e. "Telephone – 50 pair from MDF to IDF-B", etc.)

END OF SECTION

SECTION 16123

BUILDING WIRE AND CABLE

PART 1: GENERAL

1.01 SECTION INCLUDES

A. Building wire and cable.

B. Non-metallic-sheathed cable.

C. Underground feeder and branch circuit cable.

D. Service entrance cable.

E. Armored cable.

F. Metal clad cable.

G. Wiring connectors and connections.

1.02 REFERENCES

A. CEC - California Electrical Code.

1.03 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Provide for each cable assembly type.

C. Test Reports: Indicate procedures and values obtained.

D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under Regulatory Requirements.

1.04 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five years documented experience.

1.05 REGULATORY REQUIREMENTS

A. Conform to requirements of CEC.

B. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and shown.

1.06 FIELD SAMPLES

A. Provide under provisions of Section 01300.

B. Submit three lengths, each 18 inches of cable assembly from each reel.

C. Select each length to include complete set of manufacturer markings.

D. Attach tag indicating cable size and application information.

1.07 PROJECT CONDITIONS

A. Verify that field measurements are as shown on Drawings.

B. Conductor sizes are based on copper. Aluminum conductors shall not be used.

C. Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project Conditions.

D. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required.

1.08 COORDINATION

A. Determine required separation between cable and other work.

B. Determine cable routing to avoid interference with other work.

PART 2: PRODUCTS

2.01 MANUFACTURERS - BUILDING WIRE AND CABLE

A. Anaconda Power Cable.

B. Carol Cable.

C. Rome Wire and Cable.

D. Triangle Wire and Cable.

E. Alpha Wire.

F. Canada Wire.

2.02 BUILDING WIRE AND CABLE

A. Description: Single conductor insulated wire.

B. Conductor: Copper.

C. Insulation Voltage Rating: 600 volts.

D. Insulation: CEC; Stranded wire, Type THHN/THWN or XHHW insulation for feeders and branch circuits #10 AWG and larger; solid wire, Type THHN/THWN or XHHW insulation for feeders and branch circuits #12 AWG.

E. Select one type and use for entire installation, except as indicated for special purpose.

F. For conductors installed in areas subjected to temperatures exceeding 140 degrees F., including terminating in incandescent lighting fixtures and installed through or into housing containing ballasts, provide Type THHN.

G. For conductors installed in exposed conduit outside of buildings and conduit within or just under roofing material, provide Type XHHW.

H. Control Circuits for Mechanical Equipment: Use 600-volt Underwriters' Type THWN conductors except where subject to abnormally high temperatures such as on or near boilers. Under these conditions, use Type XHHW.

I. Conductor insulation shall be color coded to indicate phase leg, voltage and use.

J. Conductor insulation type, size and U.L. approval shall be printed with permanent white paint on conductor insulation, continually repeating.

K. Minimum Size of Conductors: #12 AWG copper, unless otherwise indicated.

L. Conductors shall be new and shall have been manufactured within 12 months of the date of delivery to the site and continuously stored where protected from the sun, heat or weather.

M. Deliver conductor to the site in their original cable reels or in their original unbroken packages.

N. Provide conductor packages and cable reels plainly marked or tagged with U.L. labels, AWG size, voltage rating, insulation type, type of stranding, manufacturer's name, trade name, and month and year when manufactured.

2.03 MANUFACTURERS - UNDERGROUND FEEDER AND BRANCH-CIRCUIT CABLE

A. Anaconda Power Cable

B. Carol Cable

C. Rome Wire and Cable

D. Triangle Wire and Cable

E. Alpha Wire

F. Canada Wire

2.04 UNDERGROUND FEEDER AND BRANCH CIRCUIT CABLE

A. Description: CEC, Type UF.

B. Conductor: Copper.

C. Insulation Voltage Rating: 600 volts.

D. Insulation Temperature Rating: 90 degrees C.

2.05 MANUFACTURERS - SERVICE-ENTRANCE CABLE

A. Anaconda Power Cable

B. Carol Cable

C. Rome Wire and Cable

D. Triangle Wire and Cable

E. Alpha Wire

F. Canada Wire

2.06 SERVICE ENTRANCE CABLE

A. Description: CEC, Type USE.

B. Conductor: Copper

C. Insulation Voltage Rating: 600 volts.

D. Insulation: Type RHW or XHHW.

2.07 WIRING CONNECTORS

A. Split Bolt Connectors:

1. ILSCO, Model SK.

2. Burndy, Model KSU.

3. Blackburn, Model HPS.

B. Solderless Pressure Connectors:

1. ILSCO, Model SLUH.

2. Burndy, Model KA-U.

3. Panduit, Model LAM.

C. Spring Wire Connectors:

1. Buchanan, Models 31, 33, 35 and 37.

2. 3M

3. Ideal Wirenut.

D. Compression Connectors:

1. Burndy, Model HYLUG/HYLINK.

2. Panduit, Model LAA.

3. Blackburn, Model ATL.

PART 3: EXECUTION

3.01 EXAMINATION

A. Verify that interior of building has been protected from weather.

B. Verify that mechanical work likely to damage wire and cable has been completed.

3.02 PREPARATION

A. Completely and thoroughly swab raceway before installing wire.

3.03 WIRING METHODS

A. Concealed Dry Interior Locations: Use only building wire, Type THHN/THWN or XHHW insulation, in raceway.

B. Exposed Dry Interior Locations: Use only building wire, Type THHN/THWN or XHHW insulation, in raceway.

C. Above Accessible Ceilings: Use only building wire, Type THHN/THWN or XHHW insulation, in raceway.

D. Wet or Damp Interior Locations: Use only building wire, Type THHN/THWN or XHHW insulation, in raceway.

E. Exterior Locations: Use only building wire, Type THHN/THWN or XHHW insulation, in raceway.

F. Underground Installations: Use only building wire, Type THHN/THWN or XHHW insulation, in raceway.

G. Use wiring methods indicated on Drawings.

3.04 INSTALLATION

A. Install products in accordance with manufacturers instructions.

B. Use solid conductor for feeders and branch circuits 10 AWG and smaller.

C. Use stranded conductors for control circuits.

D. Use conductor not smaller than 12 AWG for power and lighting circuits.

E. Use conductor not smaller than 16 AWG for control circuits.

F. Use 10 AWG conductors for 20 ampere, 120-volt branch circuits longer than 75 feet.

G. Use 10 AWG conductors for 20 ampere, 277-volt branch circuits longer than 200 feet.

H. Pull conductors into raceway at same time.

I. Use suitable wire pulling lubricant for building wire 4 AWG and larger.

J. Protect exposed cable from damage.

K. Support cables above accessible ceiling, using spring metal clips or metal cable ties to support cables from structure. Do not rest cable on ceiling panels.

L. Use suitable cable fittings and connectors.

M. Neatly train and lace wiring inside boxes, equipment, and panelboards.

N. Clean conductor surfaces before installing lugs and connectors.

O. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise. Keep slices in underground junction boxes, handholes, and manholes to an absolute minimum. Where splices are necessary, use resin pressure splices and resin splicing kits manufactured by the 3M Company to totally encapsulate the splice. Arrange the splicing kit to minimize the effects of moisture.

P. Use suitable reducing connectors or mechanical connector adapters for connecting existing aluminum conductors to copper conductors.

Q. Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.

R. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.

S. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.

T. Conductor Identification. All branch circuit conductors (No. 10 AWG & smaller) throughout the project shall be provided with color coded insulation as follows:

208Y/120V	Phase	480Y/277
Black	A	Brown
Red	B	Orange
Blue	C	Yellow
White	Neutral	Gray
Green	Ground	Green

U. Conductors No. 8 and larger shall be black with bands of colored, non-aging, plastic tape to color code the conductors, utilizing the same scheme as for branch circuits. The bands shall occur within each enclosure where a tap, splice or termination is made.

V. Color code control wire insulation and label each termination.

W. Conductor Support. Provide conductor supports as required by Code and recommended by the cable manufacturer. Where required, provide cable supports in vertical conduits similar to OZ Type CMT, and provide the lower end of conduit with OZ Type KVF ventilators.

X. For control wiring, conform to the wiring diagrams shown on the mechanical drawings and the manufacturer's wiring diagram to control the equipment in the manner specified under Division 15. Color code all control wiring.

Y. Where conductors in conduit pass through exterior walls, a sealing compound of moisture-resistant material shall be applied in the ends of the conduits to seal around the conductors.

Z. Tag conductors of power circuits and the various signal and sound systems, such as fire alarm, phone, etc. Tags shall be pre-marked, self-adhesive wraparound cloth Type EZ Code, Brady PERMA-CODE, or equal. Conductors shall be tagged in each junction box, pullbox, wireway or auxiliary gutter and at each device, motor outlet, panelboard, and switchboard or other conductor termination. Tags shall show feeder number size, phase and origin.

AA. Megger tests shall be taken on feeder conductors and on conductor for motors over 15 HP. Tests shall be made in presence of Project Inspector and prior to connection of equipment. Written reports shall be submitted to Architect. Conductors testing below manufacturer's standards shall be replaced.

BB. Wiring within equipment enclosures shall be neatly grouped and laced or taped together.

CC. For large power cable and wires which do not have color coded jackets, install 2 inch minimum width bands of adhesive non-fading coloring tape over the cables and wires at their terminations and in the manholes, wireways, junction boxes and outlet boxes. Colors shall be permanent and shall withstand cleaning.

DD. Capacity of conductors #2 AWG and smaller shall be based on the 60 degrees C. rating and conductors larger than #2 AWG shall be based on the 75 degrees C. rating.

EE. Conductor Arcproofing:

1. Cover two or more power feeder cables occurring in the same switchboard section junction box or pull box (including pull boxes over switchboards) with arcproof and flameproof tape.

2. Provide SCOTCH Irvington Tape No. 7700 or Plymouth Rubber Co., SLIPKNOT No. 30 to provide an installation capable of withstanding a 200-amp arc for not less than 30 seconds.

3. Apply tape in a single layer, half lapped, or as recommended by the manufacturer to conform to the above requirements. Apply with the coated side next to the cable and hold in place with a random wrap of 1/2-inch wide, pressure-sensitive, plastic film tape color coded as specified herein.

3.05 INTERFACE WITH OTHER PRODUCTS

A. Identify wire and cable under provisions of Section 16195.

B. Identify each conductor with its circuit number or other designation indicated on Drawings.

3.06 FIELD QUALITY CONTROL

A. Inspect wire and cable for physical damage and proper connection.

B. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.

C. Verify continuity of each branch circuit conductor.

END OF SECTION

SECTION 16130

BOXES

PART 1: GENERAL

1.01 SECTION INCLUDES

A. Wall and ceiling outlet boxes.

B. Floor boxes.

C. Pull and junction boxes.

1.02 REFERENCES

A. ANSI/NEMA FB 1 - Fittings and Supports for Conduit and Cable Assemblies.

B. ANSI/NEMA OS 1 - Sheet-steel Outlet Boxes, Device Boxes, Covers, and Box Supports.

C. ANSI/NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports.

D. CEC - California Electrical Code.

E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

1.03 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations and mounting heights of outlet, pull, and junction boxes.

1.04 REGULATORY REQUIREMENTS

A. Conform to requirements of CEC.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

1.05 PROJECT CONDITIONS

A. Verify field measurements are as shown on Drawings.

B. Verify locations of floor boxes and outlets in offices and work areas prior to rough-in.

C. Electrical boxes are shown on Drawings in approximate locations unless dimensioned. Install at location required for box to serve intended purpose.

PART 2: PRODUCTS

2.01 OUTLET BOXES

A. Sheet Metal Outlet Boxes: ANSI/NEMA OS 1, galvanized steel. Outlet boxes and covers shall be pressed steel and plugged holes, and shall be hot dipped galvanized or sherardized. For boxes concealed in walls or ceiling, provide the solid gang, galvanized or sherardized pressed steel knockout type. Outlet boxes shall be used as pullboxes wherever possible and junction boxes or pullboxes shall be installed only as required by the drawings or specification. Sectional boxes shall not be used. Light outlet boxes shall be equipped with fixture-supporting device, as required by the unit to be installed.

B. Exposed boxes in mechanical areas and exposed to weather shall be cast metal weatherproof, with grounding terminal, threaded hubs and gaskets. Type FS or FD series.

C. Telephone outlets shall be a minimum of 4 inches square by 1-1/2 inches deep, or as required by telephone system installer. Computer outlet boxes shall be two gang, 1-1/2 inches deep.

D. Switch Outlets: Use solid gang boxes for three or more switches for mounting behind a common single plate.

E. Fire alarm boxes shall be 4 inches square with plaster rings to suit type of device.

F. MATV, outlet boxes shall be 4 inches square by 1-1/2" deep.

G. Cast Boxes: NEMA FB 1, Type FD, aluminum, cast feralloy. Provide gasketed cover by box manufacturer. Provide threaded hubs.

2.02 SPECIAL FLOOR BOXES

A. Floor Boxes: ANSI/NEMA OS 1, fully adjustable.

B. Material: Formed steel.

C. Conform to regulatory requirements for concrete-tight floor boxes.

D. Product: Amp Inc. Product #557601-2 with concrete form box and all associated hardware, connectors, brackets, and plates. (or approved equal).

2.03 PULL AND JUNCTION BOXES

A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.

1. Exposed locations - NEMA 3R-Type.

B. Surface-Mounted Cast Metal Box: NEMA 250, Type 4 flat-flanged, surface-mounted junction box.

1. Material: Galvanized cast iron.

2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.

C. In-Ground Cast Metal Box: NEMA 250, Type 6, outside flanged, recessed cover box for flush mounting.

1. Material: Galvanized cast iron.

2. Cover: Nonskid cover with neoprene gasket and stainless steel cover screws.

3. Cover Legend: ELECTRIC or as noted.

PART 3: EXECUTION

3.01 INSTALLATION

A. Install electrical boxes as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.

B. Install electrical boxes to maintain headroom and to present neat mechanical appearance.

C. Install pullboxes and junction boxes above accessible ceilings and in unfinished areas only.

D. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.

E. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods under the provisions of Section 07270 and as indicated on the Drawings.

F. Align adjacent wall-mounted outlet boxes for switches, thermostats, and similar devices with each other.

G. Use flush mounting outlet boxes in finished areas.

H. Do not install flush mounting boxes back-to-back in fire-rated walls; provide minimum 24-inch horizontal separation.

I. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.

J. Use stamped steel bridges to fasten flush mounting outlet box between studs.

K. Install flush mounting box without damaging wall insulation or reducing its effectiveness.

L. Use adjustable steel channel fasteners for hung ceiling outlet box.

M. Do not fasten boxes to ceiling support wires.

N. Support boxes independently of conduit except cast box that is connected to two rigid metal conduits both supported within 12 inches of box.

O. Use gang box where more than one device is mounted together. Do not use sectional box.

P. Use gang box with plaster ring for single device outlets.

Q. Use cast outlet box in exterior locations exposed to the weather and wet locations, and where located in block or concrete walls.

R. Provide acoustic blanket or membrane around outlet boxes and switches located in offices, party walls, or walls indicated on architectural drawings as acoustical walls.

S. Secure recessed boxes for ceiling outlets with galvanized steel bar hangers specifically manufactured for the purpose to ceiling channels with 18 gauge steel wire.

T. Single gang wall outlet boxes located at metal studs shall have hangers specifically manufactured for installing outlet box. Screws through boxes will not be acceptable.

U. Single or multiple wall outlet boxes located between studs shall be secured in place with bar hangers running between studs.

V. Nails shall not be used to support outlet boxes.

W. Secure recessed pressed steel boxes in place with steel hangers specifically manufactured for the purpose. Fully or partially hammer driven screws are not permitted.

X. Use extension rings with blank covers for making exposed conduit connections to flush wall or ceiling boxes.

Y. For boxes not specified or indicated, use boxes and mounting height as required by equipment and recommended by equipment manufacturer.

Z. For outlets flush in exterior walls, use weatherproof joints and connections all around.

AA. Do not locate outlet boxes not containing a circuit device in any public space. Place these boxes in storage rooms, electrical closets, or above accessible ceilings.

BB. Covers for flush outlets shall finish flush with plaster or other furnished surface. Provide 24 gage or heavier galvanized steel liner to produce flush condition, where necessary.

CC. For boxes installed in concrete, provide the type specifically designed for the purpose to prevent entrance of concrete and to permit placement of box and conduit without displacing reinforcing steel. Coordinate all installations with structural engineer.

DD. Use boxes of sufficient size to legally accommodate all devices and conductors contained therein. Use no box smaller than 4 inches square by 1-1/2 inches deep, unless otherwise indicated.

EE. Accurately place and securely fasten outlet boxes to the structural members. In concrete or drywall construction, set recessed boxes so that the front of the plaster ring or front of the box for those without plaster rings is not more than 1/8 inch behind the final finished surface. Provide box extensions at all outlet boxes where architectural drawings call for tackable wall cover.

FF. Provide approved factory make knockout seals in the boxes where unused knockouts are not intact. Provide recessed threaded plugs in unused hubs of cast boxes.

GG. Label the cover of each accessible junction box with panel and circuit designation and function.

HH. Multiple gang boxes containing 277-volt switches or containing switches of different system voltages shall have a barrier between each switch.

II. Paint the outside and inside of boxes containing fire alarm devices with red paint.

JJ. Use cast floor boxes for installations in slab on grade, unless noted otherwise; formed steel boxes are acceptable for other installations.

KK. Set floor boxes level.

LL. Large Pull Boxes: Boxes larger than 100 cubic inches in volume or 12 inches in any dimension.

1. Interior Dry Locations: Use hinged enclosure under provisions of Section 16160.

2. Other Locations: Use surface-mounted cast metal box.

3. Exposed Exterior Locations: NEMA 3R-Type.

MM. All boxes shall be covered with outlet box protectors, to keep plaster and dirt from entering boxes. If plaster does get in box, it shall be removed prior to pulling wires.

3.02 INTERFACE WITH OTHER PRODUCTS

A. Coordinate locations and sizes of required access doors.

B. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.

C. Coordinate mounting heights and locations of outlets mounted above counters, benches and backsplashes.

D. Position outlet boxes to locate luminaires as shown on reflected ceiling plan.

3.03 ADJUSTING

A. Adjust floor box flush with finish flooring material.

B. Adjust flush-mounting outlets to make front flush with finished wall material.

C. Install knockout closure in unused box opening.

END OF SECTION

SECTION 16141

WIRING DEVICES

PART 1: GENERAL

1.1 SECTION INCLUDES

A. Wall switches.

B. Wall dimmers.

C. Receptacles.

D. Device plates and decorative box covers.

E. Floor box service fittings.

1.2 REFERENCES

A. NEMA WD 1 - General Purpose Wiring Devices.

B. NEMA WD 6 - Wiring Device Configurations.

C. CEC - California Electrical Code.

1.3 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.

C. Manufacturer's Instructions:

1. Indicate application conditions and limitations of use stipulated by product testing agency specified under regulatory requirements.

2. Include instructions for storage, handling, protection, examination, preparation, operation and installation of product.

1.4 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five years experience.

1.5 REGULATORY REQUIREMENTS

A. Conform to requirements of CEC.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

1.6 EXTRA MATERIALS

A. Provide two of each style, size, and finish wall plate.

B. Provide two protective rings.

C. Provide two carpet rings.

PART 2: PRODUCTS

2.1 WALL SWITCHES

A. Manufacturers:

1. Hubbell, 1200 Series.
2. Pass and Seymour, 20 AC Series.
3. General Electric, 595X Series.
4. Bryant, 4900 Series.
5. Leviton, 1200 Series.

B. Description: NEMA WD 1, heavy-duty, AC only general-use snap switch.

C. Device Body: White plastic with toggle handle.

D. Indicator Light: Lighted handle type switch, red color handle.

E. Locator Light: Lighted handle type switch; green color handle.

F. Voltage Rating: 120-277 volts, AC.

G. Current Rating: 20 amps or as indicated on drawings.

H. Ratings: Match branch circuit and load characteristics.

2.2 WALL DIMMERS

A. Manufacturers:

1. Lutron Nova Series.
2. Lightolier Neptune Series.
3. Prescolite Horizon Series.

B. Description: NEMA WD 1, Type I, semiconductor dimmer for incandescent lamps.

C. Device Body: White plastic with linear slide.

D. Voltage: 120 volts.

E. Power Rating: 1000 Watts.

F. Power Rating: Match load shown on Drawings; 1000-Watts minimum.

G. Accessory Wall Switch: Match dimmer appearance.

2.3 RECEPTACLES

A. Single Convenience Receptacle:

1. Hubbell 5351
2. Pass and Seymour 5362.
3. General Electric 5362.
4. Bryant 5362.
5. Leviton 5362.

B. Duplex Convenience Receptacle:

1. Hubbell 5362.
2. Pass and Seymour 5362.
3. General Electric 5362.
4. Bryant 5362.
5. Leviton 5362.

C. GFCI Receptacle:

1. Hubbell 5362.
2. Pass and Seymour 5362.
3. General Electric 5362.
4. Bryant 5362.
5. Leviton 5362.

D. Isolated Ground Receptacle:

1. Hubbell IG5362.
2. Pass and Seymour IG6300.
3. General Electric 5362.
4. Bryant

5. Leviton

2.4 WALL PLATES

A. Plates shall be brushed stainless steel and supplied for every local switch, receptacle, telephone and data outlet, wall speaker outlet, etc. Type shall be equal to Pass & Seymour Type 430 except where noted otherwise on drawings.

B. Weatherproof Cover Plate: Gasketed cast metal with hinged gasketed device cover.

C. Plates shall be engraved and fitted, when specified for:

1. More than two gangs.
2. Equipment that cannot be seen from the locations.
3. All lock type switches.
4. All receptacles other than 120 volts.
5. All pilot switches.
6. Switches in locations from which the equipment or circuits controlled cannot be readily seen.
7. Manual motor starting switches.
8. Where so indicated on the drawings.
9. As required on all control circuit switches, such as heater controls, etc.

2.5 TIME SWITCHES

A. Manufacturers:

1. Intermatic ET800CR series.
2. Paragon.
3. Tork.

B. Description: AC programmable electronic time clock. (astronomic).

C. Input Voltage: 120V.

D. Poles: 10A, 120V, number as indicated. (4 pole minimum)

E. Enclosure: Type as required to meet installation.

F. Configuration: 365 day electronic, programmable.

G. Accessories: Photocell control as indicated. Intermatic ET7000C Series.

2.6 FLOOR MOUNTED SERVICE FITTINGS

A. Flush Cover Convenience Receptacle:

1. Hubbell.

2. Pass and Seymour.

3. General Electric.

4. Material: Aluminum.

5. Configuration: Duplex flap opening.

PART 3: EXECUTION

3.1 EXAMINATION

A. Verify outlet boxes are installed at proper height.

B. Verify wall openings are neatly cut and will be completely covered by wall plates.

C. Verify floor boxes are adjusted properly.

D. Verify branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean debris from outlet boxes.

3.3 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install devices plumb and level.

C. Install switches with OFF position down.

D. Install wall dimmers to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.

E. Do not share neutral conductor on load side of dimmers.

F. Install receptacles with grounding pole on top.

G. Connect wiring device grounding terminal to branch circuit equipment grounding conductor.

H. Install decorative plates on switch, receptacle, and blank outlets in finished areas.

I. Connect wiring devices by wrapping conductor around screw terminal.

J. Use jumbo size plates for outlets installed in masonry walls.

K. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

L. Install protective rings on active flush cover service fittings.

M. Engrave and fill plates at control switch locations where mechanical equipment can not be seen from location.

3.4 INTERFACE WITH OTHER PRODUCTS

A. Coordinate locations of outlet boxes provided under Section 16130 to obtain mounting heights indicated on Drawings.

B. Install wall switch 48 inches above finished floor unless otherwise indicated on drawings.

C. Install convenience receptacle 18 inches above finished floor unless otherwise indicated on drawings.

D. Install convenience receptacle 6 inches above counter unless otherwise indicated on drawings.

E. Install dimmer 48 inches above finished floor unless otherwise indicated on drawings.

F. Install telephone jack 18 inches above finished floor unless otherwise indicated on drawings.

G. Install telephone jack for wall telephone 48 above finished floor unless otherwise indicated on drawings.

3.5 FIELD QUALITY CONTROL

A. Inspect each wiring device for defects.

B. Operate each wall switch with circuit energized and verify proper operation.

C. Verify that each receptacle device is energized.

D. Test each receptacle device for proper polarity.

E. Test each GFCI receptacle device for proper operation.

F. Verify that each telephone jack is properly connected and circuit is operational.

3.6 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

END OF SECTION

SECTION 16160

CABINETS AND ENCLOSURES

PART 1: GENERAL

1.01 WORK INCLUDED

A. Hinged cover enclosures.

B. Cabinets

C. Terminal blocks and accessories.

1.02 REFERENCES

A. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

B. ANSI/NEMA ICS 1 - Industrial Control and Systems.

C. ANSI/NEMA ICS 4 - Terminal Blocks for Industrial Control Equipment and Systems.

D. ANSI/NEMA ICS 6 - Enclosures for Industrial Control Equipment and Systems.

1.03 SUBMITTALS

A. Submit product data under provisions of Section 01300.

B. Shop Drawings for Equipment Panels: Include wiring schematic diagram, wiring diagram, outline drawing and construction diagram as described in ANSI/NEMA ICS 1.

PART 2: PRODUCTS

2.01 HINGED COVER ENCLOSURES

A. Construction: NEMA 250; Type 1, for dry interior locations and Type 3R, for exterior and damp locations, or as indicated on drawings.

B. Finish: Manufacturer's standard enamel finish.

C. Covers: Continuous hinge, held closed by flush latch operable by key.

D. Panel for Mounting Terminal Blocks or Electrical Components: 14 gage steel, white enamel finish.

2.02 CABINETS

A. Cabinet Boxes: Galvanized steel with removable endwalls, 24 inches wide, 30 inches high, 4 inches deep or as indicated on the drawings. Provide 3/4-inch thick plywood backboard painted matte white, for mounting terminal blocks.

B. Cabinet Fronts: Steel, flush type with concealed trim clamps, concealed hinge and flush lock keyed to match branch circuit panelboard; finish in gray baked enamel.

2.03 TERMINAL BLOCKS AND ACCESSORIES

A. Terminal Blocks: ANSI/NEMA ICS 4; UL listed.

B. Power Terminals: Unit construction type, closed-back type, with tubular pressure screw connectors, rated 600 volts.

C. Signal and Control Terminals: Modular construction type, channel mounted; tubular pressure screw connectors, rated 300 volts.

2.04 FABRICATION

A. Shop assemble enclosures and cabinets housing terminal blocks or electrical components in accordance with ANSI/NEMA ICS 6.

B. Provide knockouts on enclosures.

C. Provide protective pocket inside front cover with schematic diagram, connection diagram, and layout drawing of control wiring and components within enclosure.

PART 3: EXECUTION

3.01 INSTALLATION

A. Install cabinets and enclosures plumb; anchor securely to wall and structural supports at each corner, minimum.

B. Provide accessory feet for freestanding equipment enclosures.

C. Install trim plumb.

END OF SECTION

SECTION 16170

GROUNDING AND BONDING

PART 1: GENERAL

1.01 SECTION INCLUDES

A. Grounding electrodes and conductors.

B. Equipment grounding conductors.

C. Bonding

1.02 RELATED SECTIONS

A. Section 03200 - Concrete Reinforcement.

B. Section 03300 - Cast-In-Place Concrete.

1.03 REFERENCES

A. CEC - California Electrical Code.

1.04 GROUNDING ELECTRODE SYSTEM

A. Metal underground water pipe.

B. Metal frame of the building.

C. Concrete-encased electrode (UFER).

D. Metal underground gas piping system.

E. Rod electrode.

F. Plate electrode.

G. Active electrode.

1.05 PERFORMANCE REQUIREMENTS

A. Grounding System Resistance: 25.

1.06 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Provide data for grounding electrodes and connections.

C. Test Reports: Indicate overall resistance to ground.

D. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation and installation of exothermic connectors.

1.07 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section 01720, 01740, 01770 and 01785.

B. Accurately record actual locations of grounding electrodes.

1.08 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum three years experience.

1.09 REGULATORY REQUIREMENTS

A. Conform to requirements of CEC.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

PART 2: PRODUCTS

2.01 ROD ELECTRODE

A. Material: Copper-clad steel.

C. Diameter: 3/4 inch.

D. Length: 10 feet.

2.02 WIRE

A. Material: Stranded copper.

B. Foundation Electrodes: 2 AWG minimum unless noted otherwise.

C. Grounding Electrode Conductor: Size to meet CEC requirements.

2.03 GROUNDING WELL COMPONENTS

A. Well Pipe: 8-inch (200 mm) diameter by 24-inch (600 mm) long concrete pipe with belled end.

B. Well Cover: Concrete with legend "GROUND" embossed on cover.

PART 3: EXECUTION

3.01 EXAMINATION

A. Verify that final backfill and compaction has been completed before driving rod electrodes.

3.02 INSTALLATION

A. Install Products in accordance with manufacturer's instructions.

B. Install rod electrodes at locations indicated. Install additional rod electrodes as required to achieve specified resistance to ground.

C. Provide grounding well pipe with cover at each rod location. Install well pipe top flush with finished grade.

D. Provide grounding electrode conductor and connect to reinforcing steel in foundation footing where indicated. Bond steel together.

E. Provide bonding to meet Regulatory Requirements for all cabinets and enclosures.

F. Bond together metal siding not attached to grounded structure; bond to ground.

G. Isolated Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway where isolated grounding devices/systems are indicated. Terminate each end on lug, bus or bushing.

H. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

3.03 FIELD QUALITY CONTROL

A. Inspect grounding and bonding system conductors and connections for tightness and proper installation.

B. Use suitable test instrument to measure resistance to ground of system. Perform testing in accordance with test instrument manufacturer's recommendations using the fall-of-potential method.

END OF SECTION

SECTION 16180

EQUIPMENT WIRING SYSTEMS

PART 1: GENERAL

1.01 WORK INCLUDED

A. Electrical connections to equipment specified under other Sections or furnished by Owner.

1.02 REFERENCES

A. NEMA WD 1 - General Purpose Wiring Devices.

B. NEMA WD 5 - Specific-Purpose Wiring Devices.

PART 2: PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS - CORDS AND CAPS

A. Hubbel.

B. Pass & Seymour.

C. General Electric.

2.02 CORDS AND CAPS

A. Straight-blade Attachment Plug: NEMA WD 1.

B. Locking-blade Attachment Plug: NEMA WD 5.

C. Attachment Plug Configuration: Match receptacle configuration at outlet provided for equipment.

D. Cord Construction: Oil-resistant thermoset insulated Type SO multiconductor flexible cord with identified equipment grounding conductor, suitable for extra hard usage in damp locations.

E. Cord Size: Suitable for connected load of equipment and rating of branch circuit overcurrent protection.

PART 3: EXECUTION

3.01 INSPECTION

A. Verify that equipment is ready for electrical connection, wiring, and energization.

3.02 PREPARATION

A. Review equipment submittals prior to installation and electrical rough-in. Verify location, size, and type of connections. Coordinate details of equipment connections with supplier and installer.

3.03 INSTALLATION

A. Use wire and cable with insulation suitable for temperatures encountered in heat-producing equipment.

B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible metal conduit in damp or wet locations.

C. Install pre-finished cord set where connection with attachment plug is indicated or specified, or use attachment plug with suitable strain-relief clamps.

D. Provide suitable strain-relief clamps for cord connections to outlet boxes and equipment connection boxes.

E. Make wiring connections in control panel or in wiring compartment of pre-wired equipment in accordance with manufacturer's instructions. Provide interconnecting wiring where indicated.

F. Install disconnect switches, controllers, control stations, and control devices such as limit switches and temperature switches as indicated. Connect with conduit and wiring as indicated.

G. Coolers and Freezers: Cut and seal conduit openings in freezer and cooler walls, floor, and ceilings. Provide "Eys" seals at all conduit into chilled spaces.

END OF SECTION

SECTION 16190

SUPPORTING DEVICES

PART 1: GENERAL

1.01 WORK INCLUDED

A. Conduit and equipment supports.

B. Fastening hardware.

1.02 COORDINATION

A. Coordinate size, shape and location of concrete pads.

1.03 QUALITY ASSURANCE

A. Support systems shall be adequate for weight of equipment and conduit, including wiring, which they carry.

PART 2: PRODUCTS

2.01 MATERIAL

A. Support Channel: Galvanized.

B. Hardware: Corrosion resistant.

PART 3: EXECUTION

3.01 INSTALLATION

A. Fasten hanger rods, conduit clamps, and outlet and junction boxes to building structure using precast insert system, expansion anchors, preset inserts, and beam clamps. Do not use spring steel clips and clamps.

B. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster, or gypsum board partitions and walls; expansion anchors or preset inserts in solid masonry walls; self-drilling anchors or expansion anchor on concrete surfaces; sheet metal screws in sheet metal studs; and wood screws in wood construction.

C. Do not fasten supports to piping, ductwork, mechanical equipment, or conduit.

D. Do not use powder-actuated anchors.

E. Do not drill structural steel members.

F. Fabricate supports from structural steel or steel channel, rigidly welded or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under all nuts.

G. In wet locations electrical and communication rooms shall install floor-standing electrical equipment on concrete pads.

H. Install surface-mounted cabinets and panelboards with minimum of six anchors. Provide steel channel supports to stand cabinet one inch off wall.

I. Bridge studs top and bottom with channels to support flush-mounted cabinets and panelboards in stud walls.

J. Anchors for floor-mounted equipment shall be wedge type.

END OF SECTION

SECTION 16195

ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Nameplates.

B. Wire and cable markers.

1.2 SUBMITTALS

A. Submit shop drawings under provisions of Section 01340.

B. Include schedule for nameplates and tape labels.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Nameplates: Engraved three-layer laminated plastic, white letters on a white black background.

B. Wire and Cable Markers: Cloth markers, split sleeve or tubing type.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Degrease and clean surfaces to receive nameplates.

B. Install nameplates and tape labels parallel to equipment lines.

C. Secure nameplates to equipment fronts using screws, or rivets. Secure nameplate to inside face of recessed panelboard doors in finished locations.

D. Embossed tape will not be permitted for any application.

3.2 WIRE IDENTIFICATION

A. Provide wire markers on each conductor in panelboard gutters, pull boxes, outlet and junction boxes, and at load connection. Identify with panel and branch circuit or feeder number for power and lighting circuits, and with control wire number as indicated on schematic and interconnection diagrams equipment manufacturer's shop drawings for control wiring.

3.3 NAMEPLATE ENGRAVING

A. Provide nameplates to identify all circuits in the service distribution and power distribution panelboards; branch circuit panelboards; separately mounted starting switches; disconnecting switches; motor control push-button stations; selector switches; terminal cabinets; telephone cabinets, etc. Clearly identify on the

nameplate the equipment such as "Air Handling Unit AH-1" and "Hot Water Cir. Pump P-1" in lieu of abbreviated plan references such as "AH-1" or "P-1".

B. Provide nameplates of minimum letter height as scheduled below.

C. Panelboards and Switchboards: 1/4 inch; identify equipment designation, voltage rating, and source.

D. Individual Circuit Breakers In Panelboards and Switchboards: 1/8 inch; identify circuit and load served, including location.

E. Individual Circuit Breakers, Enclosed Switches and Motor Starters: 1/8 inch; identify voltage rating, ampere rating and load served including location.

F. HVAC and Plumbing Control Equipment: 1/8 inch; identify equipment designation and equipment served including location.

G. Communication Terminal Cabinets: 1/4 inch; identify cabinet designation and type of system.

END OF SECTION

SECTION 16461

DRY TYPE TRANSFORMERS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide dry type two-winding transformers, complete.

1.2 QUALITY ASSURANCE

A. References: ANSI/NEMA ST 20 - Dry Type Transformers for General Applications.

1.3 SUBMITTALS

A. Refer to Section 01330 for procedures.

B. Shop Drawings and Product Data: Include both outline and support point dimensions of enclosures and accessories, unit weight, voltage, kVA, impedance ratings, characteristics, loss data, efficiency at 25, 50, 75 and 100 percent rated load, sound level, tap configurations, insulation system type, and rated temperature rise.

C. Test Reports: Include Certified Test Reports for the Following Commercial Tests: Ratio, Polarity, Exciting Current, No-Load Loss, Resistance, Copper Loss, Impedance, Induced and Applied Potential Test. Provide test report for each unit.

1.4 DELIVERY, STORAGE AND HANDLING

A. Storage: Store in a warm, dry location with uniform temperature. Cover ventilating openings to keep out dust.

B. Handling: Handle transformers using only lifting eyes and brackets provided for that purpose. Protect units against entrance of rain, sleet, or snow if handled in inclement weather.

PART 2 - PRODUCTS

2.1 MANUFACTURERS - DRY TYPE TWO-WINDING TRANSFORMERS

A. Square D, Siemens ITE, or General Electric; refer to Section 01610 for substitutions.

2.2 DRY TYPE TWO-WINDING TRANSFORMERS

A. Dry Type Transformers: ANSI/NEMA ST 20; factory-assembled, air-cooled dry type transformers; ratings as shown on the drawings.

B. Insulation system and average winding temperature rise for rated kVA as follows:

Rating	Class	Rise (degree C)
16-750	220	115

C. Case Temperature: Shall not exceed 35 degrees C rise above ambient at its warmest point.

D. Winding Taps, Transformers 15 kVA and Larger: Six 2-1/2 percent full capacity primary taps, two above and four below. Furnish pistol grip for each phase.

E. Sound Levels: Maximum sound levels are as follows:

kVA Rating	Sound Level
1-5	35 dB
6-25	45 dB
26-150	45 dB
151-225	50 dB
226-300	50 dB
301-500	55 dB

F. Basic Impulse Level: 10 kV for transformers less than 300 kVA, 30 kV for transformers 300 kVA and larger.

G. Ground Core and Coil: Ground assembly to enclosure by means of a visible flexible copper grounding strap. Provide ground bus for termination of all conductors.

H. Mounting: Transformers 75 kVA and less shall be suitable for wall, floor, or trapeze mounting; transformers larger than 75 kVA shall be suitable for floor or trapeze mounting. All transformers shall be mounted on vibration isolation mounts - Cal-Dyn #VT-500.

I. Coil Conductors: Continuous copper windings with terminations brazed or welded.

J. Enclosure: ANSI/NEMA ST 20; Type 1. Type 3R. Provide lifting eyes or brackets. Ventilation openings arranged to prevent accidental access to live components. Paint with primer and manufacturer's standard finish.

K. Isolate Core and Coil: Isolate from enclosure using vibration - absorbing mounts.

L. Nameplate: Include transformer connection data, sound levels, and overload capacity based on rated allowable temperature rise.

M. Primary and Secondary Terminals: Terminate at a micarta terminal board.

N. Efficiency: Meet State of California energy efficiency requirements of NEMA TP-1

PART 3 - EXECUTION

3.1 INSTALLATION

A. Set transformer plumb and level.

B. Use flexible conduit, 2 feet minimum length, for connections to transformer case. Make the conduit connections to the side panel of the enclosure. Mount transformers on vibration isolating pads suitable for isolating the transformer noise from the building structure. Install grounding bushings on all conduits. Install flexible jumpers from enclosure to conduit grounding bushings. Ground transformer neutral as required by C.E.C for separately derived system, and as per 16170.

3.2 FIELD QUALITY CONTROL

A. Check for damage and tight connections prior to energizing transformer. Measure primary and secondary voltages with all loads on and make appropriate tap adjustments.

END OF SECTION

SECTION 16470

PANELBOARDS

PART 1: GENERAL

1.01 WORK INCLUDED

A. Service and distribution panelboards.

B. Lighting and appliance branch circuit panelboards.

C. Load centers.

1.02 REFERENCES

A. FS W-C-375 - Circuit Breakers, Molded Case, Branch Circuit and Service.

B. FS W-C-379 - Molded Case Circuit Breakers.

C. FS W-P-115 - Power Distribution Panel.

D. NEMA AB 1 - Molded Case Circuit Breakers.

E. NEMA PB 1 - Panelboards.

F. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or less.

1.03 SUBMITTALS

A. Submit shop drawings for equipment and component devices under provisions of Section 01300.

B. Include outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating and circuit breaker arrangement and sizes.

1.04 SPARE PARTS

A. Keys: Furnish 4 each to Owner.

PART 2: PRODUCTS

2.01 ACCEPTABLE MANUFACTURES - PANELBOARDS AND LOAD CENTERS

A. Square D

B. General Electric

C. Westinghouse

2.02 MAIN AND DISTRIBUTION PANELBOARDS

A. Panelboards: NEMA PB 1; and FS W-P-115, circuit breaker type as indicated on drawings

B. Enclosure: NEMA PB 1; Type 1 for dry interior and Type 3R for exterior and damp locations unless otherwise indicated on drawings. Cabinet size: As indicated on Drawings.

C. Provide cabinet front with concealed trim clamps and hinged door with flush lock. Finish in manufacturer's standard gray enamel.

D. Provide panelboards with copper bus, ratings as scheduled on Drawings. Provide separate copper neutral and ground buses in all panelboards. Provide isolated ground bus as indicated on drawings.

E. Minimum Integrated Short Circuit Rating: 14,000 amperes rms symmetrical for 208 volt panelboards; 30,000 amperes rms symmetrical for 480 volt panelboards or as shown on Drawings.

F. Molded Case Circuit Breakers: NEMA AB 1 and FS W-C-375; provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits.

G. Current Limiting Molded Case Circuit Breakers; NEMA AB 1 and FS W-C-375; provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole, coordinated with automatically resetting current limiting elements in each pole. Interrupting rating 100,000 symmetrical amperes, let-through current and energy level less than permitted for same size Class RK-5 fuse.

2.03 BRANCH CIRCUIT PANELBOARDS

A. Lighting and Appliance Branch Circuit Panelboards: NEMA PB1; and FS W-P-115; circuit breaker type.

B. Enclosure: NEMA PB 1; Type 1 for dry interior locations and Type 3R for exterior and damp locations unless otherwise indicated on drawings.

C. Cabinet Size: 6 inches deep; 20 inches wide.

D. Provide flush cabinet front with concealed trim clamps, concealed hinge and flush lock all keyed alike. Finish in manufacturer's standard gray enamel.

E. Provide panelboards with copper bus, ratings as scheduled on Drawings. Provide separate copper neutral and ground buses in all panelboards. Provide isolated ground bus as indicated on drawings.

F. Minimum Integrated Short Circuit Rating: 10,000 amperes rms symmetrical for 208 volt panelboards; 14,000 amperes rms symmetrical for 480 volt panelboards unless shown on drawings otherwise.

G. Molded Case Circuit Breakers: NEMA AB 1 and FS W-C-375; bolt-on type thermal magnetic trip circuit breakers, with common trip handle for all poles. Provide circuit breakers UL listed as Type SWD for lighting circuits. Provide UL Class A ground fault interrupter circuit breakers where scheduled on Drawings.

H. Current Limiting Molded Case Circuit Breakers: NEMA AB 1 and FS W-C-375; provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole, coordinated with automatically resetting current limiting elements in each pole. Interrupting rating 100,000 symmetrical amperes, let-through current and energy level less than permitted for same size Class RK-5 fuse.

2.04 ACCESSORIES

A. A new printed as-built single line diagram of the entire electrical distribution system as shown on the single line diagram shall be framed, plastic laminated, and mounted in each switchboard room. The diagram shall be a permanent black on white mylar at least 24 inches x 36 inches in size, professionally printed. Provide two (2) extra mylar drawings to Architect.

PART 3: EXECUTION

3.01 INSTALLATION

A. Install panelboards plumb and flush with wall finishes, in conformance with NEMA PB 1.1.

B. Height: 6 ft.

C. Provide filler plates for unused spaces in panelboards.

D. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads and/or to reflect as-built conditions.

E. Stub five empty 3/4-inch conduits to accessible location above ceiling and below floor out of each recessed panelboard.

3.02 FIELD QUALITY CONTROL

A. Measure steady state load currents at each panelboard feeder. Should the difference at any panelboard between phases exceed 20 percent, rearrange circuits in the panelboard to balance the phase loads within 20 percent. Take care to maintain proper phasing for multi-wire branch circuits.

B. Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections for circuit breakers.

END OF SECTION

SECTION 16510

INTERIOR LUMINAIRES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Interior luminaires and accessories.

B. Emergency lighting units.

C. Exit Signs.

D. Ballasts.

E. Fluorescent lamp emergency power supply.

F. Lamps.

G. Luminaire accessories.

1.2 REFERENCES

A. ANSI C78.379 - Electric Lamps - Incandescent and High-Intensity Discharge Reflector Lamps - Classification of Beam Patterns.

B. ANSI C82.1 - Ballasts for Fluorescent Lamps -Specifications.

C. ANSI C82.4 - Ballasts for High-Intensity Discharge and Low Pressure Sodium Lamps (Multiple Supply Type).

D. ANSI/NFPA 70 - National Electrical Code.

E. ANSI/NFPA 101 - Life Safety Code.

F. NEMA WD 6 - Wiring Devices-Dimensional Requirements.

G. Title-24 C.C.R.

1.3 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.

C. Product Data: Provide dimensions, ratings, and performance data.

D. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under Regulatory Requirements.

E. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.4 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section 01700.

B. Accurately record actual locations of each luminaire.

1.5 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Section 01700.

B. Maintenance Data: Include replacement parts list.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five years experience.

1.7 REGULATORY REQUIREMENTS

A. Conform to California building code and NFPA 101 for installation requirements.

PART 2 - PRODUCTS

2.1 LUMINARIES, EMERGENCY LIGHTING UNITS, AND EXIT SIGNS

A. Furnish products as specified on Drawings.

B. Install ballasts, lamps, and specified accessories at factory.

2.2 BALLASTS

A. Fluorescent Ballast:

1. Sylvania PROStart PSX Extra-Low BF or equal where no dimming is required.

2. Provide ballast suitable for lamps specified. .

3. Voltage: Match luminaire voltage.

4. Source Quality Control: Certify ballast design and construction

B. Dimming Ballast and Controls

1. 100% to 10% dimming range.

2. Programmed rapid start design for lamp life.

3. 5 year ballast warranty – material and labor.

4. Control wires – Class 1 or 2 – By local code.

5. Operating above 42 KHZ to reduce iR interference.

6. Dimming control dose not depend on branch circuit layout.

7. 0 to 10V DC control via standard fluorescent dimmers.

8. Ballast control wires shall be protected against accidental line voltage application.

C. High Intensity Discharge (HID) Ballast:

1. Advance Transformer Co., Model.

2. Universal Mfg. Co., Model.

3. General Electric, Model.

4. Description: ANSI C82.4, mercury vapor, metal halide, high pressure sodium lamp ballast as indicated on drawings.

5. Provide ballast suitable for lamp specified.

6. Voltage: Match luminaire voltage.

2.3 FLUORESCENT LAMP EMERGENCY POWER SUPPLY

A. Manufacturers:

1. Dual Lite.
2. Siltron.
3. Bodine.

B. Description: Emergency battery power supply suitable for installation in ballast compartment of fluorescent luminaire.

C. Battery Pack Rating: PS1400 with ability to operate two lamps

D. Battery: Sealed type, rated for 10 years life.

D. Include self-diagnostic option indicator light, installed to be operable and visible from the outside of an assembled luminaire.

2.4 LAMPS

A. Fluorescent Lamp Manufacturers:

1. GE.
2. Sylvania.
3. Philips.

B. High Efficiency T8 lamps, similar to Octron F032/841XPS/ECO.

C. Reflector Lamp Beam Patterns: ANSI C78.379.

2.5 ACCESSORIES

A. Provide all required accessories such as sockets, glassware, boxes, spacers, mounting devices, lamps, etc.

B. Provide minimum 0.125 inches thick, KSH Pattern 12 100% virgin acrylic lenses where applicable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrate and supporting grids for luminaries.

B. Examine each luminaire to determine suitability for lamps specified.

3.2 INSTALLATION

A. Install in accordance with manufacturers instructions.

B. Locate recessed ceiling luminaries as indicated on reflected ceiling plan.

C. Install surface mounted luminaries and exit signs plumb and adjust to align with building lines and with each other. Secure to prohibit movement.

D. Light Fixture Support: Conform to Section 16190.

E. Install recessed luminaries to permit removal from below.

F. Install wall mounted luminaries, emergency lighting units and exit signs at height as indicated on Drawings.

G. Install accessories furnished with each luminaire.

H. Connect luminaries, emergency lighting units and exit signs to branch circuit outlets provided under Section 16130 as indicated.

I. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.

J. Bond products and metal accessories to branch circuit equipment grounding conductor.

K. Install specified lamps in each luminaire, emergency lighting unit and exit sign.

L. Verify all ceiling types and provide lighting fixtures with suitable mounting hardware for mounting in or on subject ceiling.

M. Recessed mounted fixtures shall be approved for the fire rating of the ceiling or shall be enclosed with fire rated material and installed in complete accordance with fire departments requirements.

N. Surface Mounted Fluorescent Fixtures: Where fixtures are indicated for installation on low-density cellulose fiberboard (see room finish schedule on drawings), provide 1-1/2" ceiling spaces, unless UL approved for mounting directly to the ceiling material.

O. Standard Plaster Frames: Provide plaster frames for all recessed lighting fixtures installed in plaster or drywall ceilings (see room finish schedule on drawings). Provide plaster frame designed and fabricated of such materials to preclude the possibility of staining the plaster.

P. Properly support and align fixtures and provide all necessary steel shapes for support of the fixtures. Coordinate complete fixture installation with the building construction.

Q. Square and rectangular fixtures shall be mounted with sides parallel to building lines unless otherwise indicated.

R. Where special fixtures to be used in special ceiling are scheduled, verify all ceiling systems and coordinate fixture type and accessories prior to ordering fixtures. Coordinate and cooperate with ceiling supplier in the preparation of ceiling system Shop Drawings.

S. Install fluorescent fixtures as recommended by the manufacturer or as necessary to provide exact horizontal alignment, preventing horizontal or vertical deflection on angular jointing of fixtures suspended in continuous rows.

T. Two-lamp ballasts shall be allowed to feed single lamps in tandem fixtures and shall be properly identified to show which lamps are fed from this ballast by markers on the fixture and the ballast.

3.3 FIELD QUALITY CONTROL

A. Operate each luminaire after installation and connection. Inspect for proper connection and operation.

B. Each fluorescent fixture when initially energized shall be left on continuously for 100 consecutive hours to properly burn in fluorescent lamps.

3.4 ADJUSTING

A. Aim and adjust luminaries as directed.

B. Adjust exit sign directional arrows as indicated.

C. Relamp luminaries that have failed lamps at Substantial Completion.

3.5 CLEANING

A. Clean Work under provisions of Section 01700.

B. Clean electrical parts to remove conductive and deleterious materials.

C. Remove dirt and debris from enclosure.

D. Clean photometric control surfaces as recommended by manufacturer.

E. Clean finishes and touch up damage.

3.6 DEMONSTRATION

A. Provide systems demonstration under provisions of Section 01700.

B. Provide minimum of two hours demonstration of luminaire operation.

END OF SECTION

SECTION 16721

FIRE ALARM SYSTEM

PART 1.0 GENERAL

1.01 SCOPE & RELATED DOCUMENTS

A. The work covered by this section of the specifications include the furnishing of all labor, equipment, materials and performance of all operations associated with the installation of the Fire Alarm System as outlined. All items required for completion of the installation whether detailed here in the specification or on the drawings shall be included in this contract.

B. The requirements of the conditions of the Contract, Supplementary Conditions, and General Requirements apply to the work specified in this section.

C. Related work in other sections or divisions:
1.) Water-flow switches.
2.) Sprinkler valve supervisory switches.
3.) HVAC Systems Controls.
4.) Elevator monitor/control panel.
5.) Electrical (Section 16000).

D. The entire installation, including materials and equipment shall meet or exceed the minimum standards and requirements of the following:
1.) Underwriter's Laboratory Inc.
2.) California Building Code Part 2,Title 24 (2001) U.B.C. and 1998 California Amendments).
3.) California Building Code, Part 3,Title 24 (2001) N.E.C. and 1998 California Amendments).
4.) California Building Code, Part 4, Title 24 (2001) U.M.C. and 1998 California Amendments).
5.) California Fire Code, Part 9, Title 24 (2001) U.F.C. and 1998 California Amendments).
6.) California Referenced Standards Code, Part 12, Title 24
7.) Public Safety, Title 19, C.C.R. State Fire Marshal Regulations.
8.) Division of Industrial Safety, State of California, latest edition of Electrical Safety Orders
9.) NFPA 72, Local Alarm Systems, 1999 Edition, California Amendments – CBC 6004(a)
10.) All rules and regulations of local codes having jurisdiction
11.)Title 21 and 24 of California Code of Regulations
12.) Manufacturer's Specifications.

1.02 SUBMITTALS (ADDITIONAL REQUIREMENTS)

A. The contractor shall prepare eight (8) sets of blue-line drawings, eight (8) sets of submittal booklets and one (1) set of reproducible sepia drawings for submittal to the Engineer for approval. After approval, the Engineer and Architect shall wet stamp each of the above and deliver them to the Division of the State

Architect - Fire and Life Safety for approval. Upon approval, the Architect shall deliver to the Fire Alarm

Contractor one (1) set of approved blue-line drawings, one (1) set of approved submittal booklets and

one (1) set of approved sepias. These approved sets are to be used for construction purposes.

NOTE: Plans and specifications for the system shall be approved by DSA-Fire & Life Safety prior to system

installation. Any time extensions required because of substitute equipment shall be borne by the Contractor.

B. The following shall be included on all drawings:

1.) Building floor plan of each building drawn to 1/8" scale minimum. Building floor plan shall show location of all devices, conduit and interconnecting wires. Device symbols shall be the same as on

the original bid set of drawings. Show all fire rated corridors, occupancy separations and area separation walls. Show all Room Identification Numbers/Use.

2.) Site plan showing all buildings, conduit and interconnecting wires.

3.) Complete symbol legend (same symbols as bid set), showing all symbols, wire, manufacturer, model number, back-box, mounting height and CSFM Listing Number.

4.) Typical mounting height details.

5.) Voltage drop using point to point or OHMS Law calculations. Voltage drop shall not exceed 10% per circuit.

6.) Battery calculations with batteries used:
Normal - 100% for applicable equipment and devices for a period of 24 Hours.
Alarm - 100% for applicable equipment and devices for a period of 5 Minutes.

7.) Codes as used in the design of this project.

8.) DSA Application Number and District File Number.

9.) Classification per building. Ex: Manual, Automatic, etc.

10.) Typical fire penetration detail showing methods and codes used.

11.) Wiring riser diagram including but not limited to, devices, wiring, zoning, EOL'S, etc.

12.) Sequence of operations schedule.

13.) General notes pertaining to this project.

C. The following shall be included in the submittal book:

1.) Cover Sheet: Project Name, Project Location, Architect/Engineer of record, System Supplier, System Installer with C-10 License Number and Expiration Date.

2.) Table of Contents: Page numbers of all specification sheets and CSFM Listing Numbers.

3.) Specification Sheets for each piece of equipment.

4.) CSFM Listing Sheets.

1.03 EQUIPMENT QUALIFICATION

A. The specification is based upon equipment as manufactured by Edwards Systems Technology or as approved by the District. The equipment specified has a SYNERGY Access Control capability for later addition of completely ISO, CSFM, UL 864 devices for Access Control, Security and CCTV to be part of the system on a single fully-listed network backbone. There is no known equal.

Suppliers/Fire Alarm Contractors wishing to bid this project must have a 21 day prior approval in writing signed by the District, Engineer and Architect.

B. All equipment shall conform to all applicable codes and ordinances, and shall be listed by Underwriter's Laboratories and the California State Fire Marshal.

C. Pre-approved equipment supplier, installation and service organization for the equipment specified is ENKO SYSTEMS, INC, 909-885-7771..

1.04 QUALIFICATION OF BIDDERS

A. To qualify as an acceptable bidder, whether the bid is submitted to the Owner, his Agent, General Contractor or a Sub-contractor, the system bidder or contractor shall be a qualified U.L. Listed Fire Alarm Contractor at time of bid and shall hold a valid C-10 License issued by the Contractors State License Board of California. The Contractor shall also have on staff a minimum of 3 NICET Certified Technicians (at time of bid).

The system bidder or installing contractor shall herein be referred to as the Contractor. The Contractor shall also hold a State of California Consumer Affairs License - Bureau of Collection and Investigative Services. This is to insure that licensed installers familiar with this type of installation will be used on this project. The Contractor shall be the factory- authorized distributor (at time of bid), for the brand of equipment being installed. The Contractor shall have been in the business of supplying, installing and servicing Addressable Fire Alarm Systems for the past 5 years, in the State of California. The Contractor shall be able to refer to at least 20 projects of this nature rendering satisfactory service with contact persons, phone numbers and addresses. The Contractor shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment. The Contractor shall maintain an inventory of all major components in stock at all times. The Contractor shall maintain on staff for the duration of the project a minimum of two EST-3 Certified Installers. Contractors not pre-approved in writing 21 days prior to bid hour and date will not be considered for this project.

B. The responsibility of the installing Contractor is to provide all drawings, submittals, wire, devices, equipment, installation to conduit system furnished and installed under Section 16000, programming, final test out and certification. All specialty Fire Alarm Back-boxes for the conduit system provided under Section 16000 shall be provided under this section.

PART 2 SYSTEM LAYOUT

2.01 SYSTEM DESCRIPTION

A. The Fire Alarm System as outlined on the drawings, shall be a Life Safety System as manufactured by Edwards Systems Technology. It shall be complete with all necessary hardware, software and memory specifically tailored for this project.

B. Provide New Fire Alarm Control Panel, Remote Panels, Remote Annunciators, Printers, Devices, etc in accordance with specifications and drawings. Counts for devices to be in

accordance
with engineers drawings.

C. All equipment needed for a complete operable system, (whether specifically indicated or not) shall be
included in this section. It shall be the Installing Contractors responsibility for a COMPLETE AND OPERABLE SYSTEM upon completion of this project.

2.02 AUTOMATIC ALARM OPERATIONS

A. The system alarm operation subsequent to the alarm initiation via pull station, smoke detector, heat detector, sprinkler flow switch, etc., shall be as follows:

1. All audible alarm indicating devices shall sound the Temporal Signal Code, until silenced at the control panel or at the Remote Annunciator.
2. All visual alarm- indicating devices shall flash per NFPA requirements until reset at the control panel
or at the Remote Annunciator.
3. Alarm audible devices and alarm visual devices shall operate independently of each other.
4. The audible alarm signals shall be inhibited from being silenced for a period of at least 1 minute after commencing operation. This rate is to be field programmable for actual AHJ requirements.
5. Display type and location of alarm per device on the Main FACP LCD display.
6. Display type and location per device of alarm on Remote LCD Annunciator.
7. List on printer the time, date, type and user defined message for each event printed.
8. Subsequent alarms are to report to the FACP and indicate to the operator that a subsequent alarm
is present, and also indicate the number of subsequent alarms.
9. Shut down all associated air handlers in Alarm Zone.
10. De-energize door holders to release fire doors in Alarm Zone.
11. Recall elevators as required.

2.03 AUTOMATIC SUPERVISORY OPERATION

A. All data, initiating, indicating and supervisory lines shall be constantly monitored for integrity. Indicate
opens, shorts, grounds, at Main FACP and at Remote Annunciator.

2.04 OPERATION

A. During the normal state, the NORMAL LED (green) shall flash. The first line of the LCD shall display the
time in (HH:MM:SS) as well as the number of active points (AP) and the number of disabled points (DP)
in the system.

B. When the control panel goes into alarm condition, the NORMAL LED(green) extinguishes and the ALARM LED (red) shall light, the buzzer pulsates and the LCD indicates the time, the number of messages waiting, the type of alarm, the alarm zone or device number, and the time that the alarm occurred. The second line is dedicated to the user specified message.

C. To acknowledge the alarm, the operator shall press the LOCAL SILENCE button and the buzzer will silence providing there isn't an additional alarm waiting.

D. To silence the audible devices, the operator shall press the ALARM SILENCE button. A new alarm shall cause the audibles to resound.

E. During the TROUBLE condition, the amber TROUBLE LED shall light, the NORMAL LED shall go out, and the buzzer shall pulsate. The display shall indicate the type of event, the time the event occurred and up to a 40-character custom user description.

F. During the MONITOR or SUPERVISORY condition, the appropriate LED shall light, the NORMAL LED shall go out, and the buzzer shall pulsate. The display shall indicate the type of event, the time the event occurred and up to a 40 character custom user description.

PART 3 MATERIALS

3.1 MAIN FIRE ALARM PANEL EST-3 W/CAB21

A. Control Panel construction shall be modular with solid state, microprocessor based electronics. It shall display only those primary controls and displays essential to operation during a fire alarm condition. Keyboards or Keypads shall not be required to operate the system during fire alarm conditions.

B. A local audible device shall sound during Alarm, Trouble or Supervisory conditions. This audible device shall sound differently at each condition, to distinguish one condition from another without having to view the panel.

C. Primary Keys, LED's, LCD Display

1.) The following primary controls shall be visible through a front access panel:

Eight Line by 21 Character LCD display
Individual System ALARM LED and Switch
Individual SUPERVISORY LED and Switch
Individual TROUBLE LED and Switch
Individual MONITOR LED and switch
individual ALARM SILENCE LED and Switch
individual PANEL SILENCE LED and Switch
individual RESET LED and Switch
individual DRILL LED and Switch
individual LED's For Power, Test, CPU Fail, Ground Fault, Disable
NEXT/BACK Switch Per Condition

D. The Master Controller shall be capable of supporting up to 64 supervised system nodes per single line network without any change in hardware. Each controller shall contain a RS-232 Printer /Programming Port for programming locally via an IBM PC.

E. Each controller shall support up to 10 Intelligent Loop Cards (SDCs). Each card shall support (125) Intelligent Sensors and (125) Intelligent Modules. Each sensor shall respond to a panel poll for information with an analog representation of measured fire related phenomena (smoke density, particles of combustion, temperature). Such response proves end to end sensor response including the operation of the sensor electronics. Systems that only monitor the presence of a conventional detector in an addressable base shall not be acceptable.

F. The Master Controller shall have the following additional features without any changes in hardware or firmware:
1.) Auto Programming and Electronic Addressing of Field Devices.
2.) Logic Statements.
3.) Time Controls.
4.) Sequences.
5.) Actions.
6.) Analog Value Reporting of all analog sensors and traditional zones.
7.) Maintenance Reporting by Intelligent Sensor.
8.) Sensitivity Setting by Sensor (Within UL Limits).
9.) Sensitivity Setting changed by time (Day/Night Mode).
10.) Alarm Verification by point or zone. (0-60 Seconds).
11.) Print a history of Sensors Activating the Verification Cycle.
12.) On demand system condition printouts (status).
13.) Enabling and Disabling of any system device or function.
14.) Ground Fault Detection by Panel, by Signature Data Circuit, and by device module
15.) Normal and Silent One Man Test.
16.) Windows Based Programming
17.) Network Response Time Under 3 Seconds
18.) Loop Response Time under 750 Milliseconds
19.) Device Mapping Feature for As-Builts
20.) Up to 1750 History Events

3.02 REMOTE ANNUNCIATOR - 3-LCDANN

A. Remote Annunciator to accommodate all buildings for the Fire Alarm System. Annunciator zoning shall have the following displays as a minimum:
1.) Type of device per building/per floor or section.
2.) Zone of type of device per building/per floor or section.
3.) Common control features.

B. The remote Annunciator shall contain the following:
1.) 8 Line by 21 Character LCD Display
2.) Individual System ALARM LED and Switch.
3.) Individual SUPERVISORY LED and Switch.
4.) Individual TROUBLE LED and Switch.
5.) Individual MONITOR LED and Switch.
6.) Individual RESET LED and Switch.

7.) Individual ALARM LED and Switch.
8.) Individual TROUBLE LED and Switch.
9.) Individual DRILL LED and Switch.
10.) Individual LED's for Power, Test, CPU Fail, Ground Fault, Disable
.

3.03 PRINTER - PT-1S

A. Provide printer for the life safety system, as indicated below.

B. The event and status printer shall be a 9 pin, impact, and dot matrix printer with a minimum print speed of 232 characters per second. Printer parameters shall be set up with a menu drive program in the printer. The printer shall be capable of serial or parallel communications protocol.

C. The communications speed for RS-232 communications protocol shall be adjustable from 300 - 9600 Baud. The serial cable shall be supervised.

D. The printer shall list the time, date, type and user defined message for each event printed.

SIGNATURE SERIES DEVICES - GENERAL

1. Each remote device shall have a microprocessor with non-volatile memory to support its function and serviceability. Each device shall store as required for its functionality the following data: device serial number, device address, device type, personality code, date of manufacture, hours in use, number of alarms and troubles, time and date of last alarm, amount of environmental compensation left/used, last maintenance date, job/project number, current detector sensitivity values, diagnostic information (trouble codes) and algorithms required to process sensor data and perform communications with the loop controller.

2. Dependent on its functionality, each device shall be capable of monitoring up to 32 diagnostic codes. This data shall be stored at the device and available for system maintenance.

3. Each device shall be capable of performing its intended function dependent of the control panel, to lower loop data traffic. Each device shall immediately alert the loop controller of a status change to achieve a loop response time of less than 750ms.

4. Each device shall be capable of electronic addressing, either automatically or application program designed, to support physical/electrical mapping and supervision by location. Setting a device's address by physical means shall not be necessary.

3.04 ANALOG PULL STATIONS - SIGA-278

A. Provide pull stations as indicated on the drawings.

B. Pull station shall be double action with terminals for field wiring. Pull station shall be constructed of Red
Lexan with White Letters, Key re-settable with break-glass rod.

C. Station shall be equipped with a STI 1100 Protective Cover w/horn.

D. For flush mounting applications - Use 4S 2-1/8" box with 1/2" Single Gang Ring. (Furnished and Installed under Section 16000).

E. For surface mounting applications - Use 276B-RSB Back-box With STI-3100 Conduit Spacer. (Furnished under Section 16720, Installed under Section 16000).

3.05 ANALOG SMOKE DETECTORS - SIGA-IPHS W/SIGA-SB BASE

A. Provide Intelligent Multi-Sensor Detector where indicated on the drawings.

B. Units shall incorporate three (3) sensing technologies. It shall process and analyze information from each technology (ion/photo/heat) separately using dynamic filters, then apply a sophisticated algorithm for
optimum detection accuracy.

C. Each sensing element self-compensates for changes in the detectors installed environment to maintain
the sensitivity setting and prevent unwanted alarms. The detector reports when it cannot compensate any further.

D. Units shall incorporate twin status LED's . Flashing green shows normal; flashing red shows alarm state;
steady red and steady green show alarm state in stand alone mode, visible from any direction.

E. Units shall incorporate a stand-alone operation mode. The detector makes decisions and inputs an alarm
even if the loop controller fails. The detector reverts to an intelligent "conventional" detector when polling interrogation stops.

F. Units shall mount to the SIGA-SB, SIGA-RB or SIGA-IB bases as required.

G. Base shall mount to a 4S 2-1/8" box with 3-0 1/2" ring. (Furnished and Installed under Section 16000).

3.06 DUCT SMOKE DETECTORS - SIGA-DH w/SIGA-PS INTELLIGENT SENSOR

A. Provide Duct Smoke Detectors where indicated on the drawings.

B. Duct Housing shall be constructed of 16-gauge metal. Units shall incorporate the SIGA-IPHS sensor, base
as required and sampling tubes as required for duct width.

C. Each air handling unit shall be equipped with a SIGA-CR Control Relay for shut down of that particular unit. The duct smoke detector shall be correlated through programming to the control relay for this operation. Mounting box for control relay to be furnished and installed under Section 16000.

D. Duct Housings, Detectors, Sampling Tubes and Control Relays are to be supplied by Section 16720.

E. Duct Housings, Sampling Tubes and Control Relay Back-boxes are to be installed as part of the conduit system in Section 16000. Section 16000 Contractor to provide and install weatherproof housings for above, if applicable to this project.

3.07 PHOTOELECTRIC SMOKE DETECTORS - SIGA-PS

A. Provide Photoelectric Smoke Detectors where indicated on drawings

B. Detectors on-board micro-microprocessor measures and analyzes digital signals gathered by the smoke sensing element. It compares the information to historical readings and time patterns to make an alarm decision. Unwanted alarms are nearly eliminated.

C. The microprocessor in each detector provides Self- diagnostics and History Log, Automatic Device Mapping, Stand -alone Operation and Fast, Stable Communication.

D. Units shall mount to the SIGA-SB, SIGA-RB or SIGA-IB bases as required.

E. Base shall mount to a 4S 2-1/8" box with 3-0 ½" ring. (Furnished and installed under Section 16000)

3.08 HEAT DETECTORS - SIGA-HFS or SIGA-HRS W/SIGA-SB BASE

A. Provide Heat Sensors where indicated on the drawings.

B. Detectors shall gather analog information from their fixed temperature and/or rate-of-rise heat sensing elements and convert it into digital signals. The detectors on board microprocessor measures and analyzes these signals. It compares the information to historical readings and time patterns to make an alarm decision. Digital filters remove signal patterns that are not typical of fires.

C. Units shall incorporate twin status LED's. Flashing green shows normal; flashing red shows alarm state; steady red and steady green show alarm state in stand alone mode, visible from any direction.

D. Units shall mount to the SIGA-SB, SIGA-RB or SIGA-IB bases as required.

E. Base shall mount to a 4S 2-1/8" box with 3-0 1/2" ring. (Furnished and Installed under Section 16000).

3.09 ATTIC HEAT DETECTORS - 284B-PL W/SIGA-CT1

A. Provide Heat Detectors where indicated on the drawings.

B. Units shall incorporate single pole, normally open contacts and a SIGA-CT1 Monitor Module.

C. Fixed Temperature Rating shall be 194 Degrees Fahrenheit.

D. Units shall mount to a 4S 2-1/8" box with 3-0 1/2" ring (Furnished and Installed under Section 16000).

E. Monitor modules shall mount to a 4-S 2-1/8" box with 1G 1/2" ring (Furnished and Installed under Section16000).

3.10 HORNS AND STROBES – G1R-HDVM, G1R-VM, G1R-HD, G1R-P

A. Provide Field Configurable Horns and Strobes as indicated on the drawings for 15, 30, 75 or 110 cd.

A. Strobes shall have four field configurable options in one device. Strobes should not require bulky specular reflectors. Horn Strobes must have a mask and cavity design which channels and conditions light to produce a highly controllable distribution pattern. Strobes must have temporal code output.

B. Horn Strobes shall have independent horn control over a single pair of wires.

C. Single microprocessor controls both horn and strobe

D. Strobes shall be listed for indoor applications. Units shall be rated for 24 VDC polarized operation. Units shall be red in color and mount to a single gang opening.

F. For flush mount applications indoor - Use 4S 2-1/8" boxes with 1/2" Single Gang Ring, (furnished and Installed under Section 16000).

G. For surface mount applications indoor - Use Single Gang Wire mold Box (furnished and installed under Section16000).

3.11 HORNS - 757-1A-T

A. Provide Horns as indicated on the drawings.

B. Horns shall be rated at 94dBA - low and 98dBA - high. Units shall incorporate a high and low setting position. Units shall be rated for 24 VDC polarized operation. Units shall have screw terminals for input/output wiring, be red in color, and be suitable for indoor or outdoor applications. Units shall be capable of being installed on the same circuit as visual devices and shall sound the Temporal Code in synchronization with all units. Units not capable of this feature shall install separate audible and visual circuits, conductors, synchronization modules.

C. For surface mount applications indoor - Use 757A-SB Back-box (Furnished under Section 16720, Installed under Section 16000).

D. For surface mount applications outdoors - Use 757A-WB Back box (Furnished under Section 16720, Installed under Section 16000).

3.13 MONITOR MODULES- SIGA-CT1/SIGA-CT2/SIGA-CR/SIGA-MM1/SIGA-WTM

A. Provide monitor modules as indicated on the drawings.

B. Units shall permanently store serial number, type of device, and job number. Each module shall be capable of having its own personality code. Use respected module for particular application. Modules shall use electronic addressing. Use of switches to set address will be prohibited.

C. Module for flush or surface mountings - Use 4S 2-1/8" Boxes with 1/2" One Gang Ring (furnished and installed under Section 1600.

3.15 COMMUNICATOR

DL1 – Two-Line Dialer.

PART 4 - EXECUTION

4.01 INSTALLATION

A. Wiring shall be installed in conduit as specified under the electrical section of the specification (Section 16000).

B. The sum of the cross-sectional areas of individual conductors shall not exceed 40% of the interior cross sectional area of the conduit. Minimum conduit size shall be 3/4-inch trade size.

C. Wiring shall be identified at terminal and junction locations to prevent unintentional interference with the circuits during testing and servicing.

D. Junction, pull and terminal boxes/cabinets shall be labeled. Labels shall be permanently affixed to covers and/or doors. Labeling to be furnished and installed under Section 16000.

E. Wiring color code shall be consistent throughout the system and shall allow for easy identification of initiating, indicating and auxiliary control circuits.

F. Wiring at building terminal cabinets shall be terminated to screw barrier strips, with circuits identified.

G. Wiring in control, terminal and junction cabinets shall be neatly arranged and bundled.

H. Wiring shall test free of earth grounds or shorts between conductors.

I. The contractor shall be responsible and assure the use of adequate numbers of skilled workmen, who are thoroughly trained and experienced, and completely familiar with the specified equipment and code requirements.

J. The contractor shall be responsible for assuring that conduit size, wire type and color coding meets the specification, manufacturers and code requirements.

4.02 SYSTEM VERIFICATION

A. Upon completion of the installation, the fire alarm contractor shall place into operation and test all operational features, functions and devices.

B. Upon completion of testing, and after the system has been in operation for a minimum of 5 days without failure, the fire alarm contractor shall schedule with the Authority Having Jurisdiction (DSA INSPECTOR), Architect and Engineer, a demonstration and field acceptance test.

C. Field acceptance and approval of the fire alarm system shall be evidenced in writing by the Authority Having Jurisdiction.

D. Prior to scheduling field acceptance, the fire alarm system contractor shall certify in writing, and record the method of testing, the results of all tests and certify that the system has been in operation a minimum of 5 days.

E. All testing shall be conducted in accordance with NFPA-72H, contract documents, manufacturer's instructions and per the requirements of the Authority Having Jurisdiction.

4.03 GUARANTEE AND SERVICE

A. Fire alarm system contractor shall provide written guarantees for all fire alarm equipment and devices used on this project for a period of one (1) year from the date of final acceptance.

B. During the guarantee period the contractor shall repair or replace any defective material at no additional cost to the Owner.

4.04 IN SERVICE TRAINING

A. The fire alarm contractor shall provide factory- trained representatives to demonstrate the operation of the fire alarm system to the Owner's personnel. The representative shall have a thorough knowledge of the equipment and operation of the system. The contractor shall provide one (1) 4 hour in-service training session.

B. The fire alarm contractor shall provide to the Authority Having Jurisdiction a demonstration of system operation. Session shall consist of (1) 4 hour in-service training.

4.05 OPERATION MAINTENANCE MANUALS

A. The fire alarm contractor shall provide to the Engineer, three (3) weeks after the field acceptance test,
two (2) sets of operating/maintenance manuals and one (1) set of as-built drawings.

B. As-built drawings shall indicate the location of all devices, appliances, coding, zoning, wiring sequences,
wiring methods, color coding, identification, labeling and connections of the components of the fire alarm system as installed.

End of Section

SECTION 16760

INTEGRATED COMMUNICATION SYSTEM

PART 1- GENERAL

1.1 SCOPE OF WORK:

A. All applicable portions of Section 16000 shall apply to this section as though written herein completely.

B. The work under this section includes all labor, materials, equipment, and accessories required to furnish and install a complete Integrated Communication System as indicated on the drawings and as specified herein. The System shall contain the following Subsystems: Telephone Interface, Intercommunication, Master Clock, Emergency and Zone Paging, Sound Reinforcement, Intrusion Alarm, Network Media Management and Television Signal Distribution Systems.

1.2 RELATED WORK:

Document affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and sections of Divisions 1 and 16 of these specifications.

A. The work described by this part includes the furnishing of all materials, equipment, supplies, labor and the performing of all operations necessary for the installation of complete and operating systems.

B. All conduits, outlet boxes, back boxes, junction boxes, terminal cabinets, backboards, wiring, cables, equipment, devices, etc., shall be furnished and installed complete under this section. Conduit and junction box sizes shall be determined by the Installing Communications Contractor for the particular wire and cable fills required for the systems installed. (Conduit sizes shall comply with the National Electrical Code). The entire responsibility of the system, including the installation, operation, function, testing and maintenance for one (1) year after final acceptance under this section shall be the responsibility of the communications contractor.

C. The Installing Communications Contractor shall furnish and install all equipment, cables, devices, and other materials even though not specifically mentioned herein, which are necessary for the proper integration of the system so that the system shall perform the functions listed herein in compliance with all specified requirements.

1.3 GENERAL REQUIREMENTS

A. The Installing Communications Contractor shall hold a valid State of California C-10 License, shall have completed at least 20 projects of equal scope, shall have been in business of furnishing and installing communication systems of this type for at least five years, and capable of being bonded to assure the owner of performance and satisfactory service during the guarantee period.

B. The Installing Communications Contractor shall hold all other licenses required by the legally constituted authorities having jurisdiction over the work. Such as Alarm Company and Agent licenses.

C. The Installing Communications Contractor shall be a factory authorized distributor and warrantee station for the brand of equipment specified and shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment. The Installing Communication Contractor shall maintain a spare set of all major parts for the system at all times. All circuit boards, amplifiers and control sub systems shall be 100% backed up with stock at contractor's shop.

1.4 QUALITY ASSURANCE:

A. In order to match the District's Standard, establish quality and standards of performance the specified equipment for the communication systems is that of Rauland Borg Corporation. All mechanical, electrical and general information set forth on the respective data sheets for each specified item shall be considered to be part of these specifications and binding herein. Any proposed equal item offered shall be substantiated fully to prove equality. A list of at least six jobs of the identical equipment that has been in service for at least three years must be submitted with telephone numbers and addresses. The Architect reserves the right to require a complete sample of any proposed equal item and may, if necessary, request a sample tested by an independent testing laboratory to prove equality. The decision of the Architect regarding equality of proposed equal items will be final.

B. It is the intent of these specifications to establish a standard of quality for labor and material to be installed. The Base Bid shall include materials as specified <u>without exception.</u> For any proposed substitution, complete descriptive, technical and cost comparison data and test reports shall be submitted for review during the bidding period. The Contractor shall reimburse the Architect for any additional engineering charges and shall pay all charges of other trades resulting from substitutions. Proposed substitutions shall be listed on the bid form, stating the reasons for substitution and the amount to be deducted from the bid if the substitution is allowed. Final approval of the alternate system shall be determined at the time of job completion. Failure to provide the "precise functional equivalent" shall result in the removal of the alternate system and installation of the specified system at the contractors expense.

C. If a substitution item is given final acceptance by the Owner, the contractor shall pay all costs (including travel, lodging , meals, computers, etc....) required to provide factory certification, equal to that of a Factory Authorized Distributor of the substituted item, for two (2) selected Owners representatives. This training shall occur at the primary factory of the substituted item in question and shall allow the selected Owners representatives to provide any and all Factory / Manufacturer approved repairs, services, software upgrades, etc... without affecting any available or applicable Manufacturer Warranties.

D. All of the Electronic Systems Equipment shall be furnished and installed by the Authorized Factory Distributor of the equipment. The Contractor shall furnish a letter from the manufacturer of all major equipment, which certifies that the Installing Communication Contractor is the Authorized Distributor and that the

equipment has been installed according to factory intended practices. The Contractor shall also furnish a written guarantee from the manufacturer that they will have a service representative assigned to this area for the life of the equipment.

E. All communication systems supplied shall be listed by Underwriter's Laboratories under UL Standard 1459. A copy of the UL listing card for the proposed system shall be included with the contractor's submittal.

F. The material in this section will be covered by the Rauland **five year** material warranty policy.

1.5 SUBMITTAL AND MANUALS

A. Comply with all requirements of the General Conditions, Supplementary Conditions and applicable sections of Divisions 1 and 16 of these specifications.

B. Additional requirements of this section are:

1. Within thirty-five (35) calendar days after the date of award of the Contract, the Contractor shall submit to the Architect for review, eight copies of a complete submission.

2. The submission shall consist of five major sections with each section separated with index tabs. Each page in the submission shall be numbered chronologically and shall be summarized in the index.

3. The first section shall be the "Index" which shall include the project title and address, name of the firm submitting the proposal and name of the Architect.

4. The second section shall include a copy of the Installing Communication Contractors valid C-10 California State Contractors License, letters of factory authorization and guaranteed service, list of 20 projects of equal scope and list of proposed instrumentation to be used by the Contractor.

5. The third section shall contain the comparative specification listing, including a complete listing of the characteristics of the equipment to be furnished next to all of the specified equipment's features and functions as stated in the specifications and data sheets.

6. The fourth section shall contain an original factory data sheet for every piece of equipment in the specifications.

7. The fifth section shall contain a wiring designation schedule for each circuit leaving each piece of equipment and drawings showing system wiring plans.

C. The Contractor shall provide two copies of an "Operating and Servicing Manual" for the system. The manuals shall be bound in flexible binders. All data shall be printed material or typewritten. Each manual shall include the following: Instructions necessary for the proper operation and servicing of the system; complete as-built installation drawings of the system; a wiring destination schedule for

each circuit leaving for each piece of equipment; a schematic diagram of major components with all transistor and IC complements and replacement number.

PART 2 - PRODUCTS

2.1 ICS SYSTEM REQUIREMENTS

A. The system shall provide the state of the art in technology for all paging and intercom communications, secondary clock corrections, and bell schedules. The system shall be easy to learn and operate. All standard system programming shall be user friendly to allow the system administrator the ability to easily program system features. The system shall be a Rauland Telecenter.

B. This system shall be interfaced with a telephone system furnished by others and some of the features and functions that are described here are done though the telephone system. The instruments in the classrooms and administrative areas are part of the telephone system and only interfaced to the ICS system.

C. Provide complete and satisfactorily operating Integrated Intercom/Communications System as described herein, using materials and equipment of types, sizes, ratings, and performances as indicated. Use materials and equipment that comply with referenced standards and manufacturers standard design and construction, in accordance with published product information. Coordinate the features of all materials and equipment so they form an integrated system, with components and interconnections matched for optimum performance of specified functions.

D. Features offered by this system shall be implemented and controlled by software programs that can be changed and expanded as customer needs evolve.

E. The system shall allow system monitoring and administration from a local Windows 95/98 PC or remote Windows 95/98 PC via a modem.

F. The system shall be an electronic system consisting of one or two amplified intercom channels, (classroom) speakers, digital readout for display, and solid state logic and sensing.

G. Ability to provide multiple zone program distribution which is not interrupted by intercom communications.

H. The system shall lend itself to expansion by simple addition of modules.

I. The central switching system shall provide for switching of the intercom talk path to a telephone mode, during the course of a call.

J. The system shall be equipped with voice prompting to identify the calling station and respective call priority.

K. This system is to be interfaced with the site telephone system which is specified elsewhere and furnished by the owner as per the specifications.

L. Two-way communication between any telephone and any room speaker.

M. Room speakers and call switches shall be programmable and may be assigned any three, four or five digit number. Any room number may be reassigned at any time, and it shall not be dependent on wiring or circuit numbers.

N. Sixteen (16) separate paging zones shall be provided; each location shall be programmed in software to belong to any combination of software zones.

O. Each dialing administrative telephone in the system shall be programmable for the following options:

1. Allow zone paging.
2. Allow All-Page announcements.
3. Allow Executive Override.
4. Allow Emergency paging.
5. Allow activation of Time Zone tones.
6. Set the priority level and target display of "normal" calls.
7. Set the priority level and target display of "emergency" calls.
8. Assignment of architectural number.
9. Class of Service.
10. Assignment of associated speaker to paging zone.
11. Automatic Call-Back-Busy.
12. Call Forward-No Answer.
13. Call Forward-Busy.

P. Amplified two-way voice communication shall be available from any dial phone in the system, through any speaker in the system. This shall allow hands-free communication to any classroom or any individual loudspeaker unit. A programmable pre-announce tone shall sound immediately before the intercom path is opened and a supervisory tone shall continue to sound at regular intervals when speaker monitoring is active.

2.2 EQUIPMENT AND MATERIALS

A. CENTRAL CONTROLLER UNIT
The Integrated Electronic Communications Network shall have the following capabilities:

1. Facilities for multiple operations simultaneously without interference with an established pattern of priorities for all administrator/classroom communication capabilities.

2. Facilities for centralized attendant answering.

3. The system shall provide Personal Identification Numbers for selected administrators. By dialing their PIN at any system telephone, the administrator shall have access to the same intercom/paging capabilities assigned to their office telephone, regardless of the restrictions on the phone they are currently using.

4. Provide multiple attendant positions for answering intercom calls.

5. Facilities for the central control unit to store information and give reports on features, system activity, etc. upon request either on site or remotely.

6. Facilities for automatically sounding a warning tone signal over any loudspeaker selected for two-way communications to alert the station attendant (classroom teacher) to the call and prevent unauthorized monitoring.

7. Facilities for access to any single loudspeaker unit, zone loudspeaker unit, or all loudspeaker units. The warning tone signal shall sound as soon as the station is selected and shall be automatically repeated at regular intervals for the duration of the call if the voice circuit is not activated.

8. Direct Dialing, two-way amplified voice intercom between all locations equipped with administrative telephones and staff station speakers without the use of a press-to-talk or talk-listen switch.

9. The Central Controller Unit shall provide an RS-232 port for the connection of on-site or off-site diagnostics by distributor or factory-trained personnel.

10. This port shall be usable for the programming and saving of all programmed data for each system with the utilization of an on-site or off-site computer.

11. This port shall provide the capability of logging of various activities within the system.

12. Facilities for executive override permitting an assigned telephone to "override" on-going intercom conversation(s) in the system.

13. Facilities for the instantaneous distribution of emergency announcements simultaneously, by a single button access, to all locations equipped with speakers.

14. Emergency announcements originating from any assigned administrative telephone shall have priority over all regular system functions.

15. Facilities for the distribution of alarm signals to all areas equipped with speakers by single button access.

16. Up to nine (9) separate distinct alarm signals shall be provided. Each of the distinct alarm signals can be activated by a designated single button.

17. Capability for assigning speaker locations to any one or more of the sixteen (16) zones for zone paging, up to sixteen (16) zones for program distribution, eight (8) zones for class change "bells", and up to eight (8) security zones. All of these zones may be configured to be independent of the other zones.

18. Facilities for the origination of both "normal" and "emergency" calls from any staff location.

19. It shall be possible to review all calls stored in memory in the order received.

20. Facilities for answering calls registered in the digital read-out display merely by pressing a single response button. This capability shall not prevent other calls from being placed or answered by dialing their numbers.

21. Facilities to cancel all staff station originated calls from any administrative telephone.

22. Facilities for assigning or changing classroom numbers by architectural or any desired numbering system; either three-digit, four-digit, or five-digit numbers may be assigned.

23. Facilities for multiple loudspeaker or telephone conversations to take place and not prevent announcements, educational, or music programs from being distributed to other areas of the building.

24. Facilities to automatically send incoming calls to an alternate phone or if they remain unanswered for a predetermined amount of time.

25. A facility to notify a user that the intercom path called earlier is now available. If a busy signal is obtained, user shall dial callback feature code and hang up. System shall automatically call back user when intercom path is available and complete an intercom call to speaker.

26. Facilities for universal wiring for all data network, telephones, intercom speakers, and call switches using category 5 cable. Systems requiring a custom cable plant dedicated to just the intercom system will not be acceptable.

27. Facilities to provide automatic emergency instructions to be broadcast to the entire school when an alarm is tripped. The emergency instructions are preprogrammed and require no user intervention.

28. Facilities for single button access to allow page announcements into speaker zones without interrupting others performing simultaneous functions.

29. Facilities to page one or more area-wide pocket pagers when a call is placed of a specific call priority or all call priorities. The pocket pager will display the calling room number and a numeric call priority.

30. Facilities to automatically alter a call switch's class of service by time of day and day of week as directed by the owner.

31. It shall be possible to initiate Class of Service changes either manually or automatically on a per station basis using internal clock set.

32. A minimum of four independent program memory sets shall be provided. Choice of time of service change and active memory set selected shall be completely programmable.

33. Class of Service Changes shall be programmable by time of day and day of week.

34. A minimum of 64 unique classes of service shall be available.

35. Capability for assigning speaker locations to any one or more of the zones for zone paging or time signal reception; this assignment to be a programmable function.

36. Time signal tones shall be generated on a manual or automatic basis.

37. Emergency tones shall be distributed from designated Administrative Telephones.

38. Power amplifiers shall meet all specifications exactly as specified herein, including power capacity and count.

B. ADMINISTRATIVE TELEPHONE (if shown)
Administrative Telephones indicated on the drawings shall provide functions as scheduled below:

1. One button dialing of most commonly dialed number or numbers.

2. Facilities for multiple operations simultaneously without interference with an established pattern of priorities for all administrator/classroom communication capabilities.

3. Complete station software assignment including class of service, speed call numbers, and any other features assigned without any wiring changes being required.

4. Facilities to permit the distribution throughout the facility of emergency announcements, all-page announcements, zone-page announcements and emergency/evacuation alert if authorized through class of service.

5. Facilities to enable use of features without the use of "hook switching".

6. Facilities for 2 line, 48 character LCD module to display room number dialed, room station call, program distribution, and paging zones.

7. Facilities for receiving staff station and/or emergency calls with single button response.

8. Provide saved number redial function.

C. EMERGENCY/NORMAL CALL SWITCH (if shown)
Emergency/Normal Call Switches indicated on the drawings shall provide functions as scheduled below:

1. Provide one (1) "Emergency" call switch that shall activate a distinctive "EMER" level call from a single button activation. Button shall be clearly marked "EMER" and shall route call to any one or more Administrative Telephones and/or Displays for quick and easy response from an Administrative Telephone. In accordance with the Americans with Disabilities Act (ADA), the "Emergency" call will provide a flashing call assurance LED confirming that the call has been placed in the system.

2. Provide one (1) "Normal" call switch that shall activate a distinctive "NORM" level call from a single button activation. Button shall be clearly marked "NORM" and shall route call to any one or more Administrative Telephones and/or Displays for quick and easy response from an Administrative Telephone. In accordance with the Americans with Disabilities Act (ADA), the "Normal" call will provide a steady call assurance LED confirming that the call has been placed in the system.

D. NORMAL CALL SWITCH (if shown)
Normal Call Switches indicated on the drawings shall provide functions as scheduled below:

1. Provide one (1) "Normal" call switch that shall activate a distinctive "NORM" level call from a single button activation. Button shall be clearly marked "NORM" and shall route call to any one or more Administrative Telephones and/or Displays for quick and easy response from an Administrative Telephone. Ability to upgrade the "NORM" call to an "EMER" call by pressing the button a second time. In accordance with the Americans with Disabilities Act (ADA), the call will provide a steady call assurance LED (which will be upgraded to flashing for "emergency" calls) confirming that the call has been placed in the system.

E. PROGRAM DISTRIBUTION SYSTEM

1. The system shall provide facilities to distribute program material (i.e. cassette tape, CD, radio broadcasts) in the following manner:

a. The media operator shall cue remotely located music source or select radio station.

b. The media operator shall then "direct select" room(s) or areas to send the program via a switchpanel
OR The media operator shall dial from an Administrative Telephone to select the room(s) or areas to distribute program

c. Both means of switch panel and dial-up program distribution shall be accessible from the system.

2. Power amplifiers shall meet all specifications exactly as specified herein, including power capacity and count, provide a minimum of ½ watt power to all intercom speaker locations plus 15 watts power to all horn type speaker locations.

F. TIME PROGRAMMING

The master time controller shall provide the following functions:

1. Non-volatile memory capacity for storing 550 events and up to 100 Calendar dates for schedule changes.

2. Ability to review, edit and delete events via a Windows 95/98 PC running the configuration program.

3. Review events from any entered time of day.

4. Events shall be programmable to any or all of (8) zone circuits. Selection of any of (8) schedules to allow flexibility due to seasonal changes or special events.

5. Fully automatic Calendar execution.

6. User programmable Automatic Daylight Savings Time Change.

7. Programmable Music-on-Class-Change. This feature shall be programmable from 1 to 3600 seconds (60 minutes).

8. Separate bell-tone selection and separate bell duration for each event.

9. Latched operation of zones to control lighting or other devices.

10. Interface with most types of secondary slave clocks whether synchronous wired or electronic.

11. User-programmable custom slave clock correction. Output relays rated at 5 amperes shall be provided on all zone circuits as necessary.

12. Lithium battery will provide not less than 5 years battery back-up for timekeeping function.

G. CLASSROOM SECURITY AND SUPERVISION INTERFACE

1. The classroom controller shall offer easy interface to a security transducer-like motion detector or door switches.

2. All field wiring shall be individually supervised for opens or shorts to each call station and security devices.

3. No other wiring or equipment shall be needed to secure a classroom.

4. Arming and disarming functions shall be performed by dial-up via the Administrative Telephone(s).

5. Easy interface shall be provided to the main security system.

6. Any systems not providing inherent security functions in the classrooms shall not be acceptable.

H. DATA LOGGING

1. System wide events. The System Log shall contain all events that occurred in the system for which event logging has been enabled to diagnose or document system usage.

2. Schedule parameters. Shows for each day-of-the-week the times-of-day when system configuration modes change.

3. System logging. The System Log Dump report shall list all events that occurred in the system for which event logging has been enabled to diagnose or document system usage.

4. System shall be self-monitoring. System shall include a background process dedicated to self-monitoring.

I. TELECENTER SYSTEM RACK EQUIPMENT
To fulfill the above requirements, the following control equipment shall be provided:

1. Rauland Microprocessor based central switching assembly with auto modem. Equip system for number of stations required plus one station line group card but no less than 20%.

2. Power amplifiers - Power and number of amplifiers shall be as required by load plus 50% reserve.

3. All equipment shall be mounted in a Rauland equipment racks.

4. Furnish a Sola or equal 1.3KVA UPS system.

5. Provide switchbank to control pushbutton changes of master clock schedules (4) and emergency tone transmission (8).

J. ACCESSORY EQUIPMENT:

1. Classroom loudspeakers - Interior flush mounted wall or ceiling shall be Rauland USO188 mounted in Rauland ACC1004 baffle and ACC1100 back box. Use ACC1102 back box for surface installations.

2. Exterior flush ceiling or wall loudspeaker shall be Quam C10PAOT10 weatherproof mounted on Rauland ACC1012 baffle and ACC1105 back box. Use vandal-proof hardware.

3. Exterior long throw surface mounted horn loudspeaker shall be Rauland 3703. Provide Vandalproof cage to protect horn. Submit drawing for approval prior to installation.

4. Clocks shall be as shown on the plans. Rauland 2460 Series if shown to be analog, Rauland 2522 if shown digital or Westclock 710 if shown to be battery type.

K. CABLE:

1. Loudspeaker cable shall be West Penn 290/425.

2. Microphone cable shall be West Penn 291.

3. Clock cable shall be West Penn 304 if low voltage types are used.

4. All cable installed in underground conduit shall be West Penn AQC type.

2.3 MULTI-USE SOUND REINFORCEMENT SYSTEM

A. The sound reinforcing system shall provide clear, natural sound uniformly distributed throughout the designated areas.

B. The system shall utilize distributed ceiling loudspeakers or a central cluster, type to be shown on the Plans.

C. The system shall have adequate dynamic range without audible clipping or distortion to accommodate all types of program material. Electronic equalization shall be employed to insure smooth frequency response and high acoustical gain before feedback. When at maximum level, the system shall operate without audible distortion, rattles and buzzes. All switching shall be silent and without pops and transients.

D. The system frequency response, when measured on-axis of the central cluster, shall be within + - 2dB from a curve which is flat from 80Hz to 4kHz and decreasing 3dB per octave from a relative level of 0 dB from 4kHz to 10kHZ. There shall be a minimum 12dB roll-off above 10 kHz and below 63 Hz. Uniformity of coverage of the system at seated ear height (42") shall be within + - 3dB in the 4kHz 1/3 octave band at any seat location using pink noise as a test signal.

E. System noise shall not exceed an equivalent input noise of -120dB based on a 20KHz noise bandwidth. The predominant noise component in the system output under any operating condition shall be that of the input stage.

F. The sound level capability of program material levels produced in all seats shall be at least 90dB when measured with a C scale filter. There shall be at least 6dB of amplifier head room. When driven to maximum output, clipping shall first occur in the power amplifier.

G. Rack mounted sound equipment:

1. Equipment rack.

a. Wall mounted 35 rack space.

b. Locking front door.

c. Fill all unused space with blanks or the same color as rack.

d. Sequential AC control.

e. Ground buss.

f. Three space drawer.

g. Middle Atlantic DWR

h. Equal by Atlas or Lowell

2. Preamp-Mixer.

a. Six microphone/line inputs and two stereo line inputs with trim and phantom power.

b. Frequency response of +or- 1dB from 20Hz to 20KHz.

c. THD of less than .08%.

d. EIN –126dBu.

e. Three balanced outputs.

f. Rane MLM 103

g. Equal by Intelix or Biamp

3. Signal Processor.

a. DSP two in and up to four out.

b. Leveling, limiting, compression, and soft gating of signals.

c. 29 total bands of equalization, parametric or graphic.

d. Crossover, gain matrix and signal delay.

e. 16 non-volatile memory presets – contact closure activated.

f. RS232 serial port and Windows software.

g. Biamp MSP22e.

h. Equal by Rane or White.

4. Power Amplifiers

   a. Dual channel - 200 Watts per channel into 8 ohm load continuous.

   b. THD .05%

   c. Noise less than –107dB.

   d. Damping greater than 500.

   e. Frequency responds +or- .2dB from 20Hz to 20Khz.

   f. Variable speed fan from back to front.

   g. Two rack units high by 14 " deep.

   h. 1dB detented gain controls with security cover.

   i. Built in clip limiter and high pass filters.

   j. Provide numbers of amplifiers to provide each loudspeaker system with a separate amplifier channel.

   k. QSC Cx302 or Cx302V for 70 volt model.

   l. Equal by Crown or Renkus-Heinz.

5. Amplified Monitor Panel.

   a. Twelve balanced line level inputs.

   b. Visual metering for each input.

   c. TOA MP1216.

6. CD/Cassette Player.

   a. Separate and mixed outputs.

   b. Pitch controls.

   c. 32x oversampling.

   d. THD - .005%CD

   e. Signal to noise greater than 104dB/CD – 76dB/Tape.

   f. Frequency response – 20Hz to 20KHz - +or- .5dB/CD – 3dB/Tape.

   g. Marantz PMD350.

   h. Equal by Denon or Tascam.

7. Wireless Microphone System.

   a. UHF – 100 channel selectable frequency synthesized.

   b. Audio frequency response 50Hz to 15Khz +or- 1.5dB.

   c. S/N greater than 102dB.

   d. Image rejection greater than 70dB.

   e. Provide both handheld and body pack transmitters.

   f. Vega U2020

   g. Equal by Shure or Sennheiser

8. Provide necessary networks for connection of projector or aux. inputs to the amplifier.

9. Unit shall be provided with a controller to override the local system for any emergency calls or signals from the school console.

H. Loudspeaker Systems.

1. Provide a minimum of two (2) loudspeaker systems, each with a 75degree by 60 degree HF horn and compression driver and a 15" LF transducer. Unit provided with passive crossover. The actual types of loudspeaker and the placement shall be as per the approved EASE program dictates.

2. Minimum performance.

   a. Frequency response of 60Hz to 16KHz.

   b. Power handling of 400 watts RMS.

   c. Sensitivity 126dB SPL output -1w1m.

   d. Horn loaded.

   e. Electrovoice Sx500

   f. Equal by Renkus-Heinz or EAW.

3. All loudspeaker systems shall be equipped with protective grilles, custom mounting brackets and safety cables.

4. Loudspeaker systems shall be mounted as shown on plans.

5. Custom mounting frames and hardware. Submit design for approval before installation.

6. Submit loudspeaker design for approval. Provide drawings and data showing loudspeaker coverage using the EASE Computer Aided Design Program.

7. Loudspeaker rigging shall be as per State and Federal codes. Loudspeaker loads shall be dead hung from building structure. All hardware shall be grade 8 or better. Wire rope shall be a minimum of 0.125 inches in diameter with thimbles at each end. Wire rope shall be attached safely and durably. Wire rope must have a safety factor of eight (8). Each loudspeaker device shall have a non load bearing safety cable. Safety factor employed in overall design shall not be less than 5:

8. If auxiliary areas are shown with distributed ceiling loudspeakers. The loudspeakers shall be Electrovoice EP309-8T mounted in CBA-8 baffle. Furnish CTB-8 T-Bar support as required.

I. Portable Equipment.

1. Microphones.

   a. Dynamic cardoid element.

   b. Frequency response 50Hz to 15KHz.

   c. On/Off switch.

   d. Sennheiser 825S.

   e. Equal by Shure or Electovoice.

   f. Furnish two (2).

2. Microphone Cables.

   a. Two (2) Proco M25 and two (2) M50.

   b. Equal by Rapco or Conquest.

3. Microphone Stands.

   a. Two (2) Ultimate MS07B.

   b. Equal by Atlas.

J. Microphone and sound or projector receptacles shall be Switchcraft of proper configuration mounted in a wall outlet with stainless steel plate or a floor box as indicated on the Plans. Plates shall be engraved with proper ID.

K. A complete Williams PPA-BCS-FME system shall be furnished and installed to meet the ADA requirements for hard-of-hearing. Furnish R7 receivers in numbers equal to 4% of the seating. The system shall be integrated into the sound reinforcement system. Mount the transmitter into a custom flush wall cabinet and adjust as required for total coverage of seating area.

L. CABLE:

1. Auxiliary loudspeaker cable shall be West Penn 224.

2. Microphone cable shall be West Penn 291.

3. Sound Reinforcement system loudspeaker cable shall be West Penn 295.

4. All cable shall be CL3 type or better and of the type approved for the areas where it is used. All cables installed in underground conduits shall be West Penn AQC types.

M. Provide a Goldline TEF 20 and all other instruments to use during testing and adjusting of the system. Perform the following tests and include reports in the Owners Manual:

1. Time align and balance the system.

2. Raw house frequency response.

3. On-axis frequency response after equalization.

4. Maximum program material sound level and head room.

5. Maximum system gain.

6. Hum and noise signal-to-noise of the overall system for each mike input channel.

7. Adjust system gain controls for optimum S/N ratio so that full amplifier output will be achieved with 0dBm at a line-level input.

8. Correct polarity of loudspeakers and mics.

9. Distortion is less than 5% THD.

10. Loss of articulation on consonances is less than 15%.

11. Check all circuits and wiring to verify they are free of shorts and grounds.

2.4 INTRUSION ALARM SYSTEM

A. DESCRIPTION:

1. Description of system:
The system shall consist of door switches and motion detection devices connected to detect intrusion into the covered areas. The system shall be zoned per each classroom indicated on the drawings and shall have a control panel capable of providing alarm and trouble signals, by zone, for connection to the District equipment and transmitted as per District requirements. The system shall also have 2 separate zones interconnected to the Fire Alarm system control panel for alarm and

trouble, and 2 zones connected to the Kitchen freezer and refrigerator. System on-off and access control from remote equipment furnished by the District or by a remote push button key pads.

2. Each building shall be a separate compartment and shall have a key pad mounted where indicated and as directed by the School District. A master key pad position shall be provided in the administrative area where directed by the School District.

3. Contractor shall provide the first year of monitoring as part of this contract. Monitoring facility shall be as selected by the contractor.

B. PRODUCTS:

1. Provide Radionics 9412 control panels with annunciation of each classroom separately. Provide alpha remote controls as shown on plans. Provide dialing capabilities for a minimum of three separate telephone lines.

2. Passive infrared motion detectors shall be Sentrol 6155 or 6255 as required. Each with a popit.

3. Door switches: Sentrol 1078 series with mounting as necessary to adapt to doors furnished.

4. Cable shall be WestPenn 355 or equal .

5. Power supply for motion detectors shall be TECO Model PS-12R, 12vdc located in terminal cabinets.

6. Protect the roof hatches in each building with magnetic contacts and annunciate separately with a day zone to indicate opening and closing of all hatches during the day and alarm at night.

7. Provide all necessary hardware and software for a complete and working system.

C. TESTING:

1. System shall detect the entry through a door switched door and/or the motion of a body taking not more than four steps in an area secured with motion detection equipment where entry doors or windows are possible access. System shall be complete and properly operating prior to calling for the test. The inspector, contractor and engineer shall walk test system at district's option and contractor shall make minor satisfactory adjustments to the system in the presence of the inspector. Contractor shall coordinate the time of test with the district inspector. This test shall be performed during a time when there is no other persons on the site.

2. Test equipment:
Provide two portable radio transceivers to be used when walk testing the security detection system. The transceivers shall be capable of communication throughout the site.

2.5 TELEVISION SIGNAL DISTRIBUTION

A. The Contractor shall furnish all materials, equipment, labor and services required for the installation of a complete TV signal distribution system.

B. All work shall be performed under the supervision of a company accredited by the basic equipment manufacturer and such accreditation must be presented.

C. All basic electronic equipment (not including cable) specified herein shall be produced by a single manufacturer of established reputation and experience who shall have produced similar apparatus for at least three or more years and who shall be able to refer to similar installations rendering satisfactory service.

D. SYSTEM FUNCTIONS AND CAPABILITIES:

1. The system shall provide for the reception of TV signals provided by a CATV drop to the equipment rack by the owner and signals from VCR's and VDP's.

2. The distribution system shall furnish signals to TV outlets shown on plans.

3. The distribution system shall be installed so that additional channels may be added to the installed system.

4. The system shall pass all channels without noticeable degradation of intelligence of color fidelity.

5. The system shall be suitable for the proper connection of standard EIA TV receivers.

6. The system shall deliver a minimum of 10dbmV signal strength to each receiver on every TV channel in the system; this condition shall be met when every outlet is connected to a lead. Zero dbmV equals 1,000 microvolts across 75ohms.

7. The system as installed shall be rated and capable of continuous 24 hour operation.

8. The system shall be designed to accept, process and distribute a simultaneous sub-channel inserted at any outlet in the system automatically.

E. EQUIPMENT SPECIFICATIONS:

1. In order to establish quality and standards of performance of equipment required by the Owner, the specified equipment for the distribution system is that of Blonder Tongue.

2. Amplifier shall be Bida 550-50 or RMDA550-50 if rack mounted with filters and return amp modules as required.

3. Provide return equipment - DSV separator - ESHP/T8 to unused cable channel converter – AM60op4. Furnish rack for portable equipment with all necessary processors and hardware.

4. Modulators shall be AM-60-550.

5. Provide all necessary HE-12/MICM modulators, Middle Atlantic Custom rackmounts and hardware for a complete and operatable system. All devices are to be rack mounted.

6. Room taps shall be V-3889 with isolation as required.

7. Provide each tap location with a Peerless WSP414 backplate to be installed by the Electrical Contractor.

8. Terminators shall be BTFTP and splitters CRS-2 or 4 as required.

9. Trunk cable shall be Westpenn 821 for runs of 500' or less, JA500 for over 500'. Drop cable shall be Westpenn 842.

10. Equipment racks shall be Middle Atlantic WRK44 with doors front and back and all necessary side panels and blanks. Furnish a rack mounted 13 inch Panasonic color monitor and a video switcher with inputs for each source device specified.

11. Furnish a complete Rauland Avator media management software system.

F. ACCEPTANCE TEST:

1. The installer shall, upon completion of the system, orient all antennas, adjust all controls, etc., to provide a system operating at maximum capability.

2. The installer shall, after the system is installed and adjusted, notify the Owner to arrange for an acceptance test at a mutually convenient time.

3. The installer shall prove that reception quality at an outlet by the District (or authorized representative) is equal to or better than reception normally available in the area and that signal strength is as specified.

4. Submit block diagram and shop drawing of equipment.

2.6 NETWORK MULTIMEDIA SYSTEM

A. The Network Multimedia System shall be a broadband distribution system providing user control of remote multimedia devices via the local or wide area network. This system shall provide:

1. Graphical Media Scheduling/Reservations from any network workstation (local, wide area network, or Internet)

2. Audio, Video, and Text Announcements

3. Video Bulletin Board Functions

4. System Utilization Statistics

5. Multi-Media Device Control (VCRs, Laser Disk Players, Still Image Players, Broadcast channels, Satellite Receivers, DVD Players, CD-ROM, Personal Computers, etc.) from a single network interface device

6. Location and multimedia device control either via a hand-held remote control unit, network workstation, or Internet

7. Automated multimedia events

8. Remote System Diagnostics via Internet or Dial Up Modem

9. Interactive User Help

10. Multimedia resource catalogs

11. Graphical media scheduling and reservation capabilities of local and remote multimedia catalogs (from network workstation or Internet)

12. Interactive search engine for viewing and retrieving information from local and remote multimedia catalogs (from network workstation or Internet)

13. The system consists of a centrally and/or remotely located multimedia source origination and distribution system equipped with video, film, or computer playback units such as VCRs, Laser Disc Players, film to video converters, CD-I players, DVD Players, etc. Control equipment is provided for local, studio, or remote origination, direct network/satellite TVRO viewing, distance learning and teleconferencing. The network multimedia system also allows passive non-controlled video sources, such as bulletin boards, video, audio and text announcements, and other unscheduled sources, to be accessed remotely from any network interface device.

14. Multi-media resources can be searched, reviewed and reserved by users via a computer workstation on the facilities local or wide area network as well as from the Internet. A user then accesses and controls the pre-loaded multimedia devices at any time within the scheduled time period through the use of a system interface device.

B. Video Display Location Control

Location control of local viewing device and remote multimedia devices shall be done by any of the following methods (both singly or in combination)

1. Handheld remote control network interface

2. Network computer workstation (Macintosh or Windows)

3. Internet Available control infrastructures for the location shall include:

4. RS232-422 at a 100k baud

5. WAN/LAN

6. Internet

C. Location Network Interface Device

1. The Location Network Interface Device shall provide control of centrally located multimedia equipment such as the following, but not limited to: VCRs - Laser Disc Players - Still Image Players/recorders - Network Computers - CD-ROM drives - DVD players - CD-I Players - Cable Tuners - Satellite Tuners - 16mm Film Projectors - 35mm Slide Projectors

2. The Location Network Interface device may also be used to view any of the following passive, non-controlled sources: Broadcast channels - Satellite inputs - Cable channels - Video Bulletin Board - Teleconferencing and Distance Learning Devices

3. Selecting any of these sources (both controlled sources and passive/non-controlled sources) can be done by choosing the appropriate menu item or icon from graphical display.

4. In a network multimedia system equipped for central television control, selecting the appropriate menu item will automatically switch the television to the appropriate channel. It shall not be necessary for the end-user to change the channel on the television.

5. The location network interface shall be capable of providing each of the following TV control buttons: On/Off - Volume up and down - Channel up and down – Mute - TV Input (switches to a local audio/video input source as opposed to the centrally located source) - Closed Caption

6. The network multimedia system shall fully identify the devices to the user with user-programmable alphanumeric identification (e.g. VCR23, LASER5, and PC1). It shall not be acceptable to identify the devices as A - F only. Pressing one key to cycle through available devices shall not be acceptable. The title of the resource material loaded into the active multimedia device shall be displayed so that the user can verify the resource they are currently accessing. The display shall also be used to show available cable and satellite programs, pressing the appropriate menu item or button will display the selected input or channel on the location monitor. The location network interface device shall be capable of providing access to control functions for the remote multi-media devices (e.g. audio A/B switching, tracking adjustment, etc.).

7. An optional LED display shall be available for providing real-time display of attached devices available to the end user. This unit shall incorporate a clock display for the idle state when users are not accessing device information or control. The location network interface device shall provide at least, but not limited to, each of the following multimedia device control options: Play – Stop – Step - Forward/Fast Forward (symbol button) -

Step Reverse/Rewind (symbol button) – Pause – Mute – Frame – Chapter – Clear – Enter - Cursor Up - Cursor Down - Cursor Left - Cursor Right - Search for - source (or channel) Up and Down - Volume Up and Down - Display/Menu - On/Off - 0 - 9 Numerical Keys - Closed caption - capability option - TV Input (switches to a local audio/video input source as opposed to the centrally located source)

8. The location network interface shall be logically arranged for easy use. All user commands shall be achieved through menu selections. The functions shall be specific to the device type being accessed by the user. All inactive functions shall not be visible to the user. All functions shall be user programmable and assigned to each device type on an individual basis.

9. For any future software upgrades and/or features, it shall be possible to download any necessary software or firmware changes directly into the location network interface without replacing any hardware or firmware at the location device. These upgrades can be downloaded either from the system server or remotely through a modem or the Internet.

10. The location network interface shall have the option of including a serial port (RS232). It shall be possible to send serial information from a computer (either DOS-based or Macintosh) through this serial port to centrally located machines for control (e.g. Level III Control) or appropriately equipped display devices. No additional infrastructure cabling shall be required to provide this level of control.

11. Furnish Rauland TCIPIR23210T units with all necessary software and hardware as required for a complete and working system.

D. Configurable Video Output Association

1. The location network interface shall have the ability to route appropriate video resources based on user login. The resources attached to the user shall be available to the user for access from the computer workstation and/or location network interface. The system shall determine the user location based on login and attach resources to user at that location. It shall not be necessary to reschedule resources if the user moves to a different location within the system.

2. The location network interface shall have the ability to be associated with any appropriately configured NTSC monitor that is attached to the network multimedia system. If a location network interface is moved from location to location, the location network interface can be easily reconfigured to be associated with the new location.

E. Infra-Red Remote

1. A hand held, wireless remote control which permits accesses and control of local or remotely located multi-media devices may be provided if shown. This IR Remote shall provide all normal buttons/controls.

F. Computer Workstation Interface

1. The Network Multimedia System shall provide a computer workstation interface with the ability to control centrally located multi-media equipment such as the same as C 1and 2 above.
2. Choosing the appropriate menu item or icon from graphical display can select any of these sources (both controlled sources and passive/non-controlled sources).

3. In a network multimedia system equipped for central television control, selecting the appropriate menu item will automatically switch the display device to the appropriate channel. It shall not be necessary for the end-user to change the channel.

4. In a network multimedia system equipped for central television control, the computer workstation shall be capable of providing each of the following TV control buttons: On/Off - Volume up and down - Channel up and down – Mute - TV Input (switches to a local audio/video input source as opposed to the centrally located source). In systems with local display device control only, the display device-specific remote shall be used for these functions.

5. An updateable display area capable of providing user feedback and real-time graphical display of attached device shall be an available option for the computer workstation interface. The title of the resource material loaded into the active multimedia device shall be displayed so that the user can verify the resource they are currently accessing. The display shall also be used to show available cable and satellite programs, pressing the appropriate menu item or button will display the selected input or channel on the computer screen. The computer workstation interface shall be capable of providing access to control functions for the remote multi-media devices (e.g. audio A/B switching, tracking adjustment, etc.).

6. The resource display screens shall have an associated graphical representation of the available resources. The graphic will provide information about the resources which are available to that user and which device is currently in use. The network multimedia system shall fully identify the sources to the user with user-programmable alphanumeric identification. It shall not be acceptable to identify the sources as A - F only. Pressing one key to cycle through available sources shall not be acceptable.

7. The computer workstation screen shall graphically represent multimedia device control functions. Those functions shall include, but not limited to, each of the following multimedia device control options to be activated and selected through use of the keyboard and mouse: Play – Stop - Step Forward/Fast Forward (symbol button) - Step Reverse/Rewind (symbol button) – Pause – Mute – Frame – Chapter – Clear – Enter - Cursor Up - Cursor Down - Cursor Left - Cursor Right - Search for source (or channel) Up and Down - Volume Up and Down - Display/Menu - On/Off - 0 – 9 - Numerical Keys - Closed caption capability option - TV Input (switches to

a local audio/video input source as opposed to the centrally located source)

8. The computer workstation screen shall provide graphical display of multimedia control functions. The functions displayed shall be specific to the device type being accessed by the user. All inactive functions shall not be visible to the user. All functions shall be user programmable and assigned to each device type on an individual basis.

9. The computer workstation screens shall be logically arranged for easy use. All user commands will be achieved through selection of menu items or graphical icons and buttons.

10. The system shall be capable, through input to computer workstation, of identifying users via a confidential password/login assigned to each user. It shall be possible to obtain user login/password information from existing local area network.

G. User Access

1. The network multimedia system shall have the ability to allow system functionality on an individual basis. Each function of the system can be set-up by the system administrator to allow/disallow these functions to a User group. The system shall have the ability to create an unlimited number of user groups. Individual users can be members of one or more user groups.

2. The network multimedia system shall use the established groups to allow users access to location control devices and system resources.

H. Workstation Requirements

1. The computer workstation shall access the network multimedia server using a standard web browser to view system screens. The workstation shall use the browser to access dynamic HTML pages generated by the network multimedia system server. The workstation can access the screens using Netscape version 4.5 or higher or Microsoft Internet Explorer version 4.0 or higher. The dynamic pages shall be accessed using Internet Standard Applications Protocol Interface to the network multimedia server.

2. Access to the network multimedia server pages shall be accomplished via TCP/IP connections over the facilities existing LAN/WAN or remotely via modem or Internet.

3. Systems that require additional software be loaded onto the computer workstation shall be unacceptable.

I. Configurable Video Output Association

1. The computer workstation shall have the ability to route appropriate video resources based on user login. The resources attached to the user shall be available to the user for access from any computer workstation and/or

location network interface. The system shall determine the user location based on login and attach resources to the user at that location.

2. The computer workstation should have the ability to be associated with any appropriately configured NTSC monitor that is attached to the network multimedia system, so that if a workstation is moved from location to location, the workstation can be easily reconfigured to be associated with the new location. Changing the NTSC output associated with a workstation shall be an available user software function.

J. Standard Controls over Remote Multi-Media Equipment

1. The computer workstation shall be capable of issuing standard infrared, serial (RS232) or relay control commands for the multi-media devices that are assigned to it over the associated data network or Internet connection. These commands will allow complete control of the remotely located multi-media devices.

K. Graphical User Interface

1. The computer workstation shall access the network multimedia server using a standard web browser to view system screens. The workstation shall use the browser to access dynamic HTML pages generated by the network multimedia system server. The dynamic pages shall be accessed using Internet Standard Applications Protocol Interface to the network multimedia server.

2. Users shall access system functions through the graphical web pages. Commands shall be issued to the system through the selection of menu items or icon/button selection on the screen through the use of the workstation's mouse and keyboard.

L. Audio/Video Jack

1. Audio/video wall plates shall be provided with audio and video inputs. This audio/video wall plate shall be used to display a local audio/video source (e.g. NTSC from a location computer or a camera) on the video monitor (in the same location). Monitor and Teacher locations shall be with a minimum four-gang, extra deep back box, plaster ring and custom engraved face plate. Plate shall contain one Extron 70-101-01 (HD15 F-F) connector for the SVGA cable, 3 – RCA jacks for audio L and R and Video with cables and a F connector for the RG6 TV signal distribution cable. Provide all necessary cables and connectors for a complete and working system. Provide a Data jack at the monitor position with Cat 5 cable run to the IDF. See Drawings for additional information.

M. Video Messaging

1. Video messaging (Video All Call) shall be capable of being initiated from any area equipped with local origination distribution equipment (local origination carts, sub-channel modulators, and any media source regardless of where it's located in the system) such as a principal's office or a multi-purpose room. In systems with central television control,

accessing the video messaging function shall automatically turn on monitors that are off, leave on monitors that are already on, and switch all monitors to the appropriate channel through out the facility or by user selected zones. In all systems, any program that is running shall be temporarily suspended for the duration of the video message—once the event is completed the appropriate program will automatically return. Video messaging to individual locations and pre-programmed zone areas shall also be possible.

2. The network multimedia system shall have the capability of allowing users to initiate video messaging from any properly equipped system location.

N. Video Messaging Security

1. The network multimedia system shall be set up to provide secure access to video messaging functions. The system shall be capable of identifying users who have the privileges to initiate these functions. Limiting the number of users who have these privileges shall be considered unacceptable. Access to this feature shall be assigned on an individual basis.

O. Menu Driven User Prompting

1. The network multimedia system shall allow locations to access the video messaging functions via on-screen menu. These menus shall be accessible from either a handheld remote or the computer workstation, and provide the following functions:

   a. The on-screen video messaging menu shall be accessible by pressing single button on the location network interface or computer screen.

   b. A list of instructions shall appear on the associated location television or workstation. A status message shall also be sent to a defined system administrator detailing which user has initiated a video message and the originating location.

   c. The network multimedia system shall be capable of allowing the user initiating the video message to preview their broadcast prior to other locations receiving it. Once the user has accessed the video messaging menu, the preview function shall be accessed by a single keystroke. No other location shall receive the broadcast until the initiating user completes their broadcast preview.

   d. A single key shall be used to begin broadcast to all specified locations. In systems that are equipped with central television control, location TVs that are not already on shall be powered up and the location televisions will all be switched to the channel that the video announcement broadcast is on. During the power up cycle, a status message shall appear on the originating location's monitor indicating that the system is in the process of setting up for the video or text announcement. The receiving monitors shall also display a status message indicating a video announcement is

pending. At the media center computer a status screen will indicate that the system is in the process of connecting video from a specified location.

e. In systems that are equipped without central television control, it shall be necessary to initiate an audio page first to indicate that the video or text announcement is pending, no automatic tuning or power up is provided.

f. A single key shall be used to terminate a video or text announcement. In systems with central television control all locations shall be returned to the programs that they were viewing prior to the announcement. Those locations that were off prior to the announcement shall be returned to the off condition.

P. Location Monitor

1. The location monitors shall be large enough to be viewed by all students in the location. The network multimedia system shall be compatible with all manufacturer televisions and monitors provided that they have the ability to be controlled via IR or serial connection. The monitor shall be the standard product of is manufacturer and shall not be modified in any way. It shall not be acceptable to use the power from the television/monitor to power any devices associated with the network multimedia system. A separate power supply shall be used to for this purpose. Provide each classroom complete with interface and license. Location monitors shall be provide by the District and are not part of this contract.

Q. Central Television Control

1. For network multimedia systems with central television control, it shall be possible to detect the power on/off condition of all monitors and remotely turn on/off the monitors for video announcements and energy management purposes. Systems, which do not detect the power condition of the video monitor, shall not be acceptable. If the location monitor is turned on or off using either the front control panel or the television remote control (rather than the network multimedia system network interface) the system shall be able to sense this change and still know the true power condition of the location monitor. Systems which are not capable of keeping track of these changes (and can therefore get “out of sync”) shall not be acceptable.

R. Location Monitor Mounting Hardware

1. The mounting hardware for the video monitors shall offer the optimum in load-bearing strength and stability. All video/monitor mounting hardware shall be fabricated of heavy 11-gauge steel and shall be MIG welded. The bottom mounting plates shall be adjustable for "fine tuning" of the center of gravity in relation to the degree of tilt desired. All mounts shall be Underwriters Listed. Models shall be offered for wall-mounting, suspended ceiling mounting, and finished ceiling mounting. The Location Monitor Mounting Hardware shall accommodate the mounting of a

location network interface. Furnish one Peerless JMW650 for each classroom with back plate. Back Plates to be installed by General Contractor.

S. Network Multimedia System Server

1. The Network Multimedia System Server provides or controls each of the following functions:

   a. Multi-Media Device Control (VCRs, Laser Disk Players, Broadcast channels, Satellite Receivers, DVD Players, CD-ROM, Personal Computers, etc.) from a single network interface device

   b. Multimedia resource catalogs

   c. Graphical media scheduling and reservation capabilities of local and remote multimedia catalogs

   d. Interactive search engine for viewing and retrieving information from local and remote multimedia catalogs

   e. Graphical interactive screens for retrieving, adding and editing information from local and remote multimedia catalogs

   f. Video announcements

   g. System Utilization Statistics

   h. Interface to facility's local and wide are network

   j. Provide access to system multimedia resources from Internet

   k. Provide access to system locations from Internet

   l. Provide access to system multimedia catalogs from Internet

   m. Interactive Help Screens

   n. System Setup and Configuration

   o. Dynamic HTML page generation for system interface

   p. Remote Diagnostics

   q. System-wide security

2. The Network Multimedia System Server shall be a Windows NT based system that uses Dynamic Host Configuration Protocol to address client hardware and software devices on the system. The System Server shall use the TCP/IP protocol to address both hardware and software clients on the system.

3. The Network Multimedia System Server shall provide an Internet access service and dynamic HTML pages through the use of Internet Systems Application Protocol Interface. Client applications shall use a standard web-browser application to access the pages and interface with the Network Multimedia System and components.

4. This Network Multimedia System Server shall have the following minimum configuration:

   a. Pentium PC running at 266mhz

   b. 128MB of RAM Memory

   c. 8GB of Hard Disk

   d. 3-1/2" or High Density Floppy Drive

   e. CD-ROM drive

   f. SVGA Color Monitor with minimum of 512K VRAM VGA

   g. Full Function Mouse

   h. Two (2) RS232C Serial Ports

   i. One (1) Parallel Port

   j. 56k baud or higher modem w/associated Remote Control software (allowing all of the server functions to be handled from remote locations)

   k. 10/100MB Ethernet Network Interface Card

5. The Multimedia Network System Server shall also have the following associated software: Microsoft Windows NT Server. Furnish one Rauland TCIPSRV complete with license.

T. System-wide Data Security

1. The network multimedia system shall provide unlimited levels of user definable system security. The network multimedia system shall have the ability to allow system functionality on an individual basis. Each function of the system can be set-up by the system administrator to allow/disallow each function to a User group. The system shall have the ability to create an unlimited number of user groups. Individual users can be members of one or more user groups.

2. The network multimedia system shall use the established groups to allow users access to location control devices and system resources.

U. Multimedia Resource Material Databases:

1. The Network Multimedia System Server shall provide database control for multi-media resource material, such as laser discs, videotapes, and DVD disks. The System Server shall store this information in standard MARC record format. The System Server shall allow multiple resource databases to be created and exist on either the server or another network accessible storage medium.

2. The System Server shall allow for Open Database Connectivity (ODBC) from other applications to the system multimedia resource catalogs. The System Server shall have the capability of using existing multimedia resource catalog databases that allow for ODBC connectivity. Systems that require duplicate records or information translation shall not be acceptable.

3. The user shall be able to search for the desired courseware material using a standard web browser interface. A window displaying all of the matches for the information entered shall display when a search is initiated. It shall also be possible to query the entire database and view the results sorted by any of the fields of the records.

4. It shall be possible to select any of these single line entries and show expanded information, including a detailed description field. Once the appropriate material is found, the user shall be able to transfer directly to the scheduling portion of the software. For scheduling, it shall not be necessary to exit and enter a different program.

5. When a desired resource is chosen, it shall be possible to view the planned usage for that resource material. The planned usage shall show the times, dates, user name and location that materials have been reserved for.

V. Multi-Media Scheduling

1. The network multimedia system shall provide a multi-media scheduling interface from the computer workstation. The computer workstation shall access the network multimedia server using a standard web browser to view system screens. The workstation shall use the browser to access dynamic HTML pages generated by the network multimedia system server. The dynamic pages shall be accessed using Internet Standard Applications Protocol Interface to the network multimedia server.

2. Users will access scheduling functions through the graphical web pages. Commands shall be issued to the system through the selection of menu items or icon/button selection on the screen through the use of the workstation mouse and keyboard.

3. The multi-media scheduling portion of the system shall permit the user to schedule the chosen resource material for viewing at some future time or date. The computer workstation will access a standard browser and view graphical web pages for scheduling. For scheduling, a full calendar display shall be provided (non-school days, such as weekends and holidays, shall be indicated). The user shall be able to scroll through the calendar by day, week, or month to arrange for advance scheduling of

programs. If a desired time is unavailable for scheduling, information shall be provided which indicates who is using the resource or multimedia device at the desired time; this permits users to "trade" or adjust scheduling. Systems which make it difficult to obtain this information or force you to exit the scheduling portion to get the information shall not be acceptable. The scheduling software shall track all denied requests as well as the reasons for denial. This provides traffic information to be used for expansion of the system.

4. The time periods or modules shall be user definable (in any increment) to match the scheduling scheme adopted by the school. If a particular courseware piece is copyrighted for one viewer only, the network multimedia system shall not permit multiple viewers to be scheduled. A picklist of the schedule shall be viewed from a workstation or monitor to permit media personnel to load the required courseware into the proper media device when it is required. This picklist can be viewed at the workstation monitor or routed to a printer for hardcopy. This picklist can be sorted by time, by resource type, or by user. In addition, reminder messages shall be provided warn the media operator of pending, overdue or completed media events. The network multimedia systems shall be capable of using these reminder messages to trigger an external signal (e.g., light, e-mail or pager).

5. In the scheduling process, the network multimedia system shall automatically select for use the least-used media device, to avoid overworking any one device. The system shall also minimize the number of times resource material shall be shifted between devices (if the same resource is used several times during a given day, the software attempts to keep it in the same media device). The network multimedia system shall log the hours of use for each media device. This information can be used to plan for routine maintenance.

6. The workstation software shall operate in such a way as to accommodate for multiple users accessing the same information. The software shall manage any data contention so no two users will ever write to the same database at the exact same time. The workstation software shall adhere to system-wide security assignments.

W. Interactive User Help

1. The Network Multimedia Server shall provide complete interactive help. Selection of the Help button at any time shall provide assistance relevant to the task the user is attempting to complete. There shall also be a built-in Help Index, which shall permit the user to learn more about any of the key components of the system functions. In addition, the Server shall provide detailed error messages and other comprehensive messages to assist the user.

X. System Utilization Statistics

1. The user shall be able to create printed reports to determine the use and utilization of the system by users, resource, and locations. The system information shall be stored in a standard database that allows for ODBC

interface for the retrieval of the system usage information to be formatted for particular objective of institution.

Y. Automated Event Management

1. The network multimedia system shall provide automated events capability. These events shall be automatically executed at specified times according to a user-defined schedule.

2. The network multimedia system shall be capable of incorporating any of its media devices as part of an event, including VCRs, Video Bulletin Boards, Satellite or Cable Broadcasts, etc.

3. In a network multimedia system equipped for central television control, the remote video display units shall be powered up and properly set to receive the event. These remote video display units shall be returned to their original program (or turned off if no program had been in progress) at the completion of the event.

Z. Resource Type

1. The network multimedia system shall be capable of defining individual resource types. These resource types shall be programmable based on individual system functions. Resource types shall be assigned to devices based on the device function and capabilities. The system shall have the ability to define unlimited resource types.

AA. Resource Viewing and Control

1. The network multimedia system shall be capable of handling immediate viewing requests from users. Anyone who has appropriate security access shall be able to immediately connect any resource device to any remote location.

2. Users with appropriate security access shall also have the ability to view and control any of the system's media devices at a centrally locatable preview monitor or operator console. Systems, which do not allow full override control of system functions from the computer workstation, shall not be acceptable. Systems, which require a separate rack-mounted control panel for this purpose, shall not be acceptable.

3. The network multimedia system shall provide users with appropriate security access the ability to pre-queue any scheduled resource to the appropriate starting point. Any system, which requires that the resource device be scheduled/reserved in order to control it (for queuing purposes), shall not be acceptable.

4. No reservations/scheduling shall be necessary for users with appropriate security access to view or control available devices.

BB. Network Interface

1. The computer workstation shall access the network multimedia server using a standard web browser to view system screens. The workstation shall use the browser to access dynamic HTML pages generated by the network multimedia system server. The dynamic pages shall be accessed using Internet Standard Applications Protocol Interface to the network multimedia server.

2. Users shall access system functions through the graphical web pages. Commands shall be issued to the system through the selection of menu items or icon/button selection on the screen through the use of the workstation mouse and keyboard.

CC. On-Screen Menu Generation

1. The Network Multimedia Server shall automatically provide information to a system navigation device concerning the state of the multimedia device and the resource scheduled for each user. This graphical information shall then be displayed on the location monitor simply by pressing a key on the location network interface. This information shall be specific to the user that requests it. Systems, which do not provide this information based on user, shall not be acceptable.

2. Network Control of multimedia resource device, local and remote multimedia devices shall be achieved through the use of the appropriate Network Control Interface. The Network Control Interface shall communicate with the resource device using: RS232-422 – IR - Contact/Relay - Ethernet Network

3. The Network Control Interface allows the Network Multimedia Server to allow access to control these devices from the system clients, either hardware, software or Internet.

DD. School News Bulletin Board

1. Provide a computer and associated software to generate School News Bulletin Board for the distribution of messages and announcements to televisions school-wide by a dedicated channels on the Video distribution system. The computer, its keyboard and monitor shall be rack mounted in the headend racks. The School News Bulletin Board Computer shall have the following minimum configuration:

   a. 486 PC running at 33 MHz

   b. 4 MB of RAM Memory

   c. 100 MB of Hard Disk

   d. 3.5" or 5.25" High Density Floppy Drive

   e. VGA Color Monitor with 512K RAM VGA

f. 101 Style Keyboard

g. Full Function Mouse

h. A VGA to NTSC composite video scan converter equivalent to an AVerKey 500

i. VNH by Shereff Systems, Inc. running Deputy CG Software.

2. The Electronic Bulletin Board software package shall allow for the creation, storage, editing and display of up to 100 pages. It shall be possible to scroll messages vertically or horizontally. It shall also be possible to wipe pages from the screen vertically or horizontally.

EE. Laser Disc Players

1. The laser disc player supplied shall incorporate the following features:

a. Laser Barcode compatible.

b. CAV compatibility.

c. CLV compatibility.

d. Multi-speed playback.

e. RS-232C computer interface for Level III interactivity capacity.

f. Separate audio and video output.

g. Individual Frame search capability.

h. Chapter search capability.

i. Remote control of left or right channel audio selection

2. Furnish one Pioneer LD-V2800 with rack mount and modulator as required.

FF. Video Cassette Player

1. The VHS and/or SVHS player supplied shall incorporate the following features:

a. Four head double Azimuth video system.

b. On screen display of all commands.

c. HQ circuitry.

d. Blue screen audio/video mute when no signal is present.

e. Playback capability of SP, LP, and EP recorded tapes.

f. Maximum rewind time of less than three (3) minutes on a T-120 tape.

g. Video output of 1.0 V p-p.

h. Video Signal to noise ratio of better than 43 dB (in SP mode).

i. Audio Signal to noise ratio of better than 40 dB (in SP mode).

j. Slow motion playback at 1/6th the normal playback speed.

k. Real time (Hours, Minutes, and Seconds) counters.

l. Quick start loading.

m. Picture Search speed of up to 21 times normal playback speed in EP mode.

n. Automatic Power on when a tape is loaded.

2. Furnish three (3) Panasonic AG1320 units with rack mounts, modulators and all necessary hardware.

GG. CD-I Player (future)

1. The CD-I player if supplied shall incorporate the following features:

a. Interactive Response control via cursor control.

b. 680 Megabyte access on signal compact disc.

c. Digital audio.

d. Menu driven operation.

e. RCA video output jack for NTSC composite video.

f. RGB resolution up to 640 x 480 in 256 colors.

g. Controllable with infrared remote over the Network multimedia System.

h. Provide plug-in module/card which enables the CD-I unit to play full motion video from MPEG encoded CD-I discs.

HH. Satellite Tuner and TVRO (future)

1. Each Earth Station satellite receiver if supplied shall be capable of receiving and demodulating satellite signals and providing control of a steerable TVRO satellite dish. The operator shall be able to steer the antenna (dish) to the appropriate longitude and latitude for reception of a preprogrammed channel. Selection of the channel shall be through an

English language name selectable through the system scheduling software.

II. C/KU Band and Ka Band satellite equipment (future)

1. The C/KU Band and Ka Band satellite equipment if supplied shall provide the following minimum features:

   a. Capable of receiving single frame C Band and Ku Band or Ka Band (DSS) satellites.

   b. Capable of receiving and decoding scrambled signals.

   c. Incremental tuning with digital display.

   d. Signal strength meter.

   e. Line level audio output (RCA jack) and line level video output (RCA jack).

JJ. S-VHS Camera/Recorder system

1. The VHS Camera/Recorder systems if provided shall incorporate the following features:

   a. ½" CCD image sensor (360,000 pixels).

   b. High speed shutter (1/250, 1/500, 1/1000).

   c. Piezo Through-the-Lens (TTL) automatic focus system, ATW.

   d. Synchronized editing function.

   e. Rotary erase head.

   f. 0.9" electronic view finder, time/date generation.

   g. Manual color balance.

   h. High gain switch for video/mic.

   i. Automatic iris w/ manual override.

   j. A/V fade in/out.

   k. 10x power zoom lens.

2. Furnish one unit with tripod mount and equipment bag.

PART - EXECUTION

3.1 INSTALLATION

A. The wiring of the system shall be executed in accordance with the drawings and the equipment manufacturer's wiring diagrams. Should any variations in these requirements occur, the contractor shall notify the Architect before making any changes. It shall be the responsibility of the factory authorized distributor of the specified equipment to install the equipment and guarantee the system to operate as per plans and specifications.

B. Furnish all conductors, equipment plugs, terminal strips, etc., And labor to install a complete and operable system.

C. The cables within the rack or cabinets shall be carefully cabled and laced with no. 12 Cord waxed linen lacing twine or ty-raps. All cables shall be numbered for identification.

D. Splices of conductors in underground pull boxes is not permitted.

E. The labor employed by the contractor shall be regularly employed in the installation and repair of communication systems and shall be acceptable to the owner and architect to engage in the installation and service of this system.

F. The contractor shall thoroughly clean all equipment and materials. All exposed parts of the equipment, cabinets, and other equipment shall be left in a clean condition, unblemished and free of all dirt, dust, smudges, spots, fingerprints, etc., The contractor shall remove all debris and rubbish occasioned by the electronic systems work from the site. The contractor shall thoroughly clean all buildings of any dirt, debris, rubbish, marks, etc., Caused by the performance of this work.

G. The contractor shall provide not less than eight (8) hours for instruction of personnel in the operation and maintenance of the systems. This instruction time shall be divided as directed by the District.

3.2 WARRANTY

A. The entire system shall be warranted free of mechanical or electrical defects for a period of one (1) year after final acceptance of the installation. Any material showing mechanical or electrical defects shall be replaced promptly at no expense to the purchaser.

B. The contractor shall maintain a competent service organization and shall, if requested, submit a service maintenance agreement to the owner after the end of the guarantee period.

C. A typewritten notice shall be posted at the equipment rack which shall indicate the firm, address and telephone number to call when service is necessary. The notice shall be mounted in a neatly finished metal frame with a clear plastic window and securely attached to the inside of the door.

3.3 TESTING

A. Provide all instruments for testing and demonstrating in the presence of the owner's inspector that the frequency response is as stated in the factory data

sheets. Check all circuits and wiring to verify they are free of shorts and grounds. Perform all tests stated in each separate system specification.

B. The owner reserves the right to make independent tests of all equipment furnished to determine whether or not the equipment complies with the requirements specified herein and to accept or reject any or all of the equipment on the basis of the results thereby obtained.

END OF SECTION