SPECIFICATIONS

VITUS GROUP

MADONNA ROAD APARTMENTS
RENOVATION AND UPGRADE PROJECT

Issue Date: **10/05/2012 REVISION 1**
"FOR CONSTRUCTION"

Owner:

Vitus Group
1700 Seventh Avenue, Suite 2000
Seattle, WA 98101

Phone (206) 621-7420
Fax (206) 621-7433

Architect:

Fraser Seiple Architects
971 Osos Street
San Luis Obispo, CA 93401

Phone (805) 544-6161
Fax (805) 544-6183

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SECTION 01 10 00
SUMMARY OF THE WORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Description of the Work.

B. Applicable codes.

C. Abbreviations and symbols.

D. Definitions.

E. Coordination.

F. Furnished products.

1.02 RELATED SECTIONS

A. Section 01 40 00 - Quality Control.

B. Section 01 60 00 - Product Requirements.

C. Section 02 41 00 - Demolition.

1.03 DESCRIPTION OF WORK

A. "The Work" under this Contract involves various improvements to building interiors, building exteriors, the project site, and off-site public right-of-way, as described in Working Drawings titled, “Madonna Road Apartments, A Renovation and Upgrade Project.” The job site is located at 1550-1592 Madonna Road, San Luis Obispo, California. The Architect's project number is 1207.

B. Where work is shown on the Drawings or described in the Specifications as By Others or Not in Contract (abbreviated "NIC"), "The Work" under this contract includes provision for, accommodation of, and coordination by the Contractor to permit such work to be installed and completed as shown.

1.04 APPLICABLE CODES

A. Current applicable codes shall be adhered to, including but not necessarily limited to the following:

1. 2010 Building Standards Administrative Code, Part 1, Title 24 C.C.R.

2. 2010 California Building Code (CBC), PART 2, TITLE 24 C.C.R.
(2009) International Building Code and 2010 California Amendments)

3. 2010 California Electrical Code (CEC), Part 3, Title 24 C.C.R.
(2008 National Electrical Code And 2010 California Amendments)

4. 2010 California Mechanical Code (CMC) Part 4, Title 24 C.C.R.
(2009 Uniform Mechanical Code And 2010 California Amendments)

5. 2010 California Plumbing Code (CPC), Part 5, Title 24 C.C.R.
(2009 Uniform Plumbing Code and 2010 California Amendments)

6. 2010 California Fire Code, Part 9, Title 23 C.C.R.
(2009 International Fire Code and 2010 California Amendments)

7. 2010 California Green Building Standards Code (Calgreen), Part 11, Title 24 C.C.R.

8. 2010 California Referenced Standards, Part 12, Title 24 C.C.R.

9. Title 19 C.C.R. Public Safety, State Fire Marshal Regulations.

10.	NFPA 13	Automatic Sprinkler Systems with Ca Amendments	2010 Edition
11.	NFPA 14	Standpipe Systems with Ca. Amendments	2007 Edition
12.	NFPA 17a	Wet Chemical Systems	2002 Edition
13.	NFPA 20	Stationary Pumps	2007 Edition
14.	NFPA 24	Private Fire Mains with Ca. Amendments	2010 Edition
15.	NFPA 72	National Fire Alarm Code with Ca. Amendments	2010 Edition
16.	NFPA 2001	Clean Agent Fire Extinguishing Systems with Ca. Amendments	2008 Edition

1.05 ABBREVIATIONS AND SYMBOLS

A. Abbreviations and symbols used are indicated on some Drawings. Those not so defined are to be used in the current trade sense of the word or symbol. Conflicts or confusion in the application of abbreviations and symbols shall be brought to the immediate attention of the Architect for resolution prior to proceeding with affected Work.

1.06 DEFINITIONS

For the purposes of these Specifications, the following definitions of project roles shall apply:

A. "Owner" shall refer to the Vitus Group. "Owner's Representative" shall refer to any employee or agent of the Vitus Group, specifically assigned to act on the Owner’s behalf.

B. "Contractor" shall refer to Precision General Construction Contractors, Inc., and any contractor or subcontractor who, by contract with Precision GCC or directly with the Owner, is responsible for the execution of some portion of the Work.

C. "Architect" shall refer to Fraser Seiple Architects, or any of their specifically assigned project staff. Direct correspondence and submittals to Donald Love, project manager.

D. "Engineer" shall refer to any engineering consultant specifically referenced in a given section of Specifications.

E. "Contract Documents" shall refer to the Working Drawings, these Specifications, the Contract for Construction, the General Conditions, and any Special Conditions, Addenda, Change Orders, or related documents included in the above by reference.

G. “Inspector” shall refer to any inspecting agency or consultant retained by the Owner or Owner's lender to review the Work.

1.07 COORDINATION

A. Contractors shall schedule and coordinate Work in a fashion that will allow completion within the construction time frame defined in their Contract or Subcontract for Construction.

B. Contractors will assist in the coordination of quality control testing and inspections, giving City officials and Owner's Representative adequate advance notice of construction progress.

1.08 FURNISHED PRODUCTS

Contractors shall be responsible for:

A. Informing Owner’s Representative of anticipated delivery dates for products.

B. Providing shop drawings, product data, samples, and other submittals as defined in these Specifications and notifying the Architect and Inspector of any observed discrepancies or problems anticipated due to non-conformance with the Contract Documents.

C. Receiving and unloading products at the job site.

D. Handling products at the site, including uncrating and storage.

E. Protecting products from damage or exposure to the elements.

F. Assembly, installation, connection, adjustment, finishing, and cleaning of products.

G. Repairing or replacing items damaged by the Contractor.

1.09 WARRANTY

A. Contractors shall warrant their Work in compliance with the laws of the State of California for a minimum period of one year from the date of Substantial Completion, as determined by the Architect. Extended warranties and guarantees required in the Contract Documents shall not be limited by the provisions of this paragraph.

END OF SECTION

SECTION 01 13 00
SPECIAL PROJECT PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Dust, Air Pollution, and Odor Control.
B. Disposal Operations.
C. Noise Control.
D. Archaeological Resources.
E. Drainage During Construction.

1.02 GENERAL

A. Construction operations shall comply with any special project procedures listed in approved conditions of discretionary approval issued by the City of San Luis Obispo.

1.02 DUST, AIR POLLUTION, AND ODOR CONTROL

A. Dust, Air Pollution, and Odor Control: Contractors shall employ measures to avoid the creation of dust, air pollution, and odors.
   1. Wet down unpaved areas as necessary to prevent dust from leaving the site during demolition, earthwork and construction operations, and to create a crust after each day's activities cease.
   2. Store all volatile liquids, including fuels or solvents in closed containers.
   3. No open burning of debris, lumber or other scrap will be permitted.
   4. Properly maintain equipment to reduce gaseous pollutant emissions.

B. Contractors shall comply with the dust control requirements of the City of Manteca.

1.03 DISPOSAL OPERATIONS

A. Solid Waste Management: Supply solid waste transfer containers. Daily remove all debris such as spent air filters, oil cartridges, cans, bottles, combustibles and litter. Take care to prevent trash and papers from blowing onto adjacent property. Encourage personnel to use recycle and trash containers. Convey non-recylceable contents to a sanitary landfill.

B. Washing of concrete containers where waste water may reach adjacent property, storm drains or natural water courses will not be permitted. Remove any excess concrete to the sanitary landfill.

C. Chemical Waste and Hazardous Waste Materials Management: Furnish containers for storage of spent chemicals used during construction operations. Dispose of chemicals and hazardous materials in accordance with applicable regulations as enforced by the San Luis Obispo City Fire Department.

D. Garbage: Store non-recycleable garbage in covered containers for regularly scheduled pickup and disposal in a sanitary landfill.

1.04 NOISE CONTROL

A. The construction site is surrounded by residential and other noise-sensitive uses; Contractors shall make every effort to minimize the impact of construction noise on neighboring uses, especially residents.

B. Construction operations and delivieries to the project site shall be limited to the hours 7:00 a.m. through 8:00 p.m., Mondays through Saturdays. Any exceptions to this schedule shall only be made with the Owner's Representative's prior permission.

C. Generators, pumps, and related devices are prohibited from overnight operation, except in the case of emergency protection of neighboring property.

D. All construction equipment shall be provided with well maintained, functional mufflers to limit noise emissions.

1.05 ARCHAEOLOGICAL RESOURCES

A. In the event that during grading, construction or development of the project, any potential archaeological resources are uncovered, all work shall be halted until a City-approved archaeological specialist has reviewed the resources for their significance.

B. If human burials are encountered, the coroner's office shall be contacted immediately.

C. Construction shall only be restarted in the area of potential archaeological resources upon the direction of the Building Department, and after any additional studies or mitigations required by the City have been satisfactorily completed.

1.06 DRAINAGE DURING CONSTRUCTION

A. Contractors shall make provisions to direct rainwater drainage into the existing stormwater drainage system during construction, using pumps if necessary to prevent water or mud flow onto neighboring properties.

B. In the event of rain during construction operations which are susceptible to erosion, contractors shall use City approved erosion and sedimentation control measures to limit erosion damage on site and erosion-related mud flow or sedimentation off site. Such measures may include but are not limited to plastic sheeting, fabric or plastic netting, wattles, hay bales, silt curtains, or temporary debris dams.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

END OF SECTION

SECTION 01 30 00
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Submittal procedures.

B. Shop drawings.

C. Product data.

D. Samples.

E. Manufacturers' instructions.

F. Manufacturers' certificates.

1.02 RELATED SECTIONS

A. Section 01 40 00 - Quality Control

B. Section 01 70 00 - Contract Closeout: Contract warranty and manufacturer's certificates submittals

1.03 SUBMITTAL PROCEDURES

A. Transmit each submittal with a transmittal identifying the number of copies or samples, Specification Section number, and date of transmittal. Submittal numbers will be assigned by the Contractor.

B. Identify Project and Subcontractor or supplier as appropriate.

C. Schedule submittals to expedite the Project, and deliver to Architect, as directed in the preconstruction meeting. Coordinate submission of related items.

D. Identify variations from Contract Documents and product or system limitations which may be detrimental to successful performance of the completed Work.

E. Revise and resubmit submittals as required, identify all changes made since previous submittal.

1.04 SHOP DRAWINGS

A. Format:
   1. Drawings larger than 11 x 17 inches: Submit one reproducible copy and two opaque reproductions; the Architect will return the reproducible copy.
   2. Drawings 11 x 17 inches or smaller: Submit three opaque copies which will be retained by the Architect, plus the number of copies the Subcontractor or supplier requires.

B. Scale: Draw to an identifed scale sufficiently large to describe the nature and construction of the subject products or assemblies, but in no case to a smaller scale than the Construction Drawings.

C. After review, reproduce and distribute in accordance with procedures for Record Documents described in Section 01 70 00.

1.05 PRODUCT DATA

A. Submit the number of returned copies required, plus three copies which will be retained by the Architect, the Owner's Representative or Inspector, and consulting Engineer where applicable.

B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data as needed to provide information unique to this Project.

1.06 SAMPLES

A. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

B. Submit samples of finishes from the full range of manufacturers' standard colors (or in custom colors selected), textures, and patterns for Architect's selection.

C. Include identification on each sample, with full Project information.

D. Submit the number or samples specified in individual specification Sections; one of which will be retained by Architect.

E. Reviewed samples which may be used in the Work are indicated in individual Specification Sections.

1.07 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual Specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting, or finishing, in quantities specified for “product data,” above.

B. Identify any conflicts between manufacturers' instructions and Contract Documents.

1.08 GUARANTEES, WARRANTIES, MANUFACTURER'S CERTIFICATES

A. When specified in individual specification Sections, submit guarantees, warranties, or manufacturers'certificates to Architect for review, in quantities specified for “product data,” above.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference date, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect.

PART 2 - PRODUCTS

(Not Used)

PART 3 EXECUTION

(Not used) END OF SECTION

SECTION 01 40 00
QUALITY CONTROL

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Quality assurance and control of installation.

B. References.

C. Inspection and testing laboratory services.

1.02 RELATED SECTIONS

A. Section 01 42 00 - Reference Standards

B. Section 01 33 00 - Submittal Procedures

C. Section 01 60 00 - Product Requirements

1.03 QUALITY ASSURANCE/CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply fully with manufacturers'instructions, including each step in recommended sequence of fabrication, installation, and adjustment.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. In performance of the work, use only persons qualified to produce workmanship of specified quality.

F. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.04 REFERENCES

A. Conform to the current edition of reference standard as defined in Section 01 42 00.

B. Obtain copies of standards when required by Contract Documents.

C. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

D. The contractual relationship of the parties to their Contracts shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.05 TESTING AND CERTIFICATION

A. Owner will employ, and pay for testing services as required in connection with the Work, which may include, but are not necessarily limited to:

1. Stripping and clearing of vegetation and deleterious materials
2. Excavation to recommended depths
3. Soil compaction at excavation bottom
4. Fill placement and compaction
5. Footing excavations
6. Concrete slump and strength
7. Concrete block grout prism strength
8. Special inspection of structural concrete and masonry
9. Welding inspection
10. High strength bolting inspection
11. Roofing and waterproofing core testing

B. Retesting or reinspection required because of non-conformance to specified requirements shall be performed at the Contractor's expense.

C. Contractors shall provide manufacturer's certifications as required by various sections of these specifications.

PART 2 - PRODUCTS

(not used)

PART 3 - EXECUTION

(not used)

END OF SECTION

SECTION 01 42 00
REFERENCE STANDARDS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Quality assurance.

B. Schedule of references.

1.02 RELATED SECTIONS

A. Section 01 40 00 - Quality Control

1.03 QUALITY ASSURANCE

A. For products or workmanship specified by association, trade, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date for receiving bids, or date of Contract for Construction when there are no bids, except where reference standard date is specified in individual sections of these Specifications.

C. Obtain copies of standards when required by Contract Documents. Maintain copy at jobsite during submittals, planning, and progress of the specific work, until Substantial Completion.

D. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

E. The contractual relationship of the parties to the Contract for Construction shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.04 SCHEDULE OF REFERENCES

AA Aluminum Association
818 Connecticut Avenue, N.W.
Washington, DC 20006

AABC Associated Air Balance Council
1000 Vermont Avenue, N.W.
Washington, DC 20005

AASHTO American Association of State Highway
and Transportation Officials
444 North Capitol Street, N.W.
Washington, DC 20001

ACI American Concrete Institute
Box 19150
Reford Station
Detroit, MI 48219

ADC Air Diffusion Council
230 North Michigan Avenue
Chicago, IL 60601

AGC Associated General Contractors of America
957 E Street, N.W.
Washington, DC 20006

AI Asphalt Institute
Asphalt Institute Building
College Park, MD 20740

AIA American Institute of Architects
1735 New York Avenue, N.W.
Washington, DC 20006

AITC American Institute of Timber Construction
333 W. Hampden Avenue
Englewood, CO 80110

AISC American Institute of Steel Construction
400 North Michigan Avenue
Eighth Floor
Chicago, IL 60611

AISI American Iron and Steel Institute
000 16th Street, N.W.
Washington, DC 20036

AMCA Air Movement and Control Association
30 West University Drive
Arlington Heights, IL 60004

ANSI American National Standards Institute
1430 Broadway
New York, NY 10018

APA American Plywood Association
Box 11700
Tacoma, WA 98411

ARI Air-Conditioning and Refrigeration Institute
1815 North Fort Myer Drive
Arlington, VA 22209

ASHRAE American Society of Heating, Refrigerating and
Air Conditioning Engineers
1791 Tullie Circle, N.E.
Atlanta, GA 30329

ASME American Society of Mechanical Engineers
345 East 47th Street
New York, NY 10017

ASTM American Society for Testing and Materials
1916 Race Street
Phildelphia, PA 19103

AWWA American Water Works Association
6666 West Quincy Avenue
Denver, CO 80235

AWPA American Wood-Preservers' Association
7735 Old Georgetown Road
Bethesda, MD 20014

AWS American Welding Society
550 LeJeune Road
Miami, FL 33135

CDA Copper Development Association
57th Floor, Chrysler Building
405 Lexington Avenue
New York, NY 10174

CLFMI Chain Link Fence Manufacturers Institute
1101 Connecticut Avenue, N.W.
Washington, DC 20036

CRSI Concrete Reinforcing Steel Institute
933 Plum Grove Road
Schaumburg, IL 60195

EJCDC Engineers' Joint Contract Documents Committee
American Consulting Engineers Council
1050 15th Street, N.W.
Washington, DC 20005

EJMA Expansion Joint Manufacturers Association
707 Westchester Avenue
White Plains, NY 10604

FGMA Flat Glass Marketing Association
3310 Harrison
White Lakes Professional Building
Topeka, KS 66611

FM Factory Mutual System
1151 Boston-Providence Turnpike
Norwood, MA 02062

FS Federal Specification
General Services Administration
Specifications and Consumer Information
Distribution Section (WFSIS)
Washington Navy Yard, Bldg. 197
Washington, DC 20407

GA Gypsum Association
1603 Orrington Avenue
Evanston, IL 60201

IEEE Institute of Electrical and Electronics Engineers
345 East 47th Street
New York, NY 10017

IMIAC International Masonry Industry All-Weather Council
International Masonry Institute
815 15th Street, N.W.
Washington, DC 20005

MIL Military Specification
Naval Publications and Forms Center
5801 Tabor Avenue
Philadelphia, PA 19120

ML/SFA Metal Lath/Steel Framing Association
221 North LaSalle Street
Chicago, IL 60601

NAAMM National Association of Architectural Metal Manufacturers
221 North LaSalle Street
Chicago, IL 60601

NEBB National Environmental Balancing Bureau
8224 Old Courthouse Road
Vienna, VA 22180

NEMA National Electrical Manufacturers' Association
2101 L Street, N.W.
Washington, DC 20037

NFPA National Fire Protection Association
1619 Massachusetts Avenue, N.W.
Washington, DC 20036

NSWMA National Solid Wastes Management Association
1120 Connecticut Avenue, N.W.
Washington, DC 20036

NTMA National Terrazzo and Mosaic Association
3166 Des Plaines Avenue
Des Plaines, IL 60018

PCA Portland Cement Association
5420 Old Orchard Road
Skokie, IL 60077

PCI Prestressed Concrete Institute
201 North Wacker Drive
Chicago, IL 60606

PS Product Standard
U. S. Department of Commerce
Washington, DC 20203

RIS Redwood Inspection Service
One Lombard Street
San Francisco, CA 94111

RCSHSB Red Cedar Shingle and Handsplit Shake Bureau
515 116th Avenue
Bellevue, WA 98004

SDI Steel Deck Institute
Box 3812
St. Louis, MO 63122

SDI Steel Door Institute
712 Lakewood Center North
Cleveland, OH 44107

SIGMA Sealed Insulating Glass Manufacturers Association
111 East Wacker Drive
Chicago, Illinois 60606

SJI Steel Joist Institute
1703 Parham Road
Suite 204
Richmond, VA 23229

SMACNA Sheet Metal and Air Conditioning Contractors'
National Association
8224 Old Court House Road
Vienna, VA 22180

SSPC Steel Structures Painting Council
4400 Fifth Avenue
Pittsburgh, PA 15213

TAS Technical Aid Series
Construction Specifications Institute
601 North Madison Street
Alexandria, VA 22314

TCNA Tile Council of North America, Inc.
100 Blemson Research Blvd.
Anderson, SC 29625

UL Underwriters' Laboratories, Inc.
333 Pfingston Road
Northbrook, IL 60062

WCLIB West Coast Lumber Inspection Bureau
Box 23145
Portland, OR 97223

END OF SECTION

SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Temporary Utilities: Electricity, lighting, heat, ventilation, telephone service, water, and sanitary facilities.

B. Temporary Controls: Barriers, enclosures and fencing, protection of the Work, and water control.

C. Construction Facilities: Access roads, parking, progress cleaning, project signage, and temporary buildings.

1.02 RELATED SECTIONS

A. Section 01 13 00 - Special Project Procedures

B. Section 01 70 00 - Contract Closeout

1.03 TEMPORARY ELECTRICITY

A. Power is available at the jobsite.

B. Contractor shall provide portable generator for field welding if required.

C. Contractors shall provide power outlets for construction operations, with branch wiring and distribution boxes. Provide flexible power cords as required.

1.04 TEMPORARY LIGHTING

A. Contractors shall provide and maintain lighting to adequately illuminate their construction operations for safety and to facilitate accurate, workmanlike construction.

B. Owner shall provide and maintain lighting to adequately illuminate staging and storage areas after dark for safety and security purposes.

C. Permanent building lighting may be used during construction.

1.05 TEMPORARY HEAT

A. Contractors shall provide and pay for heat devices and heat as required to maintain specified conditions for construction operations.

B. Prior to operation of permanent equipment for temporary heating purposes, verify that the installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

C. Maintain adequate ambient temperature in areas where construction is in progress in accordance with product manufacturer's recommendations and as otherwise specified. Maintain adequate material temperatures in accordance with manufacturer's recommendations and as otherwise specified.

1.06 TEMPORARY VENTILATION

A. Contractors shall ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

B. Temporary ventilation shall conform to the requirements of applicable occupational health and safety regulations.

1.07 TELEPHONE SERVICE

A. Contractor shall provide, maintain and pay for telephone service to a field office at time of project mobilization.

B. The site telephone will be available for the construction related use of other parties only as allowed by the Contractor.

1.08 TEMPORARY WATER SERVICE

A. Potable water is available at the site.

B. Water for earthwork operations shall be provided by the Contactor and may be from recycled or non-potable sources.

1.09 TEMPORARY SANITARY FACILITIES

A. Contractor shall provide and maintain required sanitary facilities and enclosures.

B. Existing building sanitary facilities may only be used by Contractor as allowed by Tenant.

1.10 BARRIERS

A. Contractor shall provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.

B. Contractors shall provide barricades and walkways as required by governing authorities for public circulation and access when work occurs in the public right-of-way.

C. Contractors shall be responsible for the placement of barriers, barricades, and warnings to protect construction crews, visitors, and the public from hazardous operations, such as trenching, crane operation, loading to upper portions of the Work, and related activities.

D. Contractors shall provide barriers to protect non-owned parked or moving vehicles, stored materials, adjacent sites and structures from damage.

1.11 FENCING

A. Contractor shall provide a temporary fence around portions of the construction site being used for storage of construction materials and equipment, equipped with locking gate(s).

1.12 PROTECTION OF INSTALLED WORK

A. Contractors shall protect installed Work and provide special protection where specified in individual Specification Sections.

B. Contractors shall provide appropriate protective coverings at walls, projections, jambs, sills, and soffits of openings.

C. Finished floors and other surfaces shall be protected from traffic, dirt, wear, damage, or movement of heavy objects, with durable sheet materials.

D. Traffic or storage upon waterproofed or roofed surfaces is prohibited. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

E. Traffic or storage is prohibited in landscaped areas.

1.13 SECURITY

A. Contractors shall cooperate with the Owner's efforts to protect the Work from unauthorized entry, vandalism, or theft, following all Owner's security procedures.

1.14 ACCESS ROADS

A. Maintain access to fire hydrants, free of obstructions.

B. Access to the construction area for construction traffic shall only be as approved in advance by the Owner's Representative.

1.15 PARKING

A. Temporary surface parking for construction personnel on site shall only be as approved by the Tenant.

B. On-street parking shall respect all City ordinances and requirements.

1.16 PROGRESS CLEANING

A. Maintain site and building areas in a clean and orderly condition, free of waste materials, debris, and rubbish.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Handle waste materials, debris, and rubbish according to Specification Section 01 13 00.

1.17 TEMPORARY FIELD OFFICE

A. Tenant will make existing modular building available for Contractor’s temporary field office.

1.18 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary above-grade or buried utilities, equipment, facilities, materials, prior to Substantial Completion inspection.

B. Remove underground installations to a minimum depth of 2 feet.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

END OF SECTION

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. This Section describes basic requirements governing products including:

1. Workmanship.

2. Manufacturers' instructions.

3. Transportation and handling.

4. Storage and protection.

1.02 RELATED REQUIREMENTS

A. Section 01 33 00 - Submittal Procedures.

B. Section 01 70 00 - Closeout Procedures.

1.03 PRODUCTS

A. Products include material, equipment, and systems.

B. Comply with specifications and referenced standards as minimum requirements.

C. Components required to be supplied in quantity within a specification section shall be of the same type, made by the same manufacturer, and shall be interchangeable.

D. Reference to materials or methods of construction by name and catalog number is done to establish standards of quality, design, utility, suitability, and cost, and shall not be construed as limiting competition.

E. All products not conforming to the requirements of the specifications will be considered as defective, and such products will be rejected, whether in place or not. Remove such products immediately from the site of the Work.

F. Materials and equipment, for which Underwriter’s Laboratories, Inc. standards have been established and their label service is available, shall bear the appropriate UL Label.

G. Where the words "or equal" are used following trade names, patented products, or proprietary products or methods, they shall be deemed to read "or equal in quality, design, utility and suitability"; as solely determined by the Owner’s Representative.

1.04 QUALITY ASSURANCE

A. Comply with industry standards except when more restrictive tolerances or requirements indicate more rigid standards or greater quality.

B. Perform work by persons qualified to produce specified quality.

C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

1.05 MANUFACTURERS' INSTRUCTIONS

A. When work is specified to comply with manufacturers' instructions, submit copies as specified in Section 01 30 00, distribute copies to persons involved, and maintain one set in field office.

B. Perform work in accordance with details of instructions and specified requirements. Should conflict exist between specifications and instructions, consult with Architect.

1.06 TRANSPORTATION AND HANDLING

A. Transport products by methods to avoid product damage, deliver in undamaged condition in manufacturer's unopened containers or packaging.

B. Provide equipment and personnel to handle products by methods to prevent soiling or damage.

C. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

D. Promptly remove damaged and defective products from the site and replace at no increase to Contract Sum.

1.07 STORAGE AND PROTECTION

A. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather tight enclosures; maintain within temperature and humidity ranges required by manufacturer's instructions.

B. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering, provide ventilation to avoid condensation.

C. Store loose granular materials on solid surfaces in well-drained area; prevent mixing with foreign matter.

D. Arrange storage to provide access for inspection. Periodically inspect to assure products are undamaged and maintained under required conditions.

E. After installation, provide coverings to protect products from damage from traffic and construction operations, remove when no longer needed. Maintain temperature and humidity conditions in interior spaces for the Work in accordance with manufacturers’ instructions for the materials and equipment being protected.

END OF SECTION

SECTION 01 70 00
CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Closeout Procedures.

B. Final Cleaning.

C. Adjusting.

D. Project Record Documents.

E. Operation and Maintenance Data.

F. Warranties.

G. Spare Parts and Maintenance Materials.

1.02 RELATED SECTIONS

A. Section 01 30 00 - Submittals: Manufacturer's certificates.

B. Section 01 50 00 - Temporary Facilities and Controls: Progress cleaning.

1.03 CLOSEOUT PROCEDURES

A. When required by the Owner's Representative, the Contractor shall submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents.

B. Provide submittals that are required by governing or other authorities to Architect, in duplicate.

1.04 FINAL CLEANING

A. Execute final cleaning prior to final inspection of any portion of the Work.

B. Clean interior and exterior glass and surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

C. Clean equipment and fixtures to a sanitary condition.

D. Replace filters of operating equipment.

E. Clean debris from roofs, gutters, downspouts, and drainage systems.

F. Clean site; sweep paved areas, rake clean landscaped surfaces.

G Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.05 ADJUSTING

A. Adjust operating Products and equipment to ensure smooth and unhindered operation meeting specified performance criteria.

1.06 PROJECT RECORD DOCUMENTS

A. Where required by other Sections of these Specifications, Subcontractors shall maintain one set of the record drawings for the purpose of recording actual “as-built” revisions to the Work.

B. Record Documents shall be stored separately from documents used for construction.

C. Record information shall be permanently marked in a contrasting color, concurrent with construction progress.

D. Submit record drawings with request for final payment.

1.07 OPERATION AND MAINTENANCE DATA

A. Where required by other Sections of these Specifications, submit two sets of appliance, equipment, and other operation and maintenance data prior to final inspection, bound in 8-1/2 x 11 inch text pages, with durable plastic covers for insertion in a three-ring binder.

B. Prepare a table of contents for each set of data, with each Product or system description identified.

C. Operation and maintenance data shall identify names, addresses, and telephone numbers of Subcontractors and suppliers and identify the following:
   1. Significant design criteria.
   2. List of equipment.
   3. Parts list for each component.
   4. Operating instructions.
   5. Required and recommended inspections in connection with operations and maintenance of equipment and systems.
   6. Complete maintenance instructions for equipment and systems.
   7. Maintenance instructions for special finishes, including recommended cleaning methods and materials and special precautions identifying detrimental agents.

1.08 WARRANTIES

A. Provide duplicate signed copies of warranties required under specific Specification Sections.

B. Submit warranties prior to final application for payment.

1.09 SPARE PARTS AND MAINTENANCE MATERIALS

A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual Specification Sections.

B. Deliver to Project site and place in location as directed; obtain receipt prior to final inspection.

PART 2 - PRODUCTS

(Not used)

PART 3 - EXECUTION

(Not used)

END OF SECTION

SECTION 02 41 00
DEMOLITION

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Removal and pruning of designated trees and clearing of designated shrubs, grasses and related vegetation from site.

B. Removal of designated curbs, site walks, and paving.

C. Cutting and removal of designated common building walls, fixtures, and finishes.

D. Removal of damaged exterior plywood siding, trim, and plaster grounds.

E. Removal of designated light fixtures, doors, sheet metal, and other exterior components.

F. Removal of debris and undisclosed structures.

G. Removal of all 4-ply cap sheet roofing down to roof sheathing.

H. Removal of window panes and mullions.

1.02 RELATED WORK

A. Section 01 13 00 - Special Project Procedures

B. Section 31 00 00 - Earthwork

1.03 COORDINATION

A. Contractors performing demolition procedures shall be responsible for contacting Underground Service Alert to confirm location of any underground utilities which may be damaged during demolition.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

3.01 PREPARATION

A. Erect and maintain temporary barricades under provisions of Section 01 50 00 and as required to keep members of the public at a safe distance from demolition operations.

B. Protect existing items which are not indicated to be demolished.

C. Disconnect, remove, and cap terminated utility services within demolition areas in compliance with utility company standards and requirements of the local authority with jurisdiction.

3.02 EXECUTION

A. Demolish in an orderly and careful manner. Identify and protect existing improvements to remain.

B. Remove or mitigate known hazardous materials as directed by a certified hazardous materials abatement contractor. Immediately notify Architect or Owner's Representative of unexpected presence of contaminated, hazardous, or potentially dangerous materials encountered; proceed with removal and disposal as directed.

C. Except for where noted otherwise, immediately remove demolished materials from site. Do not burn or bury materials on site.

D. Upon completion of demolition work, leave areas surrounding work area, including public streets, in a clean condition.

E. Control the spread of dust during site demolition operations by moistening affected surfaces; refer to additional dust control provisions in Section 01 03 00.

F. Comply with all requirements of the local authority with jurisdiction, as identified on the drawings.

G. Plant and tree removal shall include removal of all roots.

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Cast-in-place concrete foundations for miscellaneous site structures.

1.02 RELATED WORK DESCRIBED ELSEWHERE

A. Section 31 00 00 - Earthwork

B. Section 32 10 15 - Concrete Paving and Flatwork

C. Section 03 60 00 - Grout

1.03 QUALITY ASSURANCE

A. Footing Inspection: Footing excavations shall be inspected and approved by the City Building Inspector.

B. Testing: Concrete slump and strength testing shall be performed in accordance with the provisions of Section 01 40 00.

1.04 SUBMITTALS

A. Submit mix designs, product data and manufacturer's instructions under provisions of Section 01 30 00.

B. Submit certified copies of mix designs for each class of concrete. Include results of testing or test data used to establish mix proportions. Include data on joint filler and any proposed admixtures or curing compounds.

C. Submit proposed location of all control and construction joint locations for the Architect's review and approval.

D. Submit all concrete delivery tickets to jobsite superintendent for filing until all strength testing has been satisfactorily completed.

PART 2 - PRODUCTS

2.01 CEMENT

A. Portland Cement Type 1 or Type II, low alkali, conforming to ASTM C150-09, a single brand of cement throughout structural concrete work.

2.02 AGGREGATE

A. Fine aggregate: ASTM C33-11

B. Coarse aggregate: Clean, hard, fine grained crushed rock or washed gravel with a minimum of 25% crushed faces; ASTM C33-11, maximum 1-1/2" size; maximum loss in Los Angeles Rattler Test shall not exceed 50% in 500 revolutions, per ASTM C535-09.

2.03 SAND

A. Sand for slab cushion: Clean, homogenous inland sand of which less than 3 percent passes the #200 sieve; free of deleterious, organic or expansive materials.

2.04 WATER

A. Mixing water: Clean, fresh water, free from acid, alkali, organic matter or other impurities which may be detrimental to concrete. Conform to ASTM C1602.

B. Washing and curing water: Same as above.

2.05 READY-MIXED CONCRETE

A. Reference Standards: Comply with ASTM C94-11.

B. Strength: 2,500 p.s.i. minimum compressive strength after 28 days (unless noted otherwise).

C. Slump: 5 +/- 1 inches maximum.

D. Mix: Minimum cement content of 5.0 sacks per cubic yard; maximum water-cement ratio of 7.2 gallons per sack of cement.

2.06 DEFORMED BAR REINFORCING

A. Reference Standards: Comply with ASTM A615-11, grade 40

B. Provide reinforcing steel in sizes described on drawings, clean of rust, grease, or contaminants that may impair concrete bonding.

2.07 WELDED WIRE FABRIC

A. Reference Standards: Comply with ASTM A185-08.

B. Provide wire fabric in size and gage indicated on drawings, clean of rust, grease, or contaminants that may impair concrete bonding

2.08 FORM MATERIALS

A. Reference Standards: Comply with ACI 301.

B. Plywood Forms: Douglas fir or spruce species; solid one side grade; sound undamaged sheets.

PART 3 - EXECUTION

3.01 INSPECTION

A. Inspect completed earthwork in area of concrete work and verify that it is ready to receive the work of this Section.

B. Beginning of trenching means acceptance of existing surfaces.

3.02 COORDINATION

A. Obtain information and instructions from other trades and suppliers in ample time to schedule and coordinate the installation of items furnished by them to be embedded in concrete under this Section so that provisions for their work can be made without delaying the project.

B. Cutting and/or patching made necessary by failure or delay in complying with these requirements shall be done at no cost to the Owner, and under the direction of the Architect.

3.03 FOOTING TRENCHING

A. Excavate at locations and to dimensions and depths shown on the drawings, making allowance for footing forms.

B. Drain all surface and ground water from excavations, using pumps, dams, or drainage ditches as required to remove water from trenches.

C. Fill over-excavated portions with structural concrete.

D. Maintain all excavations true to line and dimensions shown and free of loose earth and debris of any kind. Trenching is subject to Architect's approval.

3.04 FORMWORK

A. Coordinate carefully with other trades for the provision of sleeves, chases, knock-outs, and ties for other work.

B. Build and brace forms sufficiently to prevent leaking of concrete and any bulging or deflection of forms; double form footings.

C. Construct forms true to line and dimensions shown on drawings, with exterior surfaces flat and plumb. Formwork is subject to Architect's approval.

3.05 REINFORCING STEEL PLACEMENT

A. Place reinforcing steel with accurate spacing and clearances as shown on drawings; support securely to prevent movement during pour.

B. Use only clean concrete or metal items to support reinforcing steel.

3.06 CONCRETE PLACEMENT

A. Lightly wet forms, trenches, and sand just prior to concrete placement.

B. Vibrate concrete footings to prevent honeycombing; honeycombing in excess of 1 inch in depth or 4 inches in width will be unacceptable.

C. Leave forms in place a minimum of one day after pour is completed.

3.07 CLEAN-UP

A. All truck discharge and cleaning shall be in areas that will not receive landscaping. At completion of concrete work, remove all concrete debris, slurry, hardened concrete and other waste products.

B. Do not wash out tools, pumps, trucks, or other concrete related items in a fashion that will damage or stain road surfaces or property.

END OF SECTION

SECTION 03 60 00
GROUT

PART 1 - GENERAL

1.01 WORK INCLUDES

A. Grouting and patching at concrete surfaces.

1.02 RELATED WORK

A. Section 03 30 00 - Cast-In-Place Concrete

1.03 SUBMITTALS

A. Submit product data under provisions of Section 01 30 00.

PART 2 - PRODUCTS

2.01 GROUT

A. Acceptable manufacturer: The Burke Company

B. Alternate products may be used if approved on the basis of submittals made under provisions of Section 01300.

C. Product description: "Burke Stone" quick setting, non-shrinking anchoring and patching cement, product no. 332.

D. Design Strength: 4,300 psi after initial cure period.

E. Mixed only with clean, potable water.

PART 3 - EXECUTION

3.01 INSPECTION

A. Inspect surfaces to receive cementitious grout to verify they are clean and prepared for grouting according to the manufacturer's requirements.

B. Beginning grouting means acceptance of existing surfaces.

3.02 APPLICATION

A. Pour or trowel cementitious grout into place according to manufacturer's recommendations.

B. Finish surface of patches smooth and even with adjacent concrete or masonry surfaces.

END OF SECTION

SECTION 04 20 00
CONCRETE UNIT MASONRY

ART 1 - GENERAL

1.01 WORK INCLUDED

A. Standard concrete block at trash enclosures and miscellaneous locations.

B. Mortarless concrete block at low site walls.

C. Reinforcement, anchorages, and accessories.

1.02 RELATED WORK

A. Section 03 30 00 - Cast in Place Concrete

B. Section 09 90 00 - Painting

1.03 REFERENCES

A. ACI 315 - Details and Detailing of Concrete Reinforcement.

B. ASTM A615-09 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

C. CBC Standards - Masonry Units.

D. ASTM C90-11 - Hollow Load-Bearing Concrete Masonry Units.

E. AWS D12.1 - Reinforcing Steel Welding Code.

1.04 SUBMITTALS

A. Submit product data under provisions of Section 01 30 00.

PART 2 - PRODUCTS

2.01 STANDARD MASONRY MATERIALS

A. Acceptable Manufacturers - Hollow Load Bearing Concrete Masonry Units
   1. Air Vol Block, Inc.
   2. Angelus Block
   3. Alternate products may be used if approved on the basis of submittals made under provisions of Section 01 30 00.

B. Hollow Load Bearing Units: As specified below and on the Drawings for other applications.
   1. Concrete units conforming to ASTM C90, standard weight, Type 1, Grade N. Units shall be steam cured, and shall be a minimum of 28 days old when delivered to the job site.
   2. Concrete units elsewhere shall be “precision” design in natural grey color.
   3. Concrete unit nominal sizes shall be 8” high x 8” deep x 16” long, unless noted otherwise.
   4. Any accessory concrete units not specifically drawn, but required for this work, shall comply with all requirements of this section.

C. Shrinkage: Shrinkage of concrete units shall not exceed .05% when tested in accordance with ASTM C426-10.

D. Water Content: When delivered to the job site, concrete units shall not contain more than 35% moisture by weight; units shall be stored on site in a fashion which limits additional saturation from rainwater.

2.02 MORTARLESS MASONRY MATERIALS

A. Acceptable Manufacturers - Mortarless Concrete Masonry Units
1. Allan Block
2. Alternate products may be used if approved on the basis of submittals made under provisions of Section 01 30 00.

B. Hollow Masonry Units: As specified below and on the Drawings for other applications.
1. AB Courtyard Collection concrete units with a minimum compressive strength of 3,000 psi per ASTM C1372.
2. Concrete units shall be “precision” design in color as selected by Architect from standard range.
3. Concrete unit nominal sizes shall be 6” high x 7” deep x 15.5” long, unless noted otherwise.
4. Any accessory concrete units not specifically drawn, but required for this work, shall comply with all requirements of this section.

C. Additional Materials:
1. Wall Cap: AB Courtyard Collection concrete wall cap units.
2. Construction Adhesive: PL Premium as manufactured by OSI Sealants, Inc. or approved equivalent.

2.03 MORTAR

A. General:
1. All mortar shall conform to ASTM C270-10, Type S, natural color.
2. Mortar strength at 7 days shall be 1,000 psi minimum; at 28 days shall be 1,800 psi minimum.

B. Composition:
1. Cement: per ASTM C150-09, Type II, low alkali.
2. Hydrated lime: per ASTM C207-06.
3. Quicklime: per ASTM C5-10, non-hydraulic type.
4. Aggregate: per ASTM C144-04.

C. Pre-mixed mortar: All pre-mixed mortar shall be the product of one manufacturer, meet the criteria listed in 2.02 a and b, above, and conform to ASTM C387-11.

2.04 GROUT

A. General:
1. All grout shall conform to ASTM C476.
2. Strength at 7 days shall be 1,250 psi minimum; at 28 days shall be 2,000 psi minimum.

B. Composition:
1. Cement: per ASTM C150-09, Type I or II, low alkali.
2. Aggregate: per ASTM C404-07; pea gravel shall be graded so that 100% will pass the 3.8" sieve, and no more than 5% will pass the No. 8 sieve.

2.05 REINFORCING STEEL

A. All reinforcing steel required for concrete unit masonry work shall be deformed iron bar, conforming to ASTM A615, Grade 40 min.

2.06 REINFORCING ACCESSORIES

A. Provide appropriate reinforcing positioners and brackets to maintain all reinforcing in the proper locations during grouting, and per California Building Code Section 2104.

2.07 WATER

A. Use fresh, clean and potable water, free from minerals and organic components in concentrations which would affect the hardening of cement mortar.

2.07 STORAGE ON SITE

A. Immediately after delivery to the job site, masonry units shall be stacked under coverings or otherwise protected from weather exposure and from soil contact. Care shall be exercised in handling to avoid chipping and breaking. Use of damaged units will not be permitted. Units shall be stored on pallets or temporary wood dunnage off the ground.

2.08 OTHER MATERIALS

A. All other materials, not specifically described but required for a complete and proper concrete unit masonry installation, shall be new, of first quality, and subject to the Architect's approval.

PART 3 - EXECUTION

3.01 GENERAL

A. Follow procedures specified below and indicated on the Drawings. Use the drawings as diagrams indicating the extent of the Work to be installed, and its location relative to other Work. In the event of discrepancy, immediately notify the Architect and obtain direction prior to proceeding.

3.02 PREPARATION

A. Verify items provided by other Sections of work are properly sized and located.

B. Establish lines, levels, and coursing. Protect from disturbance.

C. Confirm that concrete footings are level and adequately cured to accept installation of standard masonry walls.

D. Confirm that aggregate subgrade/mortar bed is level and adequately compacted to accept installation of mortarless masonry walls.

E. Dampening or wetting of units prior to installation is not permitted.

3.03 MIXING MORTAR

A. Mix mortar in a mechanical mixer of one sack minimum capacity.

B. Mix mortar at least three minutes after all materials have been added.

C. Mix only as much mortar as can be used in one hour after water has first been added; continuous mortar mixing is not permitted.

D. Maintain a slump of 2-3/4", +/- 1/4".

E. Mortar shall not be re-tempered in any way.

3.04 COORDINATION

A. Carefully coordinate with all other trades to ensure that footings, attachments and related items allow a smooth interface between concrete unit masonry and other work.

3.05 COURSING AND JOINTS

A. Place masonry to lines and levels indicated.

B. Maintain masonry courses to uniform width. Make vertical and horizontal joints equal and of uniform thickness.

C. Lay concrete masonry units in running bond. Course one standard block unit and one mortar joint to equal 8 inches. Tool mortar joints as a very shallow concave shape.

D. All cells of standard block shall be grouted solid unless noted otherwise.

3.06 STANDARD MASONRY PLACING AND BONDING

A. Lay masonry in full bed of mortar, properly jointed with other work. Buttering corners of joints, and deep or excessive furrowing of mortar joints are not permitted.

B. Fully bond intersections, and external and internal corners.

C. Do not shift or tap masonry units after mortar has taken initial set. Where adjustment must be made, remove mortar and replace.

D. Remove excess mortar.

E. Perform jobsite cutting with proper tools to provide straight unchipped edges. Take care to prevent breaking masonry unit corners or edges. Any chipped or broken units in the finished wall shall be removed and replaced at no additional cost to the Owner.

F. Cut mortar joints of units flush in any location where waterproofing is applied.

3.07 MORTARLESS MASONRY PLACING AND BONDING

A. Place masonry in compliance with manufacturer's instructions, engaging raised rings in recesses to ensure vertical alignment.

B. Apply construction adhesive at wall cap and at any conditions exposed to excessive uplift or lateral force, such as ends of freestanding walls.

3.08 REINFORCING STEEL

A. Place reinforcement in accordance with ACI 315.

B. Locate reinforcing splices at points of minimum stress.

C. Place reinforcing bars supported and secured against displacement. Maintain position within 1/2 inch of true dimension.

D. Verify reinforcement is clean, free of scale, dirt, or other foreign coatings which would reduce bond to grout.

3.09 TOLERANCES

A. Variation from Unit to Adjacent Unit: 1/32 inch maximum.

B. Variation from Plane of Wall: 1/4 inch in 10 feet and 1/2 inch in 20 feet or more.

C. Variation from Plumb: 1/4 inch per story non-cumulative.

D. Variation from Level Coursing: 1/8 inch in 3 feet; 1/4 inch in 10 feet; 1/2 inch maximum.

E. Variation of Joint Thickness: 1/8 inch in 3 feet.

F. Maximum Variation from Cross Sectional Thickness of Walls: Plus or minus 1/4 inch.

3.10 GROUTED COMPONENTS

A. Perform grouting of walls in strict accordance with CBC Chapter 21, using 2,000 psi (28 days) strength grout.

B. Place and consolidate grout fill without disturbing reinforcing.

C. Do not grout any concrete unit masonry until at least 24 hours after completion of unit installation.

3.11 BUILT-IN WORK

A. As work progresses, build in items to be inserted in the work supplied by other Sections.

B. Build in items plumb and level.

C. Bed anchors in mortar joints. Fill frame voids solid with mortar.

D. Do not build-in organic materials subject to deterioration.

3.12 CLEANING

A. Remove excess mortar and smears, and replace defective mortar. Match adjacent work..

B. Clean soiled surfaces with a non-acidic solution which will not harm masonry or adjacent materials. Consult masonry manufacturer for acceptable cleaners.

3.12 PROTECTION

A. Protect finished installation under provisions of Section 01 50 00.

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Fabricated steel handrails.

B. Fabricated aluminum sun control devices.

C. Modified mailbox columns.

D. Fabricated stairway accessories.

1.02 RELATED WORK

A. Section 04 20 00 - Concrete Unit Masonry

B. Section 06 10 00 - Rough Carpentry

C. Section 09 90 00 - Painting

1.03 REFERENCES

A. ASTM A36-08 - Structural Steel.

B. ASTM A500-10 - Cold-formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

C. ASTM A501-07 - Hot-formed Welded and Seamless Carbon Steel Structural Tubing.

D. ASTM A276-10, A554-10, et al - Type 304 Stainless Steel Tubing and Shapes.

E. ASTM A668-04 - Steel Plates.

F. ASTM A53-10 - Steel Pipe.

G. ASTM A47-99 - Malleable Iron Castings.

H. ASTM B308-10 - Aluminum Standard Structural Profiles

I. ASTM A307-10 - Bolts and Nuts.

I. ASTM A123-09, A153-09 - Zinc Galvanized Coating.

J. AWS D1.1 - Structural Welding Code.

K. FS TT-P-31 - Paint, Oil: Iron Oxide, Ready Mix, Red and Brown.

L. FS TT-P-645 - Primer, Paint, Zinc Chromate, Alkyd Type.

1.04 SHOP DRAWINGS

A. Submit shop drawings for shop or site fabricated items under provisions of Section 01 30 00.

B. Indicate profiles, sizes, connections, reinforcing, anchorage, size and type of fasteners, and accessories.

C. Indicate welded connections using standard AWS welding symbols; indicate net weld lengths.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Steel Sections: ASTM A36.

B. Steel Plates to be bent or cold formed: ASTM A283, Grade C.

C. Steel Tubing: ASTM A500, Grade B.

D. Steel Pipe: ASTM A53, Grade B.

E. Stainless Steel Tubing: ASTM 554-10, Type 304; satin finish.

F. Aluminum Structural Profiles: ASTM B308-10, Type 6061-T6.

G. Welding Materials: AWS D01.1 for steel, D01.2 for aluminum (TIG).

H. Primer: FS TT-P-31, red; for shop application and field touch-up.

I. Galvanized Coating, Identified Exterior Use Products:
   1. Rolled, pressed, or forged steel shapes: ASTM A123
   2. Iron and steel hardware: ASTM A153
   3. Assembled steel products: ASTM A386.

2.02 FABRICATION

A. Verify all dimensions on site prior to shop or site fabrication.

B. Fabricate items with joints tightly fitted and secured.

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

D. Grind exposed welds flush and smooth with adjacent finished surface. Ease exposed edges to small uniform radius.

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

F. Make exposed joints butt tight, flush, and hairline.

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

2.03 FINISH

A. Clean metal fabrication surfaces of rust, scale, grease, and foreign matter prior to galvanizing, priming, or painting.

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

C. Prime paint items scheduled below with two coats.

D. Touch up holidays or damage at galvanized coatings with galvanized touch-up paint.

2.04 STAIRWAY ACCESSORIES

A. Mesh Infill Panels At Metal, Wood Guardrails.
   1. Product: custom welded wire panels with 1 inch "U" edge.
   2. Manufacturer: California Wire Products Corp. or equivalent.
   3. Mesh: 1-1/2" square, 10 gauge.
   4. Finish: hot dip galvanized for shop or field painting.
   5. Attachment: self tapping stainless steel screws into existing pickets or frames.

B. Riser Panels At Open Exterior Stairs.
   1. Product: prefabricated steel bolt-on panels for attachments to treads.
   2. Distributor: TS Distributors Inc.
   3. Material: light gauge sheet steel.
   4. Finish: zinc phosphate treated and shop painted.
   5. Attachment: stainless steel bolts or screws into drilled anchors.

PART 3 - EXECUTION

3.01 PREPARATION

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

B. Make provision for erection loads with temporary bracing. Keep work in alignment.

C. Supply items required to be anchored into concrete with setting templates.

3.02 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects, and anchored firmly in place for long life under hard use.

B. Perform field welding of steel in accordance with AWS D01.1, taking special care to protect adjacent wood surfaces from open flame or damage.

C. After installation of fabrications, touch-up field welds, scratched or damaged surfaces with primer.

3.03 CLEANUP

A. After installation of metal fabrications is complete, remove any burrs or welding slag from finished surfaces and touch up with primer prior to painting.

B. Remove any debris related to the work of this section from the job site.

END OF SECTION

SECTION 06 10 00
ROUGH CARPENTRY

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Lumber and framing hardware

B. Framing practices and procedures

1.02 RELATED WORK DESCRIBED ELSEWHERE

A. Section 01 60 00 - Material and Equipment

B. Section 05 10 00 - Structural Steel

C. Section 05 50 00 - Miscellaneous Metals

D. Section 06 17 00 - Prefabricated Wood Structural Members

E. Section 06 40 00 - Architectural Woodwork

1.03 REFERENCES

A. American Plywoood Association.

B. Western Wood Products Association.

C. American Wood Preservers Institute.

D. California Redwood Association.

E. American Institute of Timer Construction.

F. Structural notes on Drawings.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site under provisions of Section 01 60 00.

B. Store and protect products under provisions of Section 01 60 00.

PART 2 - PRODUCTS

2.01 GENERAL

A. Where these specifications conflict with a Structural Engineer’s structural general notes the structural general notes shall take precedence.

2.02 GRADE CERTIFICATION

A. Each piece of lumber shall be grade marked by an agency acceptable to the local building official, in accordance with WWPA grading for solid lumber, AITC for glue laminated products, and APA grading for plywood products.

2.03 LUMBER MATERIALS

A. Foundation sills, nailers, or ledgers in direct contact with concrete or masonry, or within 6 inches of the ground: pressure treated DF-L No. 2, per AWPA Standard C1 and C2

B. Beams, girders and posts: DF-L No. 1 or better, maximum moisture content 19%, except as noted otherwise on drawings.

C. Joists, rafters, headers, plates, blocking, 2 X 6 thru 4 X 16, and miscellaneous wood not specifically described: DF-L No. 2 or better, moisture content 19%, except as noted otherwise on drawings.

D. Wall framing, 2 X 2 thru 4 X 6 (except headers): DF-L Stud grade or Standard and better, maximum moisture content 19%.

E. Subflooring and sheathing: Plywood conforming to U.S. Product Standard PS-1-07, Group 1 or 2, or APA Performance Rated Panels (plywood, composite board, oriented strand board). Roof or wall sheathing plywood shall bear the designation CDX Structural II or better.

2.04 ROUGH HARDWARE

A. Bolts and rods: ASTM A307-10, Grade A, square or hexagonal head.

B. Lag screws: Federal Specification FF-B-561C.

C. Nails: galvanized at exterior applications per Federal Specification FF-N-105A; sinkers allowed at interior; box nails prohibited.

D. Wood screws: Federal Specification FF-B-111D.

E. Framing clips, hangers, hold-downs, and connectors: standard "Strong-Tie" products of the Simpson Company.

F. Clamps, expansion bolts, washers, and anchors: steel or iron, subject to the approval of the Architect.

2.05 MISCELLANEOUS MATERIALS

A. Wood preservative for in-plant treatment: a solution of pentachlorophenol using either oil or LPG as the primary solvent in accordance with AWPA Standard LP-3 or LP-4.

B. Wood preservative for field treatment and field touch-up of plant treated wood: Copper napthanate.

C. Elastomeric adhesive: per APA Performance Specification AFG-01, as manufactured by DAP, Franklin, Georgia Pacific, or equal, compliant with current California VOC limitations.

PART 3 - EXECUTION

3.01 WOOD PRESERVATION TREATMENT

A. Treat all wood in direct contact with, or embedded in, concrete or within 6 inches of the ground, including sills, nailers, ledgers, wood grounds, and blocking. Treatment is not required if approved redwood products have been used in place of the specified lumber.

B. Treat all end cuts of above-grade lumber exposed to the exterior.

C. Treatment Method
   1. In-plant treatment: Treat wood in strict accordance with product manufacturer's published recommendations and with AWPI Standards C1 and C2.
   2. Field treatment: For field touch-up of plant treated wood, including at notches, holes, and cuts in treated lumber, and for field treatment of above grade lumber exposed to the exterior, treat wood in strict accordance with product manufacturer's published recommendations, using either a 15-minute dipping method or a 2 coat brushing method.

3.02 INSTALLATION AND WORKMANSHIP

A. The work of rough carpentry shall only be performed by skilled carpenters, in accordance with good standards of trade practice. All framing lumber shall be accurately cut and properly fit, true to dimension, line, rake or level and permanently secured in place.

B. Layout: establish the following items of layout work as shown on the drawings and as required for a complete and accurate installation:
   1. Lines, levels, and locations for this work and other related work specified under other Sections of these Specifications.
   2. Cutting, fitting, and patching to accomodate work specified under other Sections of these Specifications.
   3. Backing, blocking, anchors, grounds, plates, and furring as required.

C. Lumber Selection: Select individual pieces of lumber so that knots and obvious minor defects will not interfere with connections, and so that the crown of the piece and tight knots are in the uppermost position. Lumber with splits longer than half the wide face of 2X lumber, or longer than the thickness of 3X and larger lumber shall not be used in the work. Select lumber for exposed exterior millwork with no visible recessed knots, splits, cheching, wanes, or similar defects.

3.03 FASTENINGS

A. Provide fastenings as required to produce framing without warping, sagging, buckling or similar defects. The number and size of nails, bolts, and other fasteners shall be as required by connector manufacturers, good trade practice, or as shown on the Drawings for specific structural conditions.

B. Nailing: provide nail size and spacing as called out on the Drawings, specified in CBC Table 2304.9.1, or as indicated in connector manufacturers' published recommendations.

C. Wood Screws shall be driven, not nailed into place. Provide embedment for anchorage of not less than six tenths (0.6) of the screw length. Bore starter holes for wood screws with a bit of not more than the diameter of the base of the threads.

D. Bolts:
   1. Drill bolt holes 1/32" to 1/16" larger than bolt diameter, accurately located.
   2. Use washers at each bolt head and nut.
   3. Tighten nut at initial installation; retighten once more before the work is closed in.
   4. Provide expansion shields as required or as directed by the Architect.

E. Lag Bolts:
   1. Bore lead holes for lag bolts of the same diameter and depth as the unthreaded shank of the bolts.
   2. Bore starter holes for threaded portion of lag bolts 60% to 75% of the threaded shank diameter and a length at least equal to the length of the threaded shank.
   3. Insert lag bolts by turning with a wrench rather than driving with a hammer.
   4. Use soap or another lubricant to facilitate insertion and avoid damage to the lag bolt.

F. Adhesives:
   1. Apply an approved panel adhesive to supporting framing at all subfloor, subfloor/underlayment, and stair tread installations throughout the Work.

3.04 FRAMING

A. Provide framing that is closely fitted, accurately set in plumb planes, straight, true and level, and firmly secured in place.

B. Walls and Partitions: Anchor sills in place as shown on the Drawings; unless otherwise noted, non-structural walls may be secured with minimum 3/16" power driven fasteners at 16" o.c. maximum, penetrating at least 1-1/2", and not over 9" from ends.

C. Coordinate with painting under Section 09 90 00 so that backprimed materials may be painted prior to installation without delay to the framing process.

D. Framed Platforms
   1. Install joists and blocks with the crown edge up.
   2. Blocking shall be a minimum 2X nominal thickness, intalled the full depth of joists or beams; block all panel edges at floor plywood and apply panel adhesive prior to plywood installation.
   3. Set all flooring nails or connectors at or slightly below the panel surface.

3.05 SHEATHING

A. Roof Sheathing and Shearwall Sheathing: Install and fasten in strict compliance with General Structural Notes, Framing Notes and schedules on Drawings.

B. Continuity of Planes: Where sheathing is required by structural Drawings on only a portion of a wall, soffit, roof, or other plane, extend the plane with additional sheathing material or furring strips as required to achieve flatness and continuity of the finished surface.

3.06 CLEAN-UP

A. Periodically remove all scrap products, debris, and trash from the work site.

B. After framing is completed, thoroughly sweep or vacuum floor surfaces.

END OF SECTION

SECTION 06 40 00
ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Finish carpentry items, other than prefabricated casework.

B. Interior and exterior trim, other than fiber cement trim provided with fiber cement siding.

C. Damaged wood treatment.

D. Hardware and attachment accessories.

E. All labor and materials necessary for a complete installation of the work of this Section, whether or not specifically described.

1.02 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry

B. Section 08 20 00 - Wood Doors

1.03 REFERENCES

A. ANSI/HPHA HP - American Standard for Hardwood and Decorative Plywood.

B. ANSI A135.4 - Basic Hardboard.

C. AWI - Quality Standards.

D. FS MM-L-736 - Lumber; Hardwood.

E. FS MMM-A-130 - Adhesive, Contact.

F. PS 1 - Construction and Industrial Hardwood.

G. PS 20 - American Softwood Lumber Standard.

H. UL - Underwriters Laboratories.

I. APA - Specialty Plywood Panels.

1.04 SUBMITTALS

A. Submit product data under provisions of Section 01 30 00.

B. Submit instructions for use of adhesives, attachment hardware and finish hardware.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver Products to site under provisions of Section 01 60 00.

B. Store and Protect products under provisions of Section 01 60 00.

C. Store materials in ventilated, interior locations under constant minimum temperatures of 60 degrees F and maximum relative humidity of 55 percent.

PART 2 - PRODUCTS

2.01 MATERALS - GENERAL

A. Where not shown or specified otherwise, softwood materials may be used for the work of this Section.

2.02 LUMBER MATERIALS

A. Interior Softwood Lumber: PS 20; Custom grade in accordance with AWI; maximum moisture content of 8 percent; fir or pine species, with mixed grain, paint grade unless specifically required to be stain grade. Finger jointed material is allowed in paint grade applications.

B. Exterior Softwood Lumber: Custom grade per AWI; maximum moisture content of 19%; Douglas fir or hemlock species, with mixed grain, paint grade unless specifically required to be stain grade.

C. Hardwood Lumber: FS MM-L-736; Custom grade in accordance with AWI; maximum moisture content of 8 percent; American Cherry or similar species as approved by Architect, stain grade.

2.03 SHEET MATERIALS

A. Wood Particleboard: Composed of wood chips, shavings or flakes made with waterproof resin binders of high density; sanded faces.

B. Hardboard: ANSI A135.4; pressed wood fiber with resin binder; tempered service grade.

C. Overlaid Plywood: Medium Density Overlay (MDO), APA rated Group 1, Exterior.

2.04 ADHESIVE

A. Contact Adhesives: FS MMM-A-130; solvent release type.

2.05 WOOD REPAIR MATERIALS

A. Fungicide: Nisus Corporation Bora-Care (Disodium Octaborate Tetrahydrate-40%).

C. Filler: Abatron WoodEpox non-shrinking adhesive putty.

D. Sealer: Amteco TWP-1500 series penetrating preservative sealer.

2.06 WOOD TREATMENT MATERIALS

A. Fire Retardant (`FR-S' Type): Chemically treated, and pressure impregnated; capable of providing a maximum flame/fuel/smoke rating of Class I or Class A, as appropriate to use and location.

B. Wood Preservative (`PT' Type): clear, as appropriate to use and location.

2.07 ACCESSORIES

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

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

C. Lumber for Shimming, Blocking: Softwood lumber of fir or pine species.

D. Primer: Alkyd primer sealer type per Section 09 90 00.

E. General Purpose Wood Filler: Oil base, tinted to match surface finish color.

2.08 FABRICATION

A. Fabricate to Woodwork Institute "Economy" standards or better.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and openings are ready to receive work and field measurements are as shown on shop drawings or instructed by the fabricator.

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 and substrate.

3.02 PREPARATION

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

3.03 INSTALLATION

A. General: Install work in accordance with Woodwork Institute "Economy" standards.

B. Set and secure materials and components in place, plumb and level.

C. Install components and trim with nails, screws or bolts as indicated on the Drawings and in these Specifications; install in a way which conceals fasteners to the maximum extent practical.

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

3.04 TOLERANCES

A. Maximum Variation from True Position: 1/16 inch.

B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

3.05 PREPARATION FOR SITE FINISHING

A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.

B. Site Finishing: Refer to Section 09 90 00.

3.06 DAMAGED WOOD REPAIR

A. Remove rotted wood, splinters, dirt, etc. to a continuous working surfaces for repairs.

B. Apply fungicide per manufacturer's directions.

C. Fill voids with non-shrinking epoxy putty to approximate original beam shape.

D. Grind/sand to re-create original component shape at exposed-to-view locations.

E. Finish with sealer/preservative.

3.07 PROTECTION

A. Protect finished installation under provisions of Section 01 50 00.

END OF SECTION

SECTION 06 41 00
CASEWORK

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Custom fabricated cabinet units.

B. Countertops.

C. Cabinet hardware.

1.02 RELATED WORK

A. Section 06 10 00 - Rough Carpentry

B. Section 06 40 00 - Architectural Woodwork

C. Section 09 90 00 - Painting

C. Division 22 - Plumbing

D. Division 26 - Electrical

1.03 REFERENCES

A. FS MM-L-736 - Lumber, Hardwood.

B. FS MMM-A-130 - Adhesive, Contact.

C. PS 1 - Construction and Industrial Plywood.

D. PS 20 - American Softwood Lumber Standard.

E. PS 51 - Hardwood and Decorative Plywood.

F. PS 58 - Basic Hardboard.

G. NEMA LD3 - High Pressure Decorative Laminates, Solid Plastic Sheet.

H. ASTM D638-08 - Tensile Properties of Solid Plastic Sheet.

I. ISSDA-2 - Classification and Standard, Solid Surfacing Material.

J. Woodwork Institute - Architectural Woodwork Standards, current edition.

1.04 QUALITY ASSURANCE

A. Manufacture all casework in accordance with the standards in the latest edition of the "Architectural Woodwork Standards" of the Woodwork Institute, in “Economy” grade or better.

B. A Woodwork Institute Compliance Certificate is not required. However, any casework which falls below the specified Woodwork Institute grade requirements shall be replaced or modified to satisfaction of, and at no additional cost to, the Owner.

1.05 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 01300.

B. Shop drawings shall indicate Woodwork Institute construction references. Include materials, component profiles, fastening methods, assembly methods, joint details, finishes, accessories and hardware locations, to a minimum scale of 3/8 inch to 1 foot.

C. Submit minimum 2" x 2" samples of available colors and patterns for plastic laminate and plastic solid surface materials.

D. Submit samples under provisions of Section 01 30 00.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site under provisions of Section 0160 00

PART 2 - PRODUCTS

2.01 GRADES

A. Provide plastic covered wood casework in accordance with Woodwork Institute "Architectural Woodwork Standards", latest edition, for Economy Grade, except as otherwise specified below.

1. Construction Style: Style A Frameless, unless shown otherwise.
2. Construction Type: Type II, single length sections to fit access openings.

B. Seismic Force Construction: Construct all products using construction methods tested to meet the seismic resistance requirements of the California Building Code (Title 24 CCR, Part 2), as described by the Woodwork Institute.

2.02 MATERIALS

A. Exposed Cabinet Frames, Exposed and Semi-exposed Door and Drawer Faces, Shelves: Solid hardwood or or hardwood veneered plywood to accept stain and clear finish per Section 09 90 00.

B. Door and Drawer Front Style: Flush overlay. All door and drawer fronts to be Woodwork Institute Type A, unless otherwise directed.

C. Drawer Boxes: Hardwood veneered plywood, butt jointed.

D. Exposed Cabinet Ends, Miscellaneous Surfaces: Hardwood veneered plywood to accept stain and clear finish per Section 09 90 00.

E. Cabinet Bottoms and Shelves: Plywood core with low-pressure melamine laminate at exposed-to-view surfaces.

F. Countertops and Backsplashes, Apartment Kitchens and Vanities: Solid hardwood, softwood, or plywood spaced backing with solid surfacing material.

G. Countertops and Backsplashes, Laundries and Common building: Custom grade fiberboard core with horizontal application of patterned high-pressure plastic laminate.

E. High Pressure Laminate: Nominal 0.05 inch general purpose grade decorative laminate by Formica or equivalent as scheduled on the Drawings, suede finish unless otherwise noted, meeting reference standard NEMA LD3.

F. Low Pressure Laminate: Melanine or polyester resin impregnated paper decorative laminate meeting reference standard NEMA LD3; solid color Melamine or equivalent for shelf and interior surfaces.

G. Solid Surfacing: Solid 1/2 inch thick sheet of homogenous filled resin meeting reference standard ISSDA-2, Formica Solid Surface or equivalent.

2.03 HARDWARE

A. Finish Hardware: Provide finish hardware for all casework included in the work of this Section. All hardware shall be installed by the casework fabricator. Alternate products to those listed below may be approved as equivalent on the basis of submittals made under provisions of Section 01300.

B. Drawer Slides: KV Series 1275 or equivalent, full extension, 75 lb. rated.

C. Adjustable Shelving Supports: Metal supports for drilled holes, 1/4" diameter, approximately 3/8" insertion, by Amerock.

D. Cabinet Pulls: Amerock or equivalent metal 4 inch wire pull, color as selected by Architect.

E. Cabinet Hinges: Salice Series 200 Concealed Hinges for 125^{o} opening, overlay style, self-closing, with Salice BAU3L19 hinge plate, or equivalent as appropriate for the application.

F. Other Finish Hardware: Provide all cabinet hardware as shown in the Drawings and as necessary for a complete and functional installation, whether or not specifically shown. Unless otherwise specified, hardware finish shall be brushed chrome or brushed stainless steel.

2.04 ACCESSORIES

A. Contact Adhesives for Solid Surface and Laminate: As specifically recommended or approved by the product manufacturer, and meeting current California VOC limitations.

B. Fasteners: Size and type to suit application.

C. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; finish to minimize contrast with adjacent finished surface in exposed locations.

D. Lumber for shimming, blocking and bracing: Softwood lumber of Douglas Fir, coastal species, or equivalent.

E. Wood Filler: Solvent base, tinted to match surface finish color.

2.05 FABRICATION

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

B. Fit shelves and miscellaneous exposed edges with edging to eliminate exposed core material. Use full length pieces only.

C. Door and drawer fronts shall be a full 3/4 inch thick.

D. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting as approved by the Architect on the basis of shop drawings and samples.

E. Fabricate solid plastic countertops with radiused square edge and integral cove backsplash with slightly radiused square top edge. Make corners and joints invisible. Slightly bevel arrises. Fabricate laminate-surfaced countertops with radiused edge and square topset backsplash.

F. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces. Backing sheet may be any Woodwork Institute specified product for Economy Grade cabinets.

G. Provide cutouts for plumbing and electrical fixtures, inserts, appliances, outlet boxes, and other fixtures and fittings. Seal contact surfaces of cut edges.

H. Assemble cases using approved Woodwork Institute jointing methods tested to meet the seismic force requirements of the California Code of Regulations Title 24, as referenced in Section 15 of the Woodwork Institute Manual of Millwork.

I. Cooperate and coordinate with the plumbing contractor in the installation of plumbing components within or attached to casework, including items of rough plumbing concealed within casework and sinks.

PART 3 - EXECUTION

3.01 INSPECTION

A. Verify adequacy of backing and support framing.

3.02 INSTALLATION

A. Set and secure casework in place rigid, plumb, and level, in accordance with Woodwork Institute “Economy” or higher quality standards.

B. Use concealed attachments for wall mounted components.

C. Use Woodwork Institute recommended concealed joint fasteners to align and secure adjoining cabinet units and counter tops

D. Carefully scribe casework which is against other building materials, leaving gaps of 1/32 inch maximum. Do not use additional overlay trim for this purpose.

E. Secure cabinet and counter bases to floor using approved anchorages shown and detailed in approved shop drawings.

F. Use scribe moldings and closure trims only as approved in advance by the Architect.

G. Apply sealant per Section 07 90 00 at casework and countertop joints subject to moisture and at joints between casework and other materials, wiping joints to achieve a minimal exposed line of sealant.

3.03 ADJUSTING AND CLEANING

A. Adjust doors, drawers, hardware, fixtures and other moving or operating parts to function smoothly and correctly. Doors and drawers shall either remain in a neutral position when opened or self close.

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

C. Clean adhesive and excess sealant from adjacent surfaces.

END OF SECTION

SECTION 06 60 00
PLASTIC FABRICATIONS

PART 1 - GENERAL

1.01 SUMMARY

A. Plastic fabrications include molded fiberglass gratings at sun control devices.

1.02 RELATED DOCUMENTS

A. Section 05 50 00 - Metal Fabrications.

B. Section 06 40 00 - Architectural Woodwork.

1.03 REFERENCES

A. ASTM D-695 - Fiberglass Compressive Strength.

B. ASTM D-790 - Fiberglass Flexural Strength.

C. ASTM D-635 - Fiberglass Flammability

1.04 SUBMITTALS

A. Submit manufacturer's specifications, data, and instructions for manufactured materials and products. Include manufacturer's certifications and laboratory test reports as required.

B. Submit product data describing available colors and surface textures for the subject fabrications.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver plastic fabrications to site and store units at Project site to prevent distortion, warping, staining, or other physical damage. Distorted, stained, or damaged units will be subject to rejection.

PART 2 - PRODUCTS

2.01 SUN CONTROL GRATINGS

A. Design is based on McNichols molded fiberglass gratings with the following characteristics. Equivalent products may be used based on review of submittals under Section 01 30 00.

1. Model: MS S-150, 1-1/2" x1-1/2" square pattern, 1-1/2" thick
2. Dimensions: 3' wide x 10' or 12' lengths as required.
3. Color: light grey or dark grey.
4. Surface Texture: smooth.
5. Special: UV inhibiting additive for constant outdoor exposure.

2.02 FABRICATION

A. Fabricate fiberglass grating units in compliance with manufacturer's established quality control and testing procedures.

B. Fabricate units straight, smooth, and true to size and shape, with exposed edges and corners precise and square, unless otherwise indicated.

PART 3 - EXECUTION

3.01 INSPECTION

A. Carefully inspect the in-place work at the substrate to receive products of this Section.

B. Beginning of installation means acceptance of substrate.

3.02 INSTALLATION

A. Install grating units to seat firmly, level and flush in frames, notching where required to clear fasteners.

B. Install manufacturer's hold-down hardware as detailed on the Drawings.

C. Bring any installation conflicts to the attention of the Architect for resolution before proceeding with the Work of this Section.

END OF SECTION

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SECTION 07 18 00
TRAFFIC TOPPING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Polymer modified, cementitious traffic topping at above-grade exterior decks.

1.02 RELATED WORK

A. Section 06 10 00 – Rough Carpentry

B. Section 07 60 00 - Flashing and Sheet Metal

C. Section 07 90 00 - Joint Sealers

1.03 REFERENCES

A. ASTM E96 – Water Vapor Transmission.

B. ASTM C297 – Tensile Bond.

C. ASTM D968 – Abrasion Resistance.

D. ASTM G23 – Accelerating Weathering.

E. ASTM E84 – Surface Burning Characteristics.

1.04 QUALITY ASSURANCE

A. Manufacturer: Company specializing in synthetic fluid topping materials with minimum five (5) years' experience.

B. Traffic Topping Applicator: Approved by and listed with topping manufacturer.

1.05 SUBMITTALS

A. Submit product data under provisions of Section 01 30 00.

B. Include material properties, substrate preparation requirements, site environmental requirements, and requirements of adjacent or affected materials.

C. Submit samples under provisions of Section 01 30 00.

D. Submit two samples 8" X 10" minimum size, illustrating material, color, and finish.

E. Submit manufacturer's installation instructions under provisions of Section 01 30 00.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Do not install topping when ambient and surface temperature is lower than 50 degrees F or above 90 degrees F.

B. Store traffic topping materials under provisions of Section 01 60 00, following manufacturer's requirements for protection from excessive heat, cold, or moisture. Do not store lower than 40 degrees F or above 110 degrees F.

1.08 WARRANTY

A. Provide three (3) year manufacturer's limited warranty under provisions of Section 01 70 00, including coverage against leaking, excessive fading, and delamination from substrate.

B. Provide installer's three (3) year warranty against installation defects under provisions of Section 01 70 00.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Desert Crete Decking

B. Pli-Deck Systems Inc.

C. Alternate products may be used if approved on the basis of submittals made under provisions of Section 01 30 00.

2.02 MATERIALS

A. Traffic Topping System: Desert Crete multi-step polymer modified cementitious decking system by Hill Brothers Chemical Company, conforming to the following criteria:
   1. Water Vapor Transmission: ASTM E96; 0.31 grams/24 hours/100 square inches.
   2. Waterproofness: ASTM D3393; No detectable water @ 2 weeks of 1/4 inch water pressure.

B. System Components:
   1. Metal Lath: 2.5 lb/s.f. hot dipped galvanized expanded metal lath, fastened with min. 16 GA 5/8" staples.
   2. First Base Application: Desert Crete Base mixed with Desert Crete Liquid Polymer.
   3. Fiberglass and Bonder: 3/4 ox./s.f. fiberglass matting over first Desert Crete Base, with Bonder 480.
   4. Second Desert Crete Base: Desert Crete Base with polymer over fiberglass/bonder.
   5. Texture: Desert Crete Texture mixed with Desert Crete Liquid Polymer, applied by pneumatic hopper gun.
   6. Floor Paint/Sealer: 2 coats Desert Brand Concrete/Masonry Floor Paint and Sealer.

C. Water for mixing: clean and potable.

D. Finish: Standard non-skid texture, color as selected by Architect from standard range.

E. Patching, Sealing, Reinforcing, Flashing Materials: As recommended by manufacturer.

PART 3 EXECUTION

3.01 INSPECTION

A. Verify that substrate slopes between 1/8” and 1/4” per foot, and all repairs are complete.

B. Beginning of installation means acceptance of project conditions and substrate.

3.02 PREPARATION

A. All damaged plywood decking shall be repaired according to traffic topping manufacturer’s recommendations.

B. Remove all grease, oil, dust, paint, sealers, efflorescence, or other contaminating materials or substances that will interfere with total adhesion of topping to substrate; set any projecting inserts or fasteners to just below substrate surface.

C. Mask off adjacent surfaces that are not scheduled to receive topping.

3.03 INSTALLATION

A. Install traffic topping system in strict accordance with manufacturer's instructions.

B. Apply system components in order listed in 2.02/B above.

C. Evenly apply texture to all surfaces in accordance with manufacturer’s instructions.

3.04 FIELD QUALITY CONTROL

A. Owner’s representative may request flood testing after initial cure period.

B. Any defects in installation shall immediately be repaired at no additional cost to the Owner.

3.05 PROTECTION

A. Protect finished installation in accordance with Section 01 50 00.

B. Installer shall provide tape barriers and signs prohibiting traffic during finish drying period.

C. Only light traffic shall be permitted on new traffic topping surface during cure period. Protect surface as recommended by traffic topping manufacturer.

3.06 CLEANUP

A. After completion of installation, remove all masking, product containers, and related debris from the job site.

B. Repair or touch up any surfaces damaged or marked during application of traffic topping to Architect’s satisfaction.

END OF SECTION

SECTION 07 20 00
INSULATION

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Sound insulation at new interior walls.

B. Thermal insulation at remodeled exterior walls.

1.02 RELATED WORK

A. Section 06 10 00 - Rough Carpentry

B. Section 09 25 00 - Gypsum Board

1.03 REFERENCES

A. ASTM C665-06, Type III, Class B - thermal performance

B. ASTM C423-09, Type E-405 - sound absorption of materials

C. ASTM E136-11 - flammability of materials

1.04 SUBMITTALS

A. Submit product data under provisions of Section 01 30 00.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to the site under provisions of Section 01 60 00.

B. Store and protect products under provisions of Section 01 60 00.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Owens-Corning, fiberglass batts or rolls.

B. CertainTeed, fiberglass batts or rolls.

C Alternate products may be used on the basis of submittals made under provisions of Section 01 30 00.

2.02 SOUND INSULATION

A. 3-1/2 inch unfaced Owens Corning QuietZone fiberglass batts, at identified common building interior walls and attics, as follows:
   1. Sound Transmission Coefficient: 45 or better
   2. Flame Spread: 25 or less
   3. Flammability Rating: Class A

2.03 THERMAL INSULATION

A. 3-1/2 inch fiberglass EcoTouch Pink Fiberglas batts, to replace or augment existing insulation in exterior wood-framed walls, as follows:
   1. Flame Spread: 25 or less
   2. Flammability Rating: Class A
   3. Insulation Value: R-13

PART 3.00 - EXECUTION

3.01 EXAMINATION

A. Verify that conduit, plumbing, and other installations in walls or insulated attic space have been completed, and necessary inspections have been made so that insulating may commence.

B. Beginning of work means acceptance of existing conditions.

3.02 NEW WALL INSULATION

A. Install insulation batts at identified new framed walls or other conditions shown on Drawings.

B. Install batts friction fit between studs. If stud spacing allows batts to slump, use wire to hold batts up in wall cavity.

3.03 EXISTING WALL INSULATION

A. Where existing thermal insulation has slumped and created a gap at the top of the wall, fill gap above existing batts with new batts.

B. Where wall repair causes damage to, or removal of existing wall or ceiling insulation, install new batts.

3.03 CLEAN-UP

A. After completion of insulation installation, remove all scrap material, packaging, and debris from the work site.

END OF SECTION

SECTION 07 46 00
FIBER CEMENT SIDING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fiber reinforced cementitious panel and planks.

B. Weather barrier underlayment.

C. Fiber cement siding system trims and accessories.

1.2 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry: Wood framing and bracing.

B. Section 06 40 00 - Architectural Woodwork.

C. Section 07 20 00 - Insulation.

D. Section 07 60 00 - Flashing and Sheet Metal

E. Section 07 90 00 - Joint Protection

F. Section 09 90 00 - Painting

1.3 REFERENCES

A. ASTM International (ASTM):
1. ASTM B136 - Standard Method for Measurement of Stain Resistance of Anodic Coatings on Aluminum.
2. ASTM B244 - Standard Test Method for Measurement of Thickness of Anodic Coatings on Aluminum and of Other Nonconductive Coatings on Nonmagnetic Basis Metals with Eddy-Current Instruments.
3. ASTM C834 - Standard Specification for Latex Sealants.
4. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
5. ASTM C1186 - Standard Specification for Flat Non-Asbestos Fiber-Cement Sheets.
6. ASTM D1117 - Standard Guide for Evaluating Nonwoven Fabrics.
7. ASTM D1730 - Standard Practices for Preparation of Aluminum and Aluminum-Alloy Surfaces for Painting.
8. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
9. ASTM E96 - Test Methods for Water Vapor Transmission of Materials.
10. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
11. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.
12. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure.

B. AATCC127 - Water Resistance: Hydrostatic Pressure Test.

C. TAPPI - T460 - Air Resistance of Paper (Gurley Method).

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Installation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Manufacturer's best practice guide.
4. Technical data sheet.
5. Standard CAD drawings

C. Shop Drawings: Provide detailed drawings of atypical non-standard applications of cladding junctions and penetrations which are outside the scope of the standard details and specifications provided by the manufacturer.

D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each finish product specified, two samples, minimum size 4 by 6 inches (100 by 150 mm), representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

A. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques
1. Finish areas designated by Architect.
2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
3. Refinish mock-up area as required to produce acceptable work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store siding flat on a smooth level surface. Protect edges and corners from chipping. Store sheets under cover and keep dry prior to installing.

C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

A. Manufacturer's Warranty: Provide Hardie Limited Product Warranty, with 30-year limited product warranty against manufacturing defects.
1. Application Warranty: Application limited warranty for 2 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: James Hardie Building Products, Inc

B. Requests for approval of equal substitutions will be considered in accordance with provisions of Section 01 60 00.

2.2 SIDING

A. Fiber Cement Siding Panels: Product shall be engineered for climate conditions.
   1. Hardie Reveal System at Roof Framing: Hardie Reveal Panel, 7/16 inches thick, 3 feet 11.5 inches wide by 7 feet 11.5 inches long, ColorPlus prefinished in color as selected by Architect.
   2. Horizontal Lap Siding at Wall Surfaces: HardiePlank Lap Siding, Smooth, 8.25" planks, ColorPlus prefinished in color as selected by Architect.

B. Code Compliance Requirement for Siding Materials:
   1. Fiber-cement siding, complies with ÅSTM C 1186 Type A Grade II.
   2. Fiber-cement siding, complies with ASTM E 136 as a noncombustible material.
   3. Fiber-cement siding, complies with ASTM E 84 Flame Spread Index = 0, Smoke Developed Index = 5.
   4. Fiber-cement siding, complies with ASTM E 119 1 hour and 2 hour fire resistive assemblies listed with Warnock Hersey.
   5. Fiber-cement siding, tested to ASTM E330 for Transverse Loads.
   6. Intertek Warnock Hersey Product Listing.
   7. Manufacturer's Technical Data Sheet.

2.3 WEATHER BARRIER

A. Weather Barrier: James Hardie HardieWrap and HardieWrap Flashing and Seam Tapes.

B. Code Compliance Requirement for Weather Barrier:
   1. Thickness, 11 mil sheet.
   2. Breathability in accordance with ÅSTM E96.
   3. Tear strength in accordance with ÅSTM D1117.
   4. Water resistance in accordance with AATCC127.
   5. Air Penetration in accordance with TAPPI - T460.
   6. HardieWrap Weather Barrier ICC-ES Evaluation Report ESR-2258

2.4 TRIMS AND ACCESSORIES

A. Reveal Panel Trim at Roof Framing: James Hardie aluminum reveal trims in 6063 alloy with a minimum thickness of 0.050 inch, ColorPlus prefinished in color as selected by Architect.

B. Surface Applied Fiber Cement Trim at Wall Surfaces, Miscellaneous Locations: HardieTrim Boards in dimensions and lengths described on Drawings, ColorPlus prefinished in color as selected by Architect.FASTENERS

C. Fasteners: Use only fasteners specifically recommended by the siding manufacturer for the application. Exposed fasteners at Reveal Panel siding shall be stainless steel.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If framing preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Ensure that drainage plane in intact and all penetrations are sealed.

3.3 INSTALLATION

A. Repair, replace, or augment existing framing as necessary to provide flat, solid framing surfaces at the interval required for siding installtion in compliance with the siding manufacturer's instructions.

B. Install weather barrier, flashing and tape in strict accordance with manufacturer's installation instructions.

C. Install panel and plank siding materials in strict accordance with manufacturer's installation instructions.

3.4 FINISHING

A. Where siding materials are not prefinished, apply finish over factory primer consisting of a minimum of one coat of high quality 100 percent acrylic exterior flat grade paint with flat finish within 180 days of installation. Follow paint manufacturer's written product recommendation and written application instructions.

B. Field cut edges shall be coated during the installation process using an exterior grade primer/sealer that is compatible with the type of paint to used on project.

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 07 50 00
MEMBRANE ROOFING

PART 1 - GENERAL

1.01 SUMMARY

A. Scope of Work:
1. Demolition of all existing 4-ply cap sheet roofs down to plywood sheathing.
2. Installation of PVC roof membrane over 1/4" roof board.
3. All parts of the Contract Documents that relate to the work specified in this section also applies to this section.
4. The preparation of substrate and/or related areas, installation of roof system, sheet metal and accessories.
5. Contractor is responsible to verify all existing conditions relative to fulfill contract documents and installation of roof system per intent of contract specifications. This shall include familiarity with information provided in but not limited to the documents referenced in this paragraph.

1.02 RELATED SECTIONS

A. Installation relating to roof system:
1. All Work of 1.02 is to be provided by the Roofing Contractor or his subcontractor as part of this Section.
2. All work to comply with project detail drawings.
3. As per SMACNA Architectural Sheet Metal Manual "Sixth Edition."
   a. All Components: Conform to applicable building code.
   b. Maintain one copy on site.
4. As per latest manufacturers and Project detail drawings.

B. Related Sections:
1. Section 06 10 00 - Rough Carpentry
2. Section 07 90 00 - Joint Sealers
3. Section 09 20 00 - Lath and Plaster
4. Section 09 90 00 - Painting
5. Section 15 40 00 - Plumbing
6. Section 15 60 00 - Heating, Ventilating, and Air Conditioning

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM): Reference latest revisions of standards unless otherwise indicated.
1. ASTM D 4434-87: Standard Specification for Polyvinyl Chloride Sheet Roofing
2. ASTM C 203-92: Standard Test Methods for Breaking Load and Flexural Properties of Block-Type Thermal Insulation
3. ASTM C 272-91: Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions
4. ASTM C 1289-95: Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board:
5. ASTM C 303-90: Test Method for Density of Pre-formed Block - Type Thermal Insulation
6. ASTM D 162173: Test Method for Compressive Properties of Rigid Cellular Plastics.
7. ASTM C 578-91a - Federal Specification No. H-H-I-524B. Types I & II EPS Insulation
8. ASTM E 108: Standard Method for Fire Testing of Roof Coverings.

B. Underwriters Laboratories:
   1. ANSI/UL Standard 790: Test for Fire Resistance of Roof Covering Materials

C. Factory Mutual:
   1. Factory Mutual System Approval Standard: Class I Roof Covers, Class Number 4470

1.04 ROOF SYSTEM DESCRIPTION

A. The following paragraphs are generally applicable requirements for performance of work on this project.
   1. Installation of roof system, insulation and roof deck shall conform to contract specification requirements. Industry practices apply only when specification and/or project documents do not address an item. Manufacturers specification designed specifically for this project may supersede printed literature. Project drawings shall not be exclusive and used mutually with requirements set forth in project specification.
   2. Reference Section 01 30 00.
   3. Reference Section 01 40 00.
   4. The Contractor shall exercise all due precaution to prevent disruption to the occupancy of the facility interior or grounds. Every effort must be employed to prevent causing additional damage to the existing roofing assembly while working in an adjacent area, point overloading of the roof deck, and damage to roof areas not in this contract.
   5. During periods of precipitation, the Contractor shall be responsible for performing, at least daily interior building inspections for leaks in the area of his work. Contractor's representative shall report to the Owner's facility engineer to inquire about known building roof leaks. Should there be any such leaks, the contractor shall repair them immediately to prevent interior building damage.
   6. The Contractor shall maintain a complete set of Project Specifications, Contract Drawings and other items identified in the project documents on the rooftop during the course of work on this facility. Failure of proper installation by the contractor, due to unavailability of Project Specifications or Drawings on the roof, constitutes negligence.

B. Roof deck shall meet the project document criteria as minimum standards.

1.05 SUBMITTALS

A. Reference Section 01 30 00.

1.06 QUALITY ASSURANCE

A. Qualifications
   1. Reference Section 01400
   2. Contractor Qualifications: Submit the following as a supplement to Section 01 40 00.
      a. Name of "Approving Authority" for Contractor
      b. Name of designated individual to complete daily inspection forms for contractor.
      c. Name of designated individual to attend Pre-Construction Conference and Final Close out and Maintenance conference.
      d. Current California C-39 Roofing Contractor license.
      e. Written proof of manufacturers approved applicators status for this project.
      f. Contractor shall assure that the installed roof system complies with specifications by providing written evidence documenting the work as per contract documents on format acceptable to Architect.
      g. Written assurance that he is aware of and proficient in all safety, control measures, precautions, and programs in connection with the Work as to familiarize and full understanding of the manufacturer's safety programs and their recommended procedures for safe application of their product as to include its crew, the owner and all occupants of building.

3. Manufacturer Qualifications: Submit the following as a supplement to Section 01 40 00:
   a. Will provide approval stamp from manufacturers technical department on all project drawings with notations, and/or attachments for material applicability, installation and warranty criteria to the “Approving Authority” for review and approval prior to construction.
   b. Sample of manufacturers warranty and/or addendum’s to be issued for this project in conjunction with specification warranty.
   c. Name of “Approving Authority” for Manufacturer responsible and authorized to make technical decisions for installation and warranty eligibility.
   d. Describe method of periodic inspections during the course of the project as required by the Architect.

B. Regulatory Requirements
   1. Underwriters Laboratories (UL):
      a. Fire Classification Rating: UL 790 Standard "Class A."
   2. Factory Mutual:
      a. Factory Mutual approved fastening.
   3. Building Code:
      a. Meet applicable provisions of local, state and national building codes. This is also applies to agencies regulating safety, environmental, transportation etc..
      b. Meet applicable requirements of “California Building Code (CBC, CCR, Title 24)

C. Pre-Installation Meetings
   1. Prior to ordering materials and commencing roofing, attend a pre-installation conference to discuss the specified roofing system and its proper application. Notify the manufacturer’s designated project representative when the pre-installation conference is scheduled.
   2. Pre-installation conference shall include manufacturer’s designated representative, approving authority and Contractor to establish application criteria and procedures for Project.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver roofing materials and accessories in manufacturer's original protective containers with labels intact and legible. Comply with manufacturer's published instructions for storage and handling.

B. Store materials in dry protected areas, on clean, raised platforms with securely anchored weather protective covering.

C. Store flammable products away from spark or open flames.

D. Store roofing materials at a minimum of forty-five (45) degrees Fahrenheit prior to use as recommended by the manufacturer. Protect materials from freezing.

1.08 PROJECT CONDITIONS OR SITE CONDITIONS

A. Proceed with roofing work only when weather conditions comply with manufacturer's recommendations. Do not exceed temperature limitations recommended by the manufacturers.

1.09 WARRANTY

A. Manufacturer Warranty:
   1. Provide a NDL twenty (20) year warranty covering materials and workmanship as to include leaks and defective materials. The effective date of the warranty shall be the "date of completion" as determined in accordance with contract documents. Contractor shall notify Manufacturers Designated Representative prior to start of roof system installation. If a longer period or greater coverage is prescribed by Federal or California law, the stricter or one providing greater protection to the Owner shall prevail.
   2. The Manufacturer shall at the same time correct any condition which was caused by the defective or non-conforming Work, without expense to the Owner except if such leaks and defects were the caused by acts of god, owner, structural deficiencies, vandalism, civil insurrection, improper maintenance and other trades after completion. The correction of any Work found defective during the period of any guarantee, warranty or the like shall be of first class workmanship, and any replacement materials and equipment shall be new and of recent manufacture, free of faults and defects, and shall conform with the Contract Documents. The Owner will inspect the Work prior to the expiration of the guarantee.

B. Contractors Warranty:
   1. The Contractor shall guarantee the Work for a period of three (3) years from the date of Substantial Completion. Unless the Owner accepts a designated part of the Work as Substantially Complete, the period of any guarantee, warranty or the like shall run for the accepted designated part from the date Architect accepts in writing. If a longer period is prescribed by law or by the terms of any applicable special guarantee, warranty, or the like required under the Contract Documents, then the stricter or one providing greater protection to the Owner shall prevail. If during any period of any guarantee, warranty or the like, any of the Work is found to be in need of repair or replacement, the Contractor shall, at no expense to the Owner, repair or replace any such Work after receipt of notice from the Owner.
   2. The Contractor shall at the same time correct any condition which was caused by the defective or nonconforming Work, without expense to the Owner except if such leaks and defects were the caused by acts of god, owner, structural deficiencies, vandalism, civil insurrection, material defects unless otherwise provided for in Manufacturers warranty, improper maintenance and other trades after completion. The correction of any Work found defective during the period of any guarantee, warranty or the like shall be of first class workmanship, and any replacement materials and equipment shall be new and of recent manufacture, free of faults and defects, and shall conform with the Contract Documents. The Owner will inspect the Work prior to the expiration of the guarantee.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

A. Accepted Manufacturers:
   1. Manufacturer must currently meet established criteria of this section and related contract documents. Accepted manufacturers:
      a. Johns Manville
      b. Firestone
   2. Wherever applicable, all insulation, fasteners, vents, drains, adherents, coatings, sheet metal, base, ply, flashing and membrane sheets shall be supplied by the manufacturer providing roof system warranty. Separate warranties for items such as insulation adhesives/fasteners, insulation and substrates that are available from the respective manufacturer may be included as an addition to the membrane manufacturer’s warranty.

3. Exceptions to 2.01 A.3:
   a. All additional items not furnished by warranting manufacturer but required for completion of roof system must be listed and approved in writing by the warranting manufacturer that while not provided by them, will not alter the performance of or warranty for the specified roof system.

2.02 FASTENERS

A. Fasteners for Wood Sheathing or Nailers
   1. Reference Section 06 10 00 - Rough Carpentry.

B. Fasteners for Sheet Metal:
   1. Stainless Steel Sheet Metal Screw: One quarter (1/4) inch Phillips head, twin lead fifteen and one half (15-1/2) threads per inch of sufficient length to penetrate the metal a minimum of one-half (1/2) inch.
      a. Neoprene washer.
   2. Solder: ASTM B32; 50/50 type.

2.03 ADHERENTS/ADHESIVE/SEALANTS

A. To Bolts/Sealant:
   1. Clear Silicone, gun applicable to minus twenty (-20°) degrees. Mildew and fungus resistant, alkaline and acid stable, paintable, minimum of eight hundred (800) percent elongation. Conforming to ASTM-C-920.

B. To Seal: Caulk/Sealant
   1. Product: Caulk
   2. Description: Single component, gun grade, non-sag, elastomeric polyurethane sealant.
   3. Usage: All details requiring caulk/sealant.

C. To Seal: Seams
   1. Product: Thermoplastic Sealant
   2. Description: Liquid Thermoplastic compound
   3. Usage: Placed at the edge of PVC membrane seams.

D. To Seal: Water Cutoff
   1. Description: One component low viscosity, self-wetting butyl blend mastic
   2. Usage: Sealing agent for temporary watertight seals

2.04 ROOFING MEMBRANE

A. Surface Membrane/Flashing Membrane
   1. Product: J-M SP5RM
      a. Description: Fused thermoplastic fiber reinforced PVC
      b. Thickness: Fifty (50) mil (1.1 mm)
      c. Usage: Surface membrane
      d. Color: White

2.05 FLASHING

A. Unreinforced Flashing Membrane:
   1. Product: J-M PVC Detail Membrane:
      a. Description: Unreinforced PVC membrane
      b. Thickness: Fifty (50) mil (1.1 mm)
      c. Usage: Flashing membrane
      c. Color: White

B. Foil Tape:
   1. Product: J-M Aluminum Tape
      a. Description: Dead soft aluminum foil tape with acrylic adhesive backing
      b. Usage: As indicated in project drawings.
      c. Thickness: 3 mil

C. Prefabricated Pipe Boots:
   1. Product: J-M PVC Vent Pipe Boot
      a. Description: Fused thermoplastic fiber reinforced /nonreinforced PVC
      b. Usage: Flashing
      c. Color: White
      c. Dimensions: ASTM D-751-79
      a. Cone Shaped with 35 x 35 cm (14” x 14”) flange.
      e. Thickness: (60) mil (.060”)

2.06 ACCESSORIES

A. Sheet Metal:
   1. General:
      a. Match existing components when possible. All replacement components to meet current code and industry standards for size, quality and applicability.
   2. Product: Metal Flashings:
      a. Product: J-M PVC Clad Metal
      b. Description: Laminate of PVC membrane and galvanized steel. PVC Clad Metal:
      c. Usage: Provide monolithic watertight flashing metal at curbs and transitions as indicated in project drawings.
      d. Color: White
      e. Galvanized Steel: 24 gauge
      f. Vinyl Backing Coating: 40 mil (1.0 mm)
      g. Vinyl Thickness: ASTM B-604:
   3. Product: Termination Bar
      a. Description: Aluminum flat bar
      b. Usage: Termination for flashings
      c. Material: Corrosion resistant aluminum
      d. Edge: Caulk reservoir channel on top
      e. Holes: Pre-punched 100 mm (3.93”) OC with 7 x 10 mm (0.28” x 0.38”) slotted holes
      f. Bar: 2.3 mm (.090”) thick x 32 mm (1.25”) wide x 3 m (10’)

B. Drains:
   1. Division 22 - Plumbing.

C. Vents / Sheet Metal Ductwork:
   1. Division 23 - Heating, Ventilating, and Air Conditioning
   2. Section 07 60 00 – Flashing & Sheet Metal.

D. Walkpads:
   1. J-M PVC WBP-100
      a. Description: Texturized nonreinforced PVC sheet
      b. Usage: Heavy-duty walkway pad.
      c. Color: Blue
      d. Thickness: 100 mil (2.5mm)

PART 3 - EXECUTION

3.01 SITE CONDITIONS, PRE-CONSTRUCTION, REMOVAL

A. Pre-Construction Requirements:
   1. Contractor shall not proceed with any removal or installations until all submittals, certifications, required pre-constructions conferences, changes or variations in project specifications have been submitted, conducted and approved for start.

B. Site Conditions
   1. Contractor shall submit to Owner documentation and a written report of existing interior and exterior damage, leakage etc. Damage not recorded and submitted may be subject to repair by the contractor at no additional cost to owner.
   2. All supplies, equipment, materials, coatings, containers, etc. shall be stored in an orderly manner, carefully arranged and adequately protected.

C. Equipment / Electrical Disconnects:
   1. Roof Mounted Equipment:
      a. Removal or raising of roof top equipment, skylights, vent, ductwork, or other appurtenances shall be in accordance with the contract drawing notation, contract specification, and, as necessary, to accommodate manufacturer's warranty requirements for a proper installation of the new roofing assembly components.
   2. Electrical conduit and junction boxes located on the roof deck and walls. Do not proceed with roofing until:
      a. Determine if existing electrical is live or abandoned.
      b. Verify attachment and conditions of live electrical equipment meet current regulatory requirements.
      c. Mark all live junction boxes prior to installation of new roof system and disconnect as required to safely installing roof membrane.
      d All electrical disconnects to be performed by a licensed electrical contractor.

3.02 EXAMINATION

A. Verify securely supported and attached deck, free of depressions, waves or projections.

B. Verify deck surfaces are dry and free of moisture in any form.

C. Verify proper placement of roof openings, pipes, curbs, sleeves, ducts, vents, drains and other penetrations.

D. Verify proper securement of penetration or roof-mounted equipment.

E. Verify proper installation and drainage of all metal crickets.

3.03 JOB AND WEATHER CONDITIONS

A. Suspend all application and installation activities during inclement weather.

B. Protect adjacent building surfaces against damage and adhesive / adherent / bitumen spillage.

C. Protect roof deck from moisture by providing water cut-off at the end of each day's work or when the weather is threatening. Failure to protect the deck and roofing from moisture will result in the removal of damaged materials or materials containing excessive moisture. Remove water cut-off prior to start of new work.

1. Reference Project Drawings.
2. Remove cut-off and tie-ins prior to continuing application. Remove all wet insulation or damaged portions of the roof system.
3. In accordance with quality control requirements continue installation of roof system as specified.

D. Remove debris from roof deck and site on a daily basis and dispose at an approved disposal site.

E. Do not permit traffic or material storage on completed roof surfaces.

F. Any application of roofing / waterproofing materials below forty (40) degrees F. shall require the contractor to address special procedures. It is the contractor's responsibility to insure that the following minimum requirements are met:
1. Maintain proper operating temperatures of all equipment
2. Maintain proper application temperatures of all adherents, sealant etc.
3. Maintain proper storage of all materials.
4. Adjust application techniques to insure proper application of materials as per specifications criteria.

3.04 ADHERENTS/ADHESIVES/SEALANTS

A. Per manufacturers written requirements for storage and application temperatures. Keep one set of written requirements on site at all times.

B. Consult all container labels and MSDS sheets prior to application. Provide protection for all building occupants by preventing fumes; vapors etc. from entering building air supply, open windows and doors. Provide building occupants with MSDS sheets and curing times prior to installation.

C. Single Ply Adhesive:
1. Adhesives should be stored between (16°C) (60°F.) and (27°C) (80°F). Adhesive should only be applied when ambient temperatures are above forty (40) degrees F. (82°C). When applied at lower temperatures care should be taken to make sure temperature at actual point of application complies with specifications.
2. Do not thin adhesive with solvents. Cements and solvents and their fumes may be extremely flammable. Do not breathe vapors or use near fire. Store away from open ventilators.
3. Consult manufacturer of all adhesives for appropriate protective clothing and eye protection.

3.05 SUBSTRATE PREPARATION

A. The roof deck and existing roof construction must be structurally sound to provide support for the new roof system. The Applicator shall load materials on the rooftop in such a manner as to eliminate risk of deck overload due to concentrated weight. The Owner's Representative shall ensure that the roof deck is secured to the structural framing according to local building code and in such a manner as to resist all anticipated wind loads in that location.

B. Re-roofing with Removal of Existing Bitumen Roofing on Wood Decking

1. All existing roofing, base flashing, deteriorated wood blocking or deteriorated metal flashings shall be removed. Remove only that amount of roofing and flashing which can be made weathertight with new materials during a one-day period or before the onset of inclement weather.
2. All rotted or deteriorated wood shall be removed and replaced. The deck thickness shall be 1-1/2 inch (38 mm) lumber or 15/32 (12 mm) plywood or match existing deck if greater. Deck type and attachment shall conform to local code requirements. Fastener heads shall be recessed into the wood surface.

3.06 SURFACE MEMBRANE

A. Insure installation of required membrane to meet Class “A” fire rating.

B. No underlayment required.

C. Mechanically attach roof membrane parallel to roof slope.
   1. Layout chalklines beginning at drains or low points to provide accurate placement. Do not use factory-applied lines if in conflict with chalklines.
   2. Position unfolded membrane over substrate without stretching. Allow membrane to relax one-half (1/2) hour prior to application. Repeat for additional sheets.
   3. Laps: Minimum five (5) inch.
   4. Stagger laps a minimum of eighteen (18) inches from underlying plies or seams.

D. Attaching Membrane
   1. Ensure membrane is smooth and free of wrinkles or buckles.
   2. Place fasteners six (6) inches on center along all seams/laps
      a. Maximum distance between edge of top sheet and fastener penetration on bottom sheet shall be four (4) inches.
      b. Do not overdrive fasteners. Reinstall loose or overdriven fasteners.
   3. Additional perimeter attachment requirements:
      a. Calculated by membrane manufacture to comply with latest Factory 1-90 wind uplift criteria
      b. Utilize copings and/or metal edging with membrane turned down over edge of roof and fastened a minimum of twelve (12) inches on vertical nailer.
      c. Fasteners shall provide a minimum of one hundred seventy-five (175) pounds pull withdrawal.

E. Seam Application:
   1. Allow membrane to relax one-half (1/2) hour.
   2. Place fasteners six (6) inches on center along all seams/laps
      a. Maximum distance between edge of top sheet and fastener penetration on bottom sheet shall be four (4) inches.
      b. Do not overdrive fasteners. Reinstall loose or overdriven fasteners.
   3. Heat weld all seams with approved equipment.
   4. Allow seams to cool and check for voids or deficiencies.
   5. All seams and laps shall be completed daily.

F. Additional Attachment
   1. Mechanical attachment is required at all penetrations and areas of transition with slopes greater than two (2) inches.
   2. Attachment is required to pressure treated nailers. Nailers shall be a minimum of three and one-half (3-1/2) inches wide with depth conforming to roof system dimensions.
   3. Fasteners shall provide a minimum of one hundred seventy-five (175) pounds pull withdrawal and spaced every eight (8) inches on center.
   4. Non-nailer fastened terminations shall be mechanically fastened through manufacturer supplied plate extending through membrane, substrate and roof deck.

G. Areas not meeting the above criteria shall be reapplied. Cut out all voids / blisters or other areas of improper application and reapply to match specified configuration.

3.07 FLASHINGS

A. General:
1. Inspect roof system to insure full adhesion and proper application of all components prior to flashing and walkpad.
2. Allow membrane to fully cure prior to application of flashings. All surfaces to be adhered should be compatible, dry and smooth with no excessive surface roughness.
3. All metal counterflashing shall be designed to completely cover and shield the flashing membrane a minimum of four (4) inches or as indicated in project drawings.
4. All protrusions shall be at least eight (8) inches from the curbs, walls, and edges to provide adequate space for proper sealing or as specified. All other projections will require specific detail/approval by Owners' Representative and Manufacturer.
5. Mechanically fasten the top of all flashing membranes per project drawings. Do not overdrive fasteners.
6. Verify wood nailers are of proper thickness, width and chamfer to accommodate flashing metal and transition to roof membrane.

B. Project Drawings:
1. The detail requirements as they pertain to this project must be followed for metal perimeter/copings, roof vents, etc. This includes all metal flange surfaces, approved adherent/sealants and membrane configurations.
2. Install flashing membrane in a smooth manner to avoid any voids, ridges or fishmouths in the approved adhesive at the rate of two (2) gallons per one hundred (100) square feet. Allow all adhesive to dry properly for optimal application. Do not apply any adhesive to portions of membrane to be heat welded. Apply seam sealant to all welded seams as directed by manufacturer.
3. Install per project and manufacturers drawings. If not specifically addressed otherwise in drawings, adhere flashing membrane in a smooth manner to avoid any voids, ridges or fishmouths. Inspect for any voids, fishmouths or other imperfections. Cut and repair fishmouth with additional layer of membrane.
   a. Extend completed flashing membranes a minimum of four (4) inches above the cant strip and/or a minimum of eight (8) inches above the roof surface. Flashing membrane shall extend a minimum of four (4) inches onto the roof membrane past horizontal/vertical and/or metal deck flange transitions.
   b. All heat-welded laps shall overlap all adjacent sheets a minimum of two (2) inches beyond any fasteners and shall be applied per roof membrane section of Specification.

3.08 ACCESSORIES

A. General:
1. New metal accessories shall be carefully handled and returned to usable condition upon completion of the roofing work. Damage done to such materials shall require replacement with new metal to match the original in thickness, type, attachment method, and configuration. Replacement shall be at the cost of the contractor and subject to acceptance by the Owner regarding quality of workmanship and materials.
2. Damaged metal is defined as metal that has either been bent or disfigured to such degree that it cannot be properly reformed as to closely approximate the original installation or has been dislodged from its fastening point sufficiently as to prevent proper reinstallation.

B. Sheet Metal:
1. Reference Contract Drawings & Roof Plan.
2. Reference Manufacturers Drawings/Requirements:

3. Reference Section 07 60 00.
4. As per SMACNA Architectural Sheet Metal Manual “Fifth Edition.”
5. Make watertight all worn, loose or missing tape/sealants at existing HVAC ducts. Use only accepted materials and install as per Inspector.
6. Seal all metal joints watertight.
7. Paint concealed metal surfaces with protective backing.
8. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
9. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
10. Join parts with rivets or sheet metal screws where necessary for strength or stiffness. Solder all steel joints and weld all aluminum joints unless otherwise directed in detail drawings.
11. Weld or solder all corner pieces. Corner pieces should be twenty-four (24) inches long on each side.
12. Any details where metal caps are being folded upward and then returned to original position to facilitate installation of new baseflashing, roofing contractor shall provide new metal caps at the corners of existing metal caps extending a minimum of three (3) inches in both directions.

C. Drains:
   1. Reference Contract Drawings & Roof Plan
   2. Reference Manufacturers Drawings/Requirements

D. Vents:
   1. Reference Contract Drawings & Roof Plan.
   2. Reference Manufacturers Drawings/Requirements

E. Specialty:
   1. Walkpads:
      a. All dirty or contaminated areas that may interfere with surfacing adhesion must be cleaned prior to application.
      b. Insure that all field and flashing membranes, accessories and other areas directly related to the roof system have been properly installed and thoroughly cured prior to application of walkboards. All deficiencies, regardless of trade, must be corrected prior to application. Do not proceed until all areas have been inspected and approved by Inspector.

      c. Verify location of all pads with owner representative prior to installation.
      d. Install heat welded applied walkboard.
         1) Walkboard shall be heat welded with minimum of 2” lap on perimeter.
         2) Application in areas that may impede proper drainage. Place boards with a minimum of two (2) inch spacing.
         3) Prevent all foot traffic until walkboard has cured.
      e. Install in areas as follows:
         1) Under support blocks.
         2) Around equipment panels.
         3) Around access hatch.
         4) Under duct legs.

F. Sealants:
   1. General
      a. Install as per contract drawings and approved Manufacturers drawing for this project
      b. Install sealants at all points of termination or other locations necessary to render the entire roofing assembly and related substrates watertight. Additional points of installation shall be based on field conditions and as necessary per good roofing practices, to include doorframes, window frames and lintels, and other such wall

related appurtenances where the roofing membrane is terminated at the base of a rising wall. Caulking and sealant products and installation shall be in accordance with Specification

c. Examine the areas and conditions under which work of this section will be performed. Correct conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.

2. Preparation per mfg. requirements.
3. Installation of back-up material:
   a. Use on the back-up material recommended by the manufacture of the sealant and approved by the Inspector for the particular installation, compressing the back-up material to a secure a positive and secure fit.
   b. Materials must be one and one-half (1-1/2) times the width of the joint.
4. Joint design:
   a. Joint depth shall never be greater than width.
   b. In deep joints, the sealant depth shall be controlled by the use of backup materials to retain the recommended depth.
   c. Where depth of joint does not permit back-up material then a bond breaker strip must be installed to prevent three (3) point bonding.
5. Installation of sealant:
   a. General: Prior to the start of installation in each joint, verify the joint type according to the details in the drawings and verify that the required proportion of width of joint to depth of joint has been secured.
   b. Installation of Sealant: Install the sealant in strict accordance with the manufacturer's recommendations as approved by the Inspector, thoroughly filling all joints to the recommended depth.

3.09 REINSTALLATION

A. Clean out and reinstall any drains. Water test. Correct leaks and defects.

B. Mechanical Contractor shall reconnect all disconnected equipment and start to insure proper working order.

3.10 FIELD QUALITY CONTROL

A. All inspections shall be in accordance with Section 01400.

B. Manufacturer shall provide quality assurance inspections, technical assistance and membrane application guidance as may be necessary to complete the roofing membrane application in accordance with project specification and warranty requirements.

C. Contractor shall inspect completed roofing and correct all defects to meet the specification requirements and project documents.

D. It is the responsibility of the Contractor to coordinate all activities required by the manufacturer to obtain the warranty per 1.12.

3.11 CLEANING

A. Upon the Substantial Completion of the Work, the Contractor shall remove all waste materials and rubbish from and about the Site, as well as all tools, construction equipment, machinery, and surplus materials and leave the Work "broom-clean" or equivalent.

B. The Contractor and Subcontractors shall be responsible for cleanup as indicated in accordance with the Contract Documents.

C. Clean any drips or spills of roofing materials, accessories or other cosmetic deficiencies as noted by the Owners representative.

D. If the Contractor fails to clean up, after notice to do so, the Owner may do so and the cost shall be charged to the Contractor.

END OF SECTION

SECTION 07 60 00
FLASHING AND SHEET METAL

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Metal gutters and downspouts.

B. Miscellaneous flashings and counterflashings as required to protect building from water penetration.

1.02 RELATED WORK

A. Section 06 10 00 - Rough Carpentry

B. Section 07 50 00 - Membrane Roofing

C. Section 09 20 00 - Lath and Plaster

D. Section 09 90 00 - Painting

E. Section 22 00 00 - Plumbing

F. Section 23 00 00 - Heating, Ventilating, and Air Conditioning

1.03 REFERENCES

A. AA (Aluminum Association) - Aluminum Construction Manual: Aluminum Sheet Metal Work and Building Construction.

B. ANSI (American Iron and Steel Institute) - Stainless Steel - Uses in Architecture.

C. ANSI/ASTM B32 - Solder Metal.

D. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate.

E. ASTM A525 - Steel Sheet, Zinc Coated, (Galvanized) by the Hot-Dip Process.

F. ASTM B209 - Aluminum and Aluminum Alloy Sheet and Plate.

G. FS O-F-506 - Flux, Soldering, Paste and Liquid.

H. FS QQ-S-571 - Solder, Tin Alloy.

I. FS SS-C-153 - Cement, Bituminous, Plastic.

J. NAAMM - Metal Finishes Handbook.

K. NRCA (National Roofing Contractors Association) - Roofing Manual.

L. SMACNA - Architectural Sheet Metal Manual.

1.04 SYSTEM DESCRIPTION

A. Work of this Section shall be applied in a fashion which will physically protect roofing, exterior walls, openings in exterior surfaces, and exterior joints between materials from damage and water penetration that would permit water leakage to building interior.

1.05 QUALITY ASSURANCE

A. Design and Fabrication: In accordance with the standards and practices described in the SMACNA Architectural Sheet Metal Manual, latest edition.

B. Applicator: Company specializing in sheet metal flashing work with three years minimum experience.

1.06 SUBMITTALS

A. Submit shop drawings under provisions of Section 01 30 00 for any custom fabricated flashings.

B. Submit product data under provisions of Section 01300 for gutter and downspout products. Include color samples for any factory applied finishes.

1.07 STORAGE AND HANDLING

A. Store products under provisions of Section 01 60 00.

B. Stack preformed and prefinished material to prevent twisting, bending, or abrasion, and to provide ventilation.

C. Prevent contact with materials during storage which may cause discoloration, staining, or damage.

PART 2 - PRODUCTS

2.01 SHEET MATERIALS AND FLASHING PRODUCTS

A. Except where special flashings integral to the membrane roof system are described in Section 07 50 00, design of flashings for the work is based on the use of galvanized steel sheet; aluminum or stainless steel sheet may be substituted as specified herein.

B. Galvanized Steel: ASTM A525, 26 gage minimum thickness core steel unless otherwise noted.

C. Aluminum Sheet: ASTM B209, 0.032 inch, plain finish.

D. Stainless Steel: ASTM A167, Type 304, soft temper; 26 gage minimum thickness, smooth finish.

E. Parapet Wall Reglet System: Fry “Springlok” MA-4 masonry reglet, 24 ga. galvanized steel or approved equivalent.

2.02 ACCESSORIES

A. Fasteners: Galvanized steel, aluminum, stainless steel with soft neoprene washers at exposed fasteners; fastener of same material as flashing metal.

B. Underlayment: ASTM D266; No. 15 asphalt saturated roofing felt.

C. Metal Primer: per Section 09 90 00.

D. Protective Backing Paint: Zinc chromate alkyd.

E. Slip Sheet: Rosin sized building paper.

F. Sealant: Per Section 07 90 00.

G. Plastic Cement: FS SS-C-153, Type I-asphaltic base cement.

H. Solder: ANSI/ASTM B32.

I. Flux: FS O-F-506.

2.03 FABRICATION

A. General: Fabricate all flashings and sheet metal pieces shown or implied on the Drawings and which are not provided by the roofing contractor under Section 07 50 00, the plaster contractor under Section 09 20 00, or the mechanical contractor under Sections 22 00 00 and 23 00 00.

B. Form sections true to shape, accurate in size, square, and free from distortion or defects.

C. Fabricate any cleats or starter strips of same material as sheet, minimum 1 inch wide, inter-lockable with sheet.

D. Form pieces in longest practical lengths.

E. Hem exposed edges on underside 1/2 inch; miter and seam corners.

F. Form exposed-to-view material with flat lock cover plate seam.

G. Solder and seal metal joints. After soldering, remove flux, wipe and wash solder joints clean.

H. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

I. Fabricate flashings to allow toe to extend 2 inches minimum over roofing. Return and brake edges.

J. Fabricate gutter and downspout sections only in shapes as approved by the Architect on the basis of submittals made under provisions of Section 01300. Seamless prefinished aluminum products are acceptable. Design is based on fascia gutter and smooth rectangular downspout; light gage “wrinkle-wall” downspout is not acceptable.

2.04 FINISH

A. Paint over any holidays in galvanized finish resulting from fabrication, assembly, or installation, with galvanizing touch-up paint.

B. Back paint concealed metal surfaces with protective backing paint.

PART 3 - EXECUTION

3.01 INSPECTION

A. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, cant strips in place, and nailing strips located.

B. Verify membrane termination and base flashings are in place, sealed, and secure.

C. Beginning of installation means acceptance of existing conditions.

3.02 PREPARATION

A. Field measure site conditions prior to fabricating work.

B. Install starter and edge strips, and cleats before starting installation.

C. Secure flashings in place using concealed fasteners recommended in SMACNA manual. Use exposed fasteners only in locations approved in advance by Architect.

D. Lap, cleat, or seam and seal all joints.

E. Apply plastic cement compound between metal flashings and felt flashings.

F. Fit flashings tightly in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

G. Seal metal joints watertight.

3.03 INSTALLATION

A. Conform to details and profiles as indicated on approved shop drawings and comply with SMACNA standard practices.

B. Replace any exposed-to-view installations which become dented, warped, or "oil canned" by actions of flashing and sheet metal fabricators or installers, at no additional cost to Owner.

C. In place repairs of damaged flashing or sheet metal shall only be as authorized and approved by the Architect.

D. Install gutters to slope 1/16” per foot minimum toward downspouts.

E. Install Fry Springlok reglets and flashings according to manufacturer’s instructions.

3.04 CLEAN UP

A. After completion of flashing and sheet metal installation, remove any excess sealant, cement, or solder from exposed-to-view surfaces.

B. Remove metal scraps, excess fasteners, and related debris from job site.

END OF SECTION

SECTION 07 90 00
JOINT PROTECTION

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Preparation of sealant substrate surfaces.

B. Sealant and backing at construction joints.

1.02 RELATED WORK

A. Section 06 20 00 - Architectural Woodwork

B. Section 07 50 00 - Membrane Roofing

C. Section 08 10 00 - Metal Door Frames

E. Section 08 80 00 - Glazing

1.03 REFERENCES

A. ASTM C790 - Use of Latex Sealing Compounds.

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

E. ASTM C834 - Latex Sealing Compounds.

F. FS TT-C-00598 - Calking Compound, Oil and Resin Base Type.

G. FS TT-S-001657 - Sealing Compound, Single Component, Butyl Rubber Based, solvent Release Type.

H. FS TT-S-00227 - Sealing Compound: Elastomeric Type, Multi- Component.

I. FS TT-S-00230 - Sealing Compound: Elastomeric Type, Single Component.

J. FS TT-S-001543 - Sealing Compound, Silicone Rubber Base.

K. SWI (Sealing and Waterproofers Institute) - Sealant and Caulking Guide Specification.

1.04 SUBMITTALS

A. Submit product data under provisions of Section 01 30 00.

B. Product data shall indicate sealant chemical characteristics, performance criteria, limitations, color availability and applications.

C. Submit manufacturer's installation instructions under provisions of Section 01 30 00.

1.05 QUALITY ASSURANCE

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

B. Applicator: Company specializing in applying the work of this Section with minimum three years experience.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Do not install solvent curing sealants in enclosed building spaces.

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

1.07 SEQUENCING AND SCHEDULING

A. Coordinate the work of this Section with all Sections referencing this Section.

PART 2 - PRODUCTS

2.01 SEALANTS

A. Polysulphide Sealant: one-component or multi-component, non-sagging, non-shrinking, self-leveling liquid polysulphide polymer; Polysulphide LP as manufactured by Morton-Thiokol or equivalent.

B. Acrylic Emulsion Latex: Single component, non-staining, non- bleeding, non-sagging; Acrylic Latex 15-Year Calk, as manufactured by Red Devil or equivalent.

C. Butyl Sealant: Single component, solvent release, non-skinning, non-sagging; Architectural Butyl Sealant, as manufactured by Red Devil or equivalent.

D. Silicone Sealant: Single component, solvent curing, non-sagging, non-staining, non-bleeding; Silpruf, Contractor's 1000, or Sanitary 1700 (depending on use), as manufactured by General Electric or equivalent.

E. Polyurethane Sealant: Two component, moisture curing, non-sagging, 50% extension/50% compression; Sonolastic NP 2 as manufactured by Sonneborn or equivalent.

2.02 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 foam 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 surfaces, or joint openings are ready to receive work.

B. Beginning of installation means installer accepts existing surfaces.

3.02 SELECTION OF JOINT SEALANT

A. From the approved joint sealant materials, select only that joint sealant or calking which is best suited to a given application, and is so recommended by the product's manufacturer.

B. Select a joint sealant which is available in a color compatible with the subtrate or adjacent surface color. Sealant color is subject to the Architect's approval.

C. Select a joint sealant for conditions of high moisture which has anti-fungal characteristics.

D. Select a joint sealant for joints involving painted surfaces which is painter grade, represented by the sealant manufacturer as a compatible substrate for paint.

E. Select exterior sealant materials which are rated for high winds, high ultraviolet light exposure, and a marine environment.

3.03 PREPARATION

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

B. Remove loose materials and foreign matter which might impair adhesion of sealant or firestopping.

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

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

3.04 INSTALLATION - SEALANTS

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

B. Measure joint dimensions and size materials to achieve required width/depth ratios.

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

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

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

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

G. Tool joints slightly concave.

3.05 CLEANING AND REPAIRING

A. Clean work under provisions of Section 01 70 00.

B. Clean adjacent soiled surfaces.

C. Repair or replace defaced or disfigured finishes caused by work of this Section.

3.06 PROTECTION OF FINISHED WORK

A. Protect finished installation under provisions of Section 01600.

B. Protect sealants until cured.

END OF SECTION

SECTION 08 10 00
METAL DOOR FRAMES

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Non-rated exterior steel door and sidelite frames.

B. Non-rated interior aluminum door and sidelite frames.

1.02 RELATED WORK

A. Section 06 10 00 – Rough Carpentry.

B. Section 08 20 00 – Wood and Fiberglass Doors.

C. Section 08 70 00 – Door Hardware.

D. Section 09 90 00 – Painting.

1.03 REFERENCES

A. Steel Door Institute Standard SDI-100 - Standard Steel Doors and Frames; SDI 105 - Recommended Erection Instructions for Steel Frames.

B. ASTM B221 - Aluminum Alloy Shapes.

C. NAAMM – Metal Finishes Manual, National Association of Architectural Metal Manufacturers.

1.04 QUALITY ASSURANCE

A. Conform to referenced standards for door and frame constuction, finish and installation.

1.05 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 01 30 00.

B. Indicate door elevations and frame configuration, anchor types and spacings, location of cutouts for hardware, reinforcement, priming and finishing options.

1.06 DELIVERY, STORAGE AND HANDLING

A. Protect products under provisions of Section 01 60 00.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS – STEEL DOOR FRAMES

A. Republic, Steelcraft.

B. Alternate products may be used if approved on the basis of submittals made under provisions of Section 01 30 00.

2.02 STEEL FRAMES (see Door Schedule and Frame Types)

A. Exterior Frame for Wood or Fiberglass Door
   1. Design: Republic MH Series mitered drywall frame.
   2. Metal Thickness: 16 gage.
   3. Face Dimension: 2 inches.
   4. Labeling: not required.
   5. Anchoring: framing anchors.
   6. Finish: “galvanealed” primed finish for field painting.

2.03 ALUMINUM FRAMES (see Door Schedule and Frame Types)

A. Interior Frame for Wood or Fiberglass Door
   1. Design: Western Integrated Materials Series 300 Prefinished Aluminum Frame.
   2. Profile: rectangular.
   3. Face Dimension: 2 inches.
   4. Labeling: not required.
   5. Anchoring: framing anchors.
   6. Finish: prefinished in standard color as selected by Architect.

2.04 PREPARATION

A. Prepare doors and frames to receive door hardware as approved through the submittal process, providing all necessary reinforcement or backing.

B. Carefully review wall assemblies and determine appropriate throat size prior to fabrication.

C. Confirm that approved locksets/latchsets will fit within stiles of doors with proposed backset dimension. Bring any conflicts to the attention of the Architect for resolution prior to door preparation.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install metal door frames in accordance with referenced standards and good trade practice.

B. Install frames plumb and square, anchoring firmly to building framing.

3.02 TOLERANCES

A. Maximum Diagonal Distortion: 1/8 inch measured with straight edge, corner to corner.

3.03 ADJUSTING AND CLEANING

A. Adjust hardware for smooth and balanced door movement.

B. Replace any metal doors or frames which are, in the opinion of the Owner, unacceptably dented, scraped, or otherwise damaged, at no additional cost to the Owner. Repairs to damaged doors shall only be allowed if acceptable to the Owner’s representative.

END OF SECTION

SECTION 08 20 00
WOOD AND FIBERGLASS DOORS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Non-rated solid core and hollow core wood doors.

B. Non-rated insulated fiberglass doors.

1.02 RELATED WORK

A. Section 08 10 00 - Metal Door Frames

B. Section 08 70 00 - Door Hardware

C. Section 09 90 00 - Painting

1.03 REFERENCES

A. ANSI/NWMA I.S.1 - Industry Standard For Wood Flush Doors (Includes Standards I.S.1.1 through I.I.S.1.7).

B. AWI - Quality Standards of Architectural Woodwork Institute, 8th edition.

C. ANSI A135.4 - Basic Hardboard.

1.04 PERFORMANCE

A. Acoustic Rating for Doors: ASTM E90, minimum STC 32.

1.05 QUALITY ASSURANCE

A. Conform to requirements of AWI Quality Standard Section 1300 and 1400 "Custom Grade I or II."

1.06 SUBMITTALS

A. Submit shop drawings, product data and manufacturer's installation instructions under provisions of Section 01 30 00.

B. Indicate door elevations, stile and rail reinforcement, internal blocking for hardware attachment, and cutouts for louvers.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect products under provisions of Section 01 60 00, and in accordance with AWI and ANSI/AWMA requirements.

B. Protect doors with resilient packaging, sealed with plastic. Break seal on site to permit ventilation.

1.06 WARRANTY

A. Provide five year manufacturer's warranty under provisions of Section 01 70 00.

B. Warranty: materials and workmanship, including warping, delamination and related defects.

PART 2 - PRODUCTS

2.01 ACCEPTABLE WOOD DOOR MANUFACTURERS

A. Masonite Corporation.

B. Alternate products may be used if approved on the basis of submittals made under provisions of Section 01 30 00.

2.02 WOOD DOORS

A. Flush Paint Grade Doors, Hollow Core, Non-Rated, for Residential Closets, Utility Rooms.
   1. Manufacturer/Model: Masonite Primed Textured series.
   2. Rating: non-rated.
   3. Thickness: 1-3/8”.
   4. Core Construction: paperboard honeycomb.
   5. Faces: primed and woodgrain embossed hardboard.
   7. Finish: painted per Section 09 90 00.

B. Flush Pre-Finished Doors, Hollow Core, Non-Rated, for Residential Bedrooms, Bathrooms.
   1. Manufacturer/Model: Masonite Embossed/Prefinished Hardboard series.
   2. Rating: non-rated.
   3. Thickness: 1-3/8”.
   4. Core Construction: paperboard honeycomb.
   5. Faces: simulated woodgrain embossed hardboard.
   7. Finish: one of six standard grain colors, as selected by Architect.

C. Flush Glazed and Non-Glazed Paint Grade Doors, Solid Core, Non-Rated, for Common Building Interiors.
   1. Manufacturer/Model: Masonite Primed Textured series.
   2. Rating: non-rated.
   3. Thickness: 1-3/4”.
   4. Core Construction: particleboard.
   5. Faces: primed and woodgrain embossed hardboard.
   7. Finish: painted per Section 09 90 00.
   8. Glazing: 1/4" clear, tempered safety glass where indicated in Door Schedule.

2.03 ACCEPTABLE FIBERGLASS DOOR MANUFACTURERS

A. Thermatru.

B. Alternate products may be used if approved on the basis of submittals made under provisions of Section 01 30 00.

2.04 FIBERGLASS DOORS

A. Flush Paint Grade Doors, Insulated Core, Non-Rated, for Residential Entries.
   1. Manufacturer/Model: Thermatru Smooth Star series, 2-panel square top design.
   2. Rating: non-rated.
   3. Thickness: 1-3/4”.
   4. Core Construction: foamed in place polyurethane.
   5. Faces: smooth fiberglass composite, paint-ready.
   7. Finish: painted per Section 09 90 00.

B. Flush Paint Grade Glazed Doors, Insulated Core, Non-Rated, for Common Building Exterior.
   1. Manufacturer/Model: Thermatru Smooth Star series, full lite flush glazed design.
   2. Rating: non-rated.
   3. Thickness: 1-3/4”.
   4. Core Construction: foamed in place polyurethane.
   5. Faces: smooth fiberglass composite, paint-ready.
   7. Finish: painted per Section 09 90 00.
   8. Glazing: 1/2" dual pane, clear low E glazing unit, tempered 1/8" safety glass.

2.05 DOOR FABRICATION

A. Fabricate doors in accordance with referenced AWI and WIC Quality Standards in manufacturers' product data.

B. Provide flush doors with minimum 1/2 inch thick solid edge without holidays or rough grain, and minimum 3 inch wide solid wood support at latch jamb location of latch/lock hardware.

C. Premachine doors for finish hardware.

PART 3 - EXECUTION

3.01 INSTALLATION

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

B. Machine cut relief for hinges and closers and coring for locksets and cylinders.

C. Trim door width from lock edge only, to a maximum of 3/16 inch, trim door height by cutting equally on top and bottom edges to a maximum of 3/4 inch.

D. Pilot drill screw and bolt holes.

E. Prepare doors to receive finish hardware in accordance with AWI requirements.

F. Conform to AWI and UBC Standard 43-2 requirements for fit tolerances.

3.02 INSTALLATION TOLERANCES

A. Maximum Diagonal Distortion: 1/8 inch measured with straight edge, corner to corner.

3.03 ADJUSTING AND CLEANING

A. Adjust for smooth and balanced door movement.

END OF SECTION

SECTION 08 53 00
VINYL WINDOWS

PART 1 - GENERAL

1.01 WORK INCLUDES

A. Vinyl exterior windows

1.02 RELATED WORK

A. Section 06 10 00 - Rough Carpentry

B. Section 07 46 00 - Fiber Cement Siding

C. Section 07 90 00 - Joint Sealants

D. Section 08 80 00 - Glass and Glazing

1.03 REFERENCES

A. AAMA standard 2410 - Flush Installation of Exterior Windows, Remodel

B. ASTM D4726-09 - Vinyl Extrusions for Windows

C. California Administrative Code Title 24 for infiltration.

1.04 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 01 30 00.

B. Indicate opening dimensions and tolerances, material description and finishes, construction and mounting at head, jamb and sill.

1.05 DELIVERY, STORAGE AND HANDLING

A. Protect products under provisions of Section 01 60 00.

B. Protect window products with resilient corner protectors and complete plastic wrapping; do not remove until installation.

1.06 WARRANTY

A. Provide a manufacturer's warranty under provisions of Section 01 70 00 for five (5) years covering all insulating glass used in vinyl windows.

B. Provide a manufacturer's warranty under provisions of Section 01 70 00 for two (2) years covering vinyl window construction, working parts and hardware.

PART 2 - PRODUCTS

2.01 EXTERIOR VINYL WINDOWS

A. Acceptable Manufacturers
   1. Anlin Window Systems
      Milgard
      Ply-Gem
   2 Alternate products may be used if approved on the basis of submittals made under provisions of Section 01300.

B. Picture Window, Single Sliding, and Single Hung Window Characteristics
   1. Product Model: Anlin Catalina even sight line series.
   2. Material: Rigid extruded vinyl, 0.080" wall thickness.
   3. Glazing: 3/4" dual pane glass, clear; tempered where required by code, per Section 08 80 00.
   4. Finish: Integral white color.
   5. Construction: Fully welded corners.
   6. Applied Muntins or Mullions: None.
   7. Glazing Bead: Dual durometer.
   8. Locks: Pass CFE (California Forced Entry) test.
   9. Screens: Manufacturer's fiberglass screens.

PART 3 - EXECUTION

3.01 INSPECTION

A. Prior to the installation of vinyl windows, carefully inspect the completed work of all other trades and verify that all such work is complete to the point where this installation may properly proceed.

B. Confirm that vinyl windows can be installed in compliance with all pertinent codes and regulations, the original design, and the manufacturer's recommendations.

C. Meet with exterior millwork contractor to review overlapping of products of both trades. Report any conflicts to Architect for resolution prior to installation of metal windows.

D. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION

A. Install all vinyl windows in strict accordance with the manufacturer's published recommendations, anchoring all components firmly into position.

B. Set vinyl windows in a continuous bead of exterior rated silicone sealant, applied per sealant manufacturer's instructions and Section 07 90 00 of these specifications.

C. Flash vinyl window nailing fins with minimum 30 lb. elastomeric roll flashing material, stapled or nailed with flashing manufacturer's recommended fasteners. Do not use sisal kraft flashing.

D. Set vinyl windows to receive finishes and trims as detailed in the Drawings.

3.03 CLEAN-UP AND ADJUSTMENT

A. After completion of vinyl window installation, remove packaging and debris from the work site.

B. Just prior to final completion, remove all labels, packing slips, and safety markings from glass. Use only cleaners recommended by the manufacturer.

C. Adjust operable window components to move smoothly and easily and to close tightly and lock.

D. Adjust visible window components to be neat, square, and plumb, including drain hole covers.

E. Touch up any damage to frame finish with manufacturer’s touch-up paint.

END OF SECTION

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Hardware for interior and exterior doors.

B. Weatherstripping and thresholds at door frames.

1.02 RELATED WORK

A. Section 08 10 00 – Metal Door Frames.

B. Section 08 20 00 – Wood and Fiberglass Doors.

1.03 REFERENCES

A. ANSI A117.1, CAC Title 24, U.S. Dept. of Justice 28 CFR Part 36 (ADA) - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.

B. AWI - Architectural Woodwork Institute.

C. BHMA - Builders' Hardware Manufacturers Association.

D. DHI - Door and Hardware Institute.

E. NFPA 101 - Life Safety Code.

F. Underwriters Laboratories Inc.

1.04 COORDINATION

A. Coordinate work of this Section with other directly affected Sections involving manufacturer of any internal reinforcement for door hardware.

B. Coordinate keying requirements with Owner's representative as described below.

C. Coordinate connection of all electric hardware control and alarm wiring with building power wiring provided by electrical contractor.

1.05 QUALITY ASSURANCE

A. Design Criteria: The intent of this Section is the provision of all required items of finish hardware. Any work less than this intent shall form the basis for corrective measures under the Contractor's guarantee of all work.

B. Hardware Supplier: Company specializing in supplying commercial and institutional door hardware with minimum three (3) years' experience.

1.06 SUBMITTALS

A. Submit schedule, shop drawings, and product data under provisions of Section 01 30 00.

B. Indicate locations, mounting heights, finishes, accessories, and anchorage of each type of hardware.

C. Provide product data on specified hardware, including explanation of all abbreviations, symbols, and codes used to identify components or functions.

1.07 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data under provisions of Section 01 70 00.

B. Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site, store and protect under provisions of Section 01 60 00.

B. Deliver keys to Owner by secure shipment direct from hardware supplier.

1.09 WARRANTY

A. Provide minimum two year warranty on all locksets, latchsets, and closers under provisions of Section 01 70 00.

1.10 MAINTENANCE MATERIALS

A. Provide special wrenches and tools applicable to each different or special hardware component.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Hinges and Miscellaneous Hardware: Stanley

B. Latchsets, Locksets, and Cylinders: Schlage

C. Stops, Holders and Miscellaneous Hardware: Ives, Amerock

D. Closers: LCN

E. Weatherstripping, Thresholds, and Door Bottoms: Pemko

F. Alternate products may be used if approved on the basis of submittals made under provisions of Section 01 30 00.

2.02 OTHER MATERIALS

A. Provide all mounting hardware, plates, trims, accessories, attachments, relays, actuators, and power connections as required for a complete and operable installation.

2.03 KEYING

A. Keying shall be carefully coordinated with Owner's representative, using at least two master levels.

B. Supply 2 keys for each lock, plus 2 keys for each level of master keying; stamp all keys "Do Not Duplicate."

2.04 FINISHES

A. Finishes are listed in the Door Hardware Schedule on the Drawings.

B. Where not otherwise described, metal finishes shall be either satin stainless steel, satin chrome, or brushed chrome.

2.05 MATERIALS

A. Materials shall be as identified in the Door Hardware Schedule on the Drawings. Hardware Groups are called out in the Door Schedule on the Drawings.

B. Additional or accessory products as required to provide a complete and functional installation shall be compatible with the above materials and are subject to the Architect's approval.

PART 3 - EXECUTION

3.01 INSPECTION

A. Verify that doors and frames are ready to receive work and dimensions are as indicated on approved shop drawings.

B. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION

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

B. Use the templates provided by hardware item manufacturer.

C. Mounting heights for hardware from finished floor to center line of hardware item shall be the same as adjacent, existing hardware of the same type, or as indicated on the drawings.

D. Conform to the California Building Code (Section 1133B.2.5.2) for positioning requirements for the disabled.

E. Coordinate installation timing with Owner's Representative in a fashion that does not leave building unlocked.

F. Adjust interior and exterior door closers to require a maximum pressure of 5 pounds to push or pull the door open.

3.03 CLEANUP

A. After installation remove all plastic sheets, manufacturer's temporary markings, and construction dirt or markings from finish hardware.

B. Use only cleaners compatible with hardware finish.

END OF SECTION

SECTION 08 80 00
GLAZING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Glass and glazing for doors and windows.

1.02 RELATED WORK

A. Section 08 10 00 - Metal Door Frames.

B. Section 08 20 00 - Wood and Fiberglass Doors.

1.03 REFERENCES

A. ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Material Used in Buildings.

B. "Manual of Glazing" of the Flat Glass Marketing Association.

C. U.S. General Service Administration Standard Test Method for Glazing and Window Systems Subject to Dynamic Overpressure Loadings.

D. ASTM C1349-04 Standard Specification for Architectural Flat Glass Clad Polycarbonate.

E. ASTM Z97.1 Test for Safety Glazing Materials Used in Buildings.

1.04 QUALITY ASSURANCE

A. All glass shall bear the label of its manufacturer and quality.

B. Conform to Flat Glass Marketing Association (FGMA) recommendations for glazing installation methods.

1.05 SUBMITTALS

A. Submit product data under provisions of Section 01 30 00.

1.06 DELIVERY, STORAGE, AND PROTECTION

A. Deliver products to site, store and protect under provisions of Section 01 60 00.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS - GLASS PRODUCTS

A. Glass: PPG Residential Glass

B. Alternate products may be approved based on submittals made under provisions of Section 01 30 00.

2.02 NON-TEMPERED GLASS - EXTERIOR

A. Glass Type G.1: Dual pane, clear, regular strength insulating glass, 1/8” or 3/16” as required to comply with CBC wind loading criteria, low-E insulating glass with argon gas, or equivalent.

2.03 TEMPERED GLASS - EXTERIOR

A. Glass Type G.2: Dual pane, clear, tempered safety insulating glass, 1/4” where required by CBC 2406.4, low-E Insulating Glass with argon gas, tempered, or equivalent.

2.04 TEMPERED GLASS - INTERIOR

A. Glass Type G.3: Single pane 1/4” tempered, clear.

2.05 OBSCURE GLASS - EXTERIOR

A. Glass Type G.4: Dual pane, clear, regular strength insulating glass, 1/8” glass, one obscure pane, or equivalent.

2.06 GLAZING COMPOUNDS

A. Glazing compound may be any Class A, single component compound intended for the specified application.

PART 3 - EXECUTION

3.01 INSPECTION

A. Site glazing installation: verify surfaces of glazing channels or recesses are clean, free of obstructions, and ready for work of this Section.

B. Beginning of installation means acceptance of substrate.

3.02 SITE GLAZING INSTALLATION

A. Install glass panels resting on setting blocks. Install applied stop and place spacer shims at 1/4 inch below sightline.

B. Locate and secure using glaziers' clips.

C. Fill gaps between panel and stops with glazing compound until flush with sightline. Tool surface to straight line.

D. Glazing with glazing tape is an acceptable alternate installation.

E. At openings provided with manufacturer's glazing bead, install bead per manufacturer's recommendations, using glazing compound or sealant only as specifically directed.

3.03 CLEANING

A. After installation, mark vision glass with an "X" by using plastic tape or removable paste.

B. Remove glazing materials from finish surfaces.

C. Remove labels and clean glass after work is completed.

END OF SECTION

SECTION 09 20 00
LATH AND PLASTER

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Building paper and metal lath.

B. Plaster inserts and accessories.

C. Three coat Portland cement plaster to extend or repair existing plaster exterior walls.

1.02 RELATED WORK

A. Section 07 46 00 - Fiber Cement Siding

B. Section 07 60 00 - Flashing and Sheet Metal

D. Section 09 90 00 - Painting

1.03 REFERENCES

A. Federal Specification UU-B-70 - building paper, stucco lath.

B. ASTM C150 - Portland cement.

C. ASTM C-206 - lime.

D. ASTM C-144-62T - graded sand.

E. "Lathing and Plastering Data Guide and Reference Specifications,"by the Southern California Plastering Institute.

1.04 QUALITY ASSURANCE

A. Applicator: Company specializing in the application of exterior portland cement plaster finishes, with at least three (3) years' experience.

1.05 SUBMITTALS

A. Submit product data and samples under provisions of Section 01 30 00.

B. Submit product data, with manufacturer's installation instructions, for all proposed plaster additives.

C. Prepare one mock-up, at least 48 inches by 48 inches, of each proposed plaster texture and color, for Architect's and Owner’s approval prior to application of plaster brown coat. Mockup may be used as a portion of the actual building Work.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, protect lath and plaster materials under provisions of Section 01 60 00.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Do not apply plaster when the outside air temperature is below 40 degrees F, or above 90 degrees F.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Paper-backed Stucco Lath, Vertical Surfaces: K-Lath, Western Metal Lath Company.

B. Stucco Lath, Soffits and Other Horizontal, Near Horizontal or Beveled Surfaces: Inland Ryerson, Western Metal Lath Company.

C. Screeds, Moldings, and Accessories: Fry, Western Metal Lath Company, Delta Star (Superior), California Expanded Metal Products Corporation.

D. Alternate products may be used if approved on the basis of submittals made under provisions of Section 01 30 00.

2.02 LATHING MATERIALS

A. Lath at Walls and Other Vertical Surfaces: 1-1/2 inch mesh, hexagonally woven, galvanized wire mesh, attached to Class B, waterproofed building paper in a self-furring fashion; Paperbacked Stucco Netting SFB by K-Lath.

B. Lath at Soffits and Other Horizontal, Near Horizontal or Beveled Surfaces: 3/8 inch galvanized, expanded metal rigid lath; Stay-Rib by Inland Ryerson.

C. Line wire backing: 18 gage galvanized, Class I annealed steel wire.

2.03 SCREEDS, MOLDINGS, AND ACCESSORIES

A. General: Prefabricated standard shapes, manufactured for the designated use of hot-dip zinc galvanized steel or extruded aluminum.

B. Corner Reinforcement (at outside corners): Western Stucco-Lok corner reinforcement.

C. Casing Bead (where plaster panel abuts dissimilar material other than aluminum): Western No. 66/Expanded Flange.

D. Drip Screed (at bottom of wall conditions): Superior reveal screed in sizes indicated on Drawings.

2.04 WOOD GROUNDS

A. Temporary wood grounds: seasoned wood of uniform thickness and free from pitch or defects.

B. Permanent wood grounds shall not be used.

2.05 CEMENT

A. Portland cement: Conform to ASTM designation C-150, Type I.

B. Plastic additives are limited to 12 percent by volume.

2.06 LIME

A. Dry Hydrated Lime: Conform to ASTM designation C-206, Type S.

B. Lime putty, if used, shall weigh no less than 83 pounds per cubic foot.

2.07 SAND

A. Sand Aggregate: Clean, well graded from coarse to fine, conforming to ASTM C-144-62T.

2.08 FINISH COAT

A. Product: Omega Semi-Smooth Finish or approved equivalent acrylic finish coat.

B. Texture: To match existing "sand" finish.

C. Colors: Integral color by Omega as selected by Architect from standard range.

2.09 OTHER MATERIALS

A. All other materials, not specifically described but required for a complete and proper installation of lath and plaster, shall meet or exceed the requirements of the referenced standards and shall be subject to the approval of the Architect.

PART 3 - EXECUTION

3.01 INSPECTION

A. Verify that substrates are ready to receive lath and plaster, including treatment of existing plaster edge to key new plaster as required.

B. Verify that lath and plaster may be installed in accordance with all pertinent codes and regulations, the original design, and the referenced standards.

C. Beginning of installation means acceptance of existing conditions.

3.02 WEATHER CONDITIONS

A. Do not apply plaster when prevailing outdoor temperature is below 40 degrees Fahrenheit; if freezing is expected, do not apply plaster beyond the period required for proper hydration.

B. Do not apply plaster when prevailing outdoor temperature is above 90 degrees Fahrenheit.

3.03 LATHING - VERTICAL APPLICATIONS

A. Install line wire backing at open wall framing, where exterior sheathing does not occur. Install line wire at 6" o.c. vertically; run horizontally, stretched taut but not tight, fastened at 32" o.c.

B. Install paper-backed stucco lath with the long dimension horizontal, lapping the paper of upper courses over the paper of lower courses at least two (2) inches, and lapping vertical paper joints at least six (6) inches. Tie lath laps together above paper laps.

C. At exterior corners, wrap paper and lath around corner and reinforce with external corner reinforcement.

D. At interior corners, fold the lath and paper through the corner and reinforce with interior corner reinforcement.

E. Take care in attachment of paper-backed lath to building surfaces to allow lath to remain furred approximately 1/4 inch above the surface of building paper.

F. Attach all screeds, moldings, or accessories firmly to supporting structure per the recommendations of the reference standards. Where screeds, moldings, and accessories meet or intersect, cut non-continuous member to fit snug and square against through member. Where screeds continue around outside corners, miter to maintain a continuous line.

G. Attach paper backed lath to concrete block at site walls with power driven concrete fasteners.

3.04 PLASTERING

A. Perform all mixing, plastering, and plaster curing in strict accordance with the provisions of the referenced standards.

B. Scratch Coat: Apply the scratch coat with sufficient material and force to form good keys, embedding and filling all spaces of the lath, and scoring the plaster horizontally.

C. Brown Coat: Do not apply the brown coat sooner than forty eight (48) hours after application of the scratch coat. Apply brown coat to scratch coat, bring out to grounds, straighten to a true surface, float, compact, and leave sufficiently rough to ensure adequate bond for finish coat.

D. Finish Coat
   1. Do not apply finish coat sooner than seven (7) days after application of brown coat. Apply smooth, dense, flat and true float finish coat, textured as approved by the Architect on the basis of field mock-ups, beginning and ending application at naturally occurring joints, edges, and boundaries on finish surfaces. Unsightly laps and joints will not be acceptable.
   2. Finish coat shall be continuous across brown coat.
   3. Finish coat shall be finished in one integrally pigmented color, as approved by Architect on the basis of field mock-ups.

E. Finish all plaster surfaces true and even within 1/8 inch tolerance in ten (10) feet. Leave the finished surfaces free from tool marks, scaffold ties, and other blemishes.

F. Carefully float new plaster to match surface elevation and texture of adjacent existing plaster.

3.05 CLEANING AND PROTECTION

A. Protect all window and door frames, thresholds, and other products from plaster debris or splatter with tape, building paper, plastic sheet, or similar methods. Immediately clean splatter from unprotected products or surfaces.

B. After application of finish coat, remove all tape, inserts and protective covers from screeds, moldings and accessories, and clean metal surfaces as described in Section 09 90 00 to receive paint finish.

C. After completion of plastering work, remove all plaster related debris from work areas and clean any spilled plaster products from building and site areas.

D. Do not wash out plastering tools and equipment in a fashion that will stain finish surfaces or run off into public drainage courses.

END OF SECTION

SECTION 09 25 00
GYPSUM DRYWALL

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Gypsum drywall at walls and ceilings.

B. Gypsum drywall trims and finishing.

1.02 RELATED WORK

A. Section 06 10 00 - Rough Carpentry

B. Section 09 20 00 - Lath and Plaster

C. Section 09 90 00 - Painting

1.03 REFERENCES

A. Gypsum Association publication GA 216-2007.

B. ASTM c1396-09 Standard Specification for Gypsum Board.

C. ASTM C475-07 Standard Specification for Joint Compound and Joint Tape.

1.04 SUBMITTALS

A. Submit product data under provisions of Section 01 30 00.

1.05 DELIVERY, HANDLING, AND STORAGE

A. Deliver, handle, and store materials under provisions of Section 01600.

B. Replace damaged materials at no cost to the Owner.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. United States Gypsum Company.

B. Gold Bond Products.

C. Alternate products may be used if approved on the basis of submittals made under provisions of Section 01 30 0.

2.02 GYPSUM DRYWALL PANELS - WALLS AND CEILINGS

A. Product Description: USG "Sheetrock" brand gypsum panels.

B. Thickness:
1. Ceilings: 5/8 inch, Type X firecode where required by floor/ceiling assembly.
2. Party Walls: 5/8 inch, Type X firecode.
3. Other Walls: 1/2 inch at residential units; 5/8 inch at common buildings.

C. Moisture Resistance: use "W/R" panels where panels will experience regular exposure to moisture, including but not limited to walls behind tub/showers, walls within 4 feet horizontally of tub/showers, and plumbing walls in common restrooms, laundries and equipment rooms.

2.03 FASTENERS

A. All fasteners shall be of the length and pattern recommended by the manufacturer of the gypsum panels used, required by the rated system, and as indicated on Drawings.

2.04 METAL CORNERBEAD AND TRIM

A. All metal cornerbead, casing bead, and trim, and all accessory items, shall be a system recommended by the manufacturer as compatible with the gypsum panels. Outside corners shall be square.

2.05 JOINT SYSTEM

A. The joint system, including tape and compounds, shall be a system recommended by the manufacturer as compatible with the gypsum panels.

B. Only non-shrinking joint compounds are allowed.

2.06 TEXTURE SYSTEMS

A. Preparation Coating: Hamilton "Prep-Coat" high solids drywall sealer or approved equivalent.

B. Interior Walls and Ceilings: USG “Sheetrock” brand Tuf-Tex Wall and Ceiling Spray Texture or approved equivalent, to be painted.

2.07 OTHER MATERIALS

A. All other materials, not specifically described but required for a complete and proper installation of gypsum drywall and compliance with rated assembly criteria, shall be as selected by the Contractor subject to approval by the Architect.

PART 3.00 - EXECUTION

3.01 INSPECTION

A. Verify that wall and ceiling surfaces are ready to accept the work of this section in compliance with the reference standards.

B. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION

A. General installation standards
   1. Install per GA 216 and USG 923 and 927.
   2. Place metal corner bead at all exterior corners.
   3. Use "L" casing bead where indicated on drawings and wherever gypsum panels abut rather than overlap dissimilar materials; hold molding back 1/8 inch from adjacent surface for sealant.
   4. Tape, fill and sand to achieve a smooth, even surface.
   5. Apply preparation coating directly to gypsum panels and joint system per manufacturer's recommendations.

6. Carefully float joint compound across new-to-existing drywall joints to achieve a homogenous extension of the existing surface.
7. Texture panels to receive the specified finish.

3.03 FINISH AND TEXTURES

A. Unless otherwise required, finish and texture gypsum drywall walls and ceilings as follows:
   1. New walls and ceilings unless noted otherwise: Light sprayed orange peel without sharp detail, sanded before sealing.
   2. Repairs to, or extensions of, existing walls and ceilings: Match existing adjacent texture.

3.04 CLEAN UP

A. Maintain the premises in a neat and orderly condition at all times. Periodically remove all trash, debris, and waste from the work in order to maintain clear and unobstructed access.

B. In the event of spilling or splashing compound onto other surfaces, immediately remove the spilled or splashed material and all trace of the residue to the approval of the Architect.

END OF SECTION

SECTION 09 30 00
CERAMIC TILE

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Ceramic tile at vertical and horizontal restroom surfaces as indicated on Drawings.

1.02 RELATED WORK

A. Section 03 30 00 - Cast-in-Place Concrete

B. Section 09 25 00 - Gypsum Drywall

1.03 REFERENCES

A. Ceramic Tile: The Installation Handbook, by the Tile Council of North America, Inc.

B. ASTM C150-83a - Portland Cement

C. ASTM C144 - Aggregate for Masonry Mortar.

1.04 SUBMITTALS

A. Submit product data under provisions of Section 01 30 00.

B. Submit tile and grout samples under provisions of Section 01 30 00.

1.05 MAINTENANCE DATA

A. Provide maintenance data under provisions of Section 01700.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Maintain materials and surrounding air to a minimum 50 degrees F prior to, during, and 48 hours after completion of work.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Dal Tile

B. Latco

B. Alternate products may be used if approved on the basis of submittals made under provisions of Section 01300.

2.02 UNGLAZED TILE AT RESTROOM FLOORS

A. Product: Dal Tile Endurance Unglazed Recycled Ceramic.

B. Size: 4" X 4".

C. Color: Single color as selected by Architect.

D. Trim: Coved 4" x 4" wall base, with inside and outside corner pieces.

E. Grout: Natural grey latex/Portland cement, by Custom Products or equivalent.

2.03 GLAZED WALL TILE AT BATHROOM WALLS

A. Product: Dal Tile Modern Dimensions Glazed Ceramic.

B. Size: 4-1/4"" X 12-3/4"".

B. Color: One field color and one accent color, in pattern to be provided by Architect; no more than 10% of accent color.

C. Trim: Bullnose and quarter round as appropriate at edges of field.

D. Grout: Natural grey latex/Portland cement, by Custom Products or equivalent.

2.04 MORTAR MATERIALS – THIN SET APPLICATIONS

A. Thin-Set Mortar: Master Blend Thin Set Mortar by Custom Building Products.

B. Admixture: Acrylic Mortar Admix by Custom Building Products.

C. Water: Potable.

2.05 MORTAR MATERIALS – MASTIC APPLICATIONS

A. Acrylic Latex Mastic: Acryl 4000 Multi-Purpose Ceramic Tile Mastic by Custom Building Products or approved equivalent.

B. Latex Leveling Compound: Quick-Fix All Purpose Patching Compound by Custom Building Products or approved equivalent.

2.06 ACCESSORIES

A. Provide such accessories and additional materials as will be required to accomplish a complete and functional tile installation.

PART 3 EXECUTION

3.01 PREPARATION

A. Inspect work area and confirm substrate is ready to receive ceramic tile work.

B. Beginning installation means acceptance of existing substrate conditions.

C. Establish lines, levels, and pattern. Protect from disturbance.

3.02 INSTALLATION

A. Install interior floor tile generally in accordance with recommendations in TCNA reference standard F113, installing tile dead level except where slopes to floor drains are indicated. Locate control/contraction/isolation joints to coincide with any control joints in slab on grade and install per TCNA.

B. Install interior wall tile generally in accordance with recommendations in TCNA reference standard W243.

C. Set floor tile in thinset cementitious mortar bed to support tile over full bearing surface, back buttering where appropriate as recommended by mortar manufacturer.

D. Level high spots and fill low spots in wall substrate with leveling compound. Set wall tile in full bed of mastic applied with mastic manufacturer's recommended notched trowel.

E. Maintain uniform joint width.

F. Maximum variation from horizontal plane of unit to adjacent unit: 1/32 inch. Maximum variation of finished planes from flat: 1/8 inch in 10 feet.

G. To accommodate grouting, rake wet mortar out of joints to a depth of 3/16 inch.

H. Fill joints with grout. Pack and work into voids. Neatly tool surface to a finished joint.

3.03 CLEANING

A. Clean soiled surfaces per tile manufacturer's recommendations, using solution which will not harm tile, grout, or adjacent surfaces; use only non-metallic cleaning tools.

B. Remove all waste, debris, and packing materials from work area.

END OF SECTION

SECTION 09 65 00
RESILIENT FLOORING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Resilient tile and plank flooring.

B. Resilient wall base and transitions.

1.02 RELATED SECTIONS

A. Section 03 30 00 - Cast-in-place Concrete

C. Section 06 10 00 - Rough Carpentry

D. Section 09 68 00 - Carpeting

1.03 REFERENCES

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

B. FS L-F-475 - Floor Covering, Vinyl Surface (Tile and Roll), with Backing.

C. FS SS-W-40 - Wall Base: Rubber and Vinyl Plastic.

1.04 REGULATORY REQUIREMENTS

A. Products shall have a flame spread rating of 25 or less in accordance with ASTM E84.

1.05 SUBMITTALS

A. Submit product data under provisions of Section 01 30 00.

B. Provide product data on specified products, describing physical and performance characteristics, sizes, patterns and colors available.

C. Submit samples under provisions of Section 01 30 00.

D. Submit one full sample kit each for vinyl tile and resilient base, containing the full range of colors and patterns available in the specified products.

1.06 OPERATION AND MAINTENANCE DATA

A. Submit cleaning and maintenance data under provisions of Section 01 70 00.

B. Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Store materials for three days prior to installation in area of installation to achieve temperature stability.

B. Maintain ambient temperature required by adhesive manufacturer three days prior to, during, and 24 hours after installation of materials.

1.08 EXTRA STOCK

A. Provide an extra 5 percent of the total amount of flooring and base required by the work under provisions of Section 01 70 00.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS - RESILIENT FLOORING

A. Armstrong

B. Congoleum

C. Alternate products may be used if approved on the basis of submittals made under provisions of Section 01 30 00.

2.02 RESILIENT TILE MATERIALS

A. Resilient Tile RF-1: Armstrong Standard Excelon, as follows:
   1. Size: 12 inch X 12 inch
   2. Thickness: 1/8 inch
   3. ASTM F1066: Comp. 1, Class 2, through pattern
   4. ASTM E648: Class I
   5. Federal Spec.: SS-T-312B(1), Type IV, Comp. 1
   6. ASTM E662: 450 or less
   7. Color: one field color and two border colors as selected by Architect from full range.

2.03 SHEET RESILIENT MATERIALS

A. Sheet Flooring RF-2: Armstrong Classic Corlon, as follows:
   1. Roll Size: 72" wide
   2. Thickness: 0.085 overall; 0.050 patterned wear layer
   3. ASTM E648: Class I
   4. ASTM E662: 450 or less
   5. Federal Spec.: L-F-475A (3), Type II, Grade A
   6. Colors: as selected by Architect from full range

2.04 RESILIENT PLANK MATERIALS

A. Resilient Plank Option for RF-1: Armstrong Luxe Plank, as follows:
   1. Product: Luxe Plank Good Collection, #A6805 or equivalent.
   2. Plank Size: 6" x 36"
   3. ASTM E648: Class I
   4. ASTM E662: 450 or less
   5. Wear Layer: Urethane
   6. Manufacturer's Warranty: 10 years
   7. Color/Pattern: as selected by Architect from full range

2.05 MANUFACTURERS - WALL BASE

A. Burke

B. Flexco

C. Alternate products may be used if approved on the basis of submittals made under provisions of Section 01 30 00.

2.06 WALL BASE MATERIALS

A. Base RB-1: Burke 4" resilient wall base, coved base profile per Finish Schedule.

B. Base RB-2: Burke 4" resilient wall base, straight carpet profile per Finish Schedule.

C. Color: As selected by Architect from full range

2.07 ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by flooring material manufacturer.

B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer:

C. Sealer and Wax: Types recommended by flooring manufacturer.

D. Floor Transition Materials
   1. Resilient flooring to carpet: #365 Cerco Edge T with #970 Single Flange Vinyl Track by Mercer Products or equivalent, color as selected by Architect.
   2. Ceramic tile to resilient tile (common restrooms): #940 Standard Edge T in #970 Single Flange Vinyl Track by Mercer Products or equivalent, color as selected by Architect.

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 concrete floors are dry to a maximum moisture content of 7 percent, and exhibit no alkalinity, carbonization, or dusting.

C. Confirm that second floor subfloor and underlayment fastening meets resilient flooring manufacturer's requirements and that fastener heads are set below underlayment surface.

D. Beginning of installation means acceptance of existing substrate and site conditions.

3.02 PREPARATION

A. Thoroughly de-grease all surfaces to receive resilient flooring products as recommended by manufacturer.

B. Remove ridges and bumps in substrate. Fill low spots, cracks, joints, holes, and other defects with subfloor filler.

C. Apply, trowel, and float filler to leave a smooth, flat, hard surface.

D. Prohibit traffic from area until filler is cured.

E. Vacuum clean substrate.

F. Apply primer as recommended by manufacturer.

3.03 RESILIENT FLOORING INSTALLATION

A. Install in accordance with manufacturers' instructions.

B. Spread only enough adhesive to permit installation of materials before initial set.

C. Set flooring in place, press with heavy roller to attain full adhesion.

D. Lay flooring with joints parallel to building lines to produce minimum number of joints.

E. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.

F. Scribe flooring to walls, columns, cabinets, and other items to produce tight joints.

G. Mix tile from containers to ensure shade variations are consistent.

H. Install tile to square grid layout with all joints aligned.

I. Resilient tile in Multi-Use, Day Care, and Laundry buildings shall be installed with a two color border pattern according to Drawings to be provided by the Architect during construction.

J. Form sheet resilient flooring into a wall coving over flooring manufacturer’s recommended cove backing and cap with termination molding.

3.04 BASE INSTALLATION

A. Fit joints tight and vertical. Maintain minimum measurement of 18 inches between joints.

B. Miter internal corners. At external corners, use premolded units or shave rear of base at corner to prevent gapping. At exposed ends use premolded units.

C. Install base on solid backing. Bond tight to wall and floor surfaces.

D. Scribe and fit to door frames and other interruptions.

3.05 PROTECTION

A. Prohibit traffic on floor finish for 48 hours after installation.

3.06 CLEANING

A. Remove excess adhesive from floor, base, tread, and wall surfaces without damage.

B. Clean, seal, and wax floor and base surfaces in accordance with manufacturer's instructions.

END OF SECTION

SECTION 09 68 00
CARPET

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Preparation of substrate to receive carpeting.

B. Carpeting and carpet accessories.

1.02 RELATED WORK

A. Section 03 30 00 - Cast-in-Place Concrete

C. Section 06 10 00 - Rough Carpentry

D. Section 09 65 00 - Resilient Flooring

1.03 REFERENCES

A. FS DDD-C-0095 - Carpet and Rugs, Wool, Nylon, Acrylic, Modacrylic, Polyester, Polypropylene.

B. NBS - Byproducts of combustion.

C. UM44c – GSA/FHA/HUD Use of Materials Bulletin for characteristics, installation of carpet.

1.04 SUBMITTALS

A. Submit product data under provisions of Section 01300.

B. Submit samples under provisions of Section 01300; provide two (2) samples of specified carpet in all specified colors and weaves.

C. Submit two (2) copies of flame spread certificate for all carpet and related materials to Owner's representative under provisions of Section 01300.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Do not commence with carpet installation until painting and finishing work is complete and ceilings and overhead work, tested, approved, and completed.

B. Maintain room temperature at minimum 60 degrees F for at least 24 hours prior to installation, and relative humidity at approximately that at which the area is to be maintained.

C. Provide lighting adequate for good visibility during installation.

1.06 EXTRA STOCK

A. Deliver to the Owner extra carpet stock equal to 5% of the total installed carpet area.

PART 2 - PRODUCTS

2.01 CARPET

A. Acceptable Manufacturers
   1. Beaulieu.
   2. Lees.
   3. Mohawk.
   3. Alternate products may be used if approved on the basis of submittals made under provisions of Section 01 30 00.

B. Carpet Characteristics, CAR-1:
   1. Application: Unit interiors.
   2. Construction: Level Loop.
   3. Yarn Content: 100% solution dyed olefin.
   4. Guage: 1/10 inch.
   5. Stitches per Inch: 9.7.
   6. Tufted Pile Height: .156 inches.
   7. Tufted Yarn Weight: 20 oz. per square yard .
   8. Width: 12 feet.
   8. Primary Backing: Woven polypropylene.
   9. Secondary Backing: Woven polypropylene.
   10. Radiant Panel Flammability Rating: Class II.
   11. NBS Smoke Chamber Test: Maximum Specific Optical Density of 450 or less.
   12. Static Propensity: Less than 3.5 KV per AATCC-0134.
   13. Federal Certification: UM44c

C. Carpet Characteristics, CAR-2:
   1. Application: Common Building interiors.
   2. Construction: Level Loop.
   3. Yarn Content: 100% solution dyed olefin.
   4. Guage: 1/10 inch.
   5. Stitches per Inch: 9.7.
   6. Tufted Pile Height: .156 inches.
   7. Tufted Yarn Weight: 26 oz. per square yard .
   8. Width: 12 feet.
   9. Primary Backing: Woven polypropylene.
   10. Secondary Backing: Woven polypropylene.
   11. Radiant Panel Flammability Rating: Class II.
   12. NBS Smoke Chamber Test: Maximum Specific Optical Density of 450 or less.
   13. Static Propensity: Less than 3.5 KV per AATCC-0134.
   14. Federal Certification: UM44c

2.02 CARPET PAD

A. Carpet Pad Characteristics:
   1. Manufacturer: Accu-Lon or equivalent.
   2. Composition: Polyurethane foam.
   3. Density: 18 lbs. per cubic foot + or - 10%.
   4. Thickness: .100 inches minimum.
   5. Federal Certification: UM72-80

2.03 ADHESIVE

A. Carpet Adhesive: Where carpet is direct applied, use only adhesives specifically recommended by the manufacturer for the carpet and substrate and California compliant.

PART 3 - EXECUTION

3.01 PREPARATION

A. Clean floors of dust, dirt, solvents, oil, grease, paint, plaster, and other substances detrimental to proper performance of adhesive and carpet. Allow floors to thoroughly dry.

B. Ensure floors are level, with maximum surface variation of 1/4 inch in 10 feet.

C. Ensure concrete floors are free from scaling and irregularities and exhibit neutrality relative to acidity and alkalinity.

D. Beginning of installation means acceptance of substrate.

3.02 CARPET INSTALLATION

A. Check matching of carpet from different rolls before beginning layout.

B. Layout carpet so that any single space will not contain visibly different dye lots.

C. Install carpet per manufacturer's recommendations, keeping joints between rolls straight and snug.

D. Vacuum clean substrate just ahead of carpet being laid.

E. Lay carpet on floors with the run of the pile in same direction as anticipated traffic.

F. Do not change run of pile in any one room or from one room to next where continuous through a wall opening.

G. Cut and fit carpet neatly around projections through floor and to walls and other vertical surfaces. Maximum allowable separation of carpet edge from vertical surfaces is 1/16 inch.

3.03 CLEANUP

A. Remove excess adhesive from carpet, base, or wall surfaces with manufacturer's recommended remover.

B. Clean any spots or stains and vacuum all carpet surfaces. Remove scrap carpet and related debris from the job site except for scrap carpet pieces requested by the General Contractor.

END OF SECTION

SECTION 09 7700
PREFINISHED PANELS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Prefinished wall panels at locations shown on Drawings.

B. Prefinished panel accessories.

1.02 RELATED SECTIONS

A. Section 07 90 00 - Sealants

B. Section 09 25 00 - Gypsum Drywall

C. Section 09 65 00 - Resilient Flooring

1.03 REFERENCES

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

1.04 REGULATORY REQUIREMENTS

A. Products shall have a Class C or better fire rating in accordance with ASTM E84.

1.05 SUBMITTALS

A. Make product submittals under provisions of Section 01 30 00.

B. Provide product data on specified products, describing physical and performance characteristics, sizes, patterns and colors available.

C. Submit samples under provisions of Section 01 30 00.

1.06 OPERATION AND MAINTENANCE DATA

A. Submit cleaning and maintenance data under provisions of Section 01700.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Store materials for three days prior to installation in area of installation to achieve temperature stability.

B. Maintain ambient temperature required by adhesive manufacturer three days prior to, during, and 24 hours after installation of materials.

1.08 EXTRA STOCK

A. Provide an extra 5 percent of the total amount of paneling required by the work under provisions of Section 01 70 00.

PART 2 - PRODUCTS

2.01 MANUFACTURERS - WALL PANELS AND ACCESSORIES

A. Marlite

B. Nudo Products, Inc.

C. Alternate products may be used if approved on the basis of submittals made under provisions of Section 01 30 00.

2.02 WALL PANELS

A. Product: Standard FRP, pebble finish, by Marlite.

B. Construction: fiberglass reinforced plastic.

C. Color: as selected by Architect from standard range.

2.03 WALL PANEL ACCESSORIES

A. Moldings: vinyl panel joints, top moldings, bottom moldings, corner moldings, and other shapes as required, by Marlite.

B. Adhesives: waterproof, as recommended by panel manufacturer.

C. Sealant: silicone, as recommended by panel manufacturer.

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. Beginning of installation means acceptance of existing substrate and site conditions.

3.02 PREPARATION

A. Level gypsum drywall substrate with joint/topping compound to achieve a smooth, flat surface.

B. Vacuum clean substrate.

C. Apply primer if recommended by adhesive manufacturer.

3.03 PANEL INSTALLATION

A. Install in accordance with manufacturers' instructions.

B. Spread only enough adhesive to permit installation of materials before initial set.

C. Press panels firmly in place to attain full adhesion.

D. Install panels with joints parallel to building lines; lay out to minimize number of joints and small pieces.

E. Hold panels back from joints and corners as recommended by manufacturer, to allow for installation of sealants and moldings.

F. Apply a full bead of sealant to panel edges.

G. Install moldings straight and snug against panel surfaces; install panel base molding to accommodate panels and resilient flooring.

3.04 PROTECTION

A. Protect panels and moldings from damage by other trades with plastic or paper covers.

3.05 CLEANING

A. Remove excess adhesive from floor and wall surfaces without damage.

B. Clean panels and moldings in accordance with manufacturer's instructions.

END OF SECTION

SECTION 09 90 00
PAINTING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Surface preparation.

B. Exterior and interior surface finishes.

C. Surface finish schedule.

D. All labor and material necessary for a complete installation of the work of this section whether or not specifically described.

1.02 RELATED WORK

A. Section 04 20 00 - Concrete Unit Masonry.

C. Section 05 50 00 - Metal Fabrications.

D. Section 06 40 00 - Architectural Woodwork.

E. Section 08 10 00 - Metal Door Frames.

F. Section 08 20 00 - Wood and Fiberglass Doors.

G. Section 09 25 00 - Gypsum Drywall.

1.03 REFERENCES

A. ANSI/ASTM D16-11 - Definitions of Terms Relating to Paint, Varnish, Laquer, and Related Products.

1.04 DEFINITIONS

A. Conform to ANSI/ASTM D16 for interpretation of terms used in this Section.

1.05 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 documented experience, approved by product manufacturer.

1.06 SUBMITTALS

A. Submit product data under provisions of Section 01 30 00.

B. Provide product data on all finishing products, including full current color selector fans if requested by Architect.

C. Submit under provisions of Section 01 30 00 two samples brushouts 8 x10 inch in size illustrating range of colors and textures specified for each surface finishing product scheduled.

D. Submit manufacturer's application instructions under provisions of Section 01 30 00.

1.07 FIELD SAMPLES

A. Provide samples under provisions of Section 01 30 00.

B. Provide field sample panel, a minimum of 10 square feet of painted surface, illustrating coating color, texture, and finish, for each coating color when requested by the Architect or Owner's representative.

C. Locate where directed.

D. Accepted sample may remain as part of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site under provisions of Section 01 60 00.

B. Store and protect products under provisions of Section 01 60 00.

C. Deliver products to site in sealed and labelled containers; inspect to verify acceptance.

D. Container labelling 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.

E. Store paint materials at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in well ventilated area, unless required otherwise by manufacturer's instructions.

F. 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 (7 degrees C) for 24 hours before, during, and 48 hours after application of finishes, unless required otherwise by manufacturer's instructions.

B. Do not apply exterior coatings during rain or when relative humidity is above 50 percent, unless required otherwise by manufacturer's instructions.

C. Minimum Application Temperatures for Latex Paints: 45 degrees F (7 degrees C) for interiors; 50 degrees F (10 degrees C) for exterior; unless required otherwise by manufacturer's instructions.

D. Minimum Application Temperature for Varnish Finishes: 65 degrees F (18 degrees C) for interior or exterior, unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

1.10 EXTRA STOCK

A. Provide a one gallon container or 5% of total job amount of each color (whichever is more) to Owner.

B. Label each container with color, texture, and room locations, in addition to the manufacturer's label.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS - PAINT, STAIN, PRIMERS AND SEALERS

A. Sherwin Williams.

B. Dunn Edwards.

C. Alternate products may be used if approved on the basis of submittals made under the provisions of Section 01 30 00.

2.02 MATERIALS

A. Coatings: Ready mixed, except field catalysed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.

B. Stains: Ready mixed partially-penetrating sealer and coating capable of providing a homogenous application filling all voids and surface imperfections.

C. Coating Application Characteristics: Good flow and brushing properties; capable of drying or curing free of streaks or sags.

D. 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 FINISHES

A. Refer to Materials Schedules for surface finish locations; refer to Drawings for color locations.

PART 3 - EXECUTION

3.01 INSPECTION

A. Verify that substrate conditions 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 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.
   4. Exterior Located Wood: 19 percent.

D. Beginning of installation means acceptance of existing substrate.

3.02 PREPARATION

A. Remove electrical plates, hardware, light fixture trim, and fittings prior to preparing surfaces or finishing.

B. Correct minor defects and clean surfaces which affect work of this Section.

C. Shellac and seal marks which may bleed through surface finishes.

D. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

E. Aluminum Surfaces Scheduled for Field Paint Finish: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.

F. Asphalt, Creosote, or Bituminous Surfaces Scheduled for Paint Finish: Remove foreign particles to permit adhesion of finishing materials. Apply compatible sealer or primer.

G. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.

H. Concrete Floors: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.

I. Copper Surfaces Scheduled for a Paint Finish: Remove contamination by steam, high pressure water, or solvent washing. Apply vinyl etch primer immediately following cleaning.

J. Copper Surfaces Scheduled for a Natural Oxidized Finish: Remove contamination by applying oxidizing solution of copper acetate and ammonium chloride in acetic acid. Rub on repeatedly for required effect. Once attained, rinse surfaces with clear water and allow to dry.

K. Gypsum Board Surfaces: Latex fill minor defects. Spot prime defects after repair.

L. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.

M. Concrete and Unit Masonry Surfaces Scheduled to Receive Sealer or Paint Finish: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry. Fill cracks and voids with elastomeric patching material only where opaque painted finish will be applied.

N. Plaster Surfaces: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

O. Uncoated Steel and Iron Surfaces: Remove grease, scale, dirt, and rust. Where heavy coatings of scale are evident, remove by wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.

P. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.

Q. Interior Wood Items Scheduled to Receive Paint Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats.

R. Interior Millwork and Wood Casework Scheduled to Receive Transparent Finish: Remove handling marks or effects of exposure to moisture with a thorough final sanding over all surfaces of the exposed portions, using at least 150 grit or finer sandpaper, and thoroughly clean all surfaces before applying sealer and finish.

S. Exterior Wood Scheduled to Receive Paint Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied.

T. Wood and Metal Doors Scheduled for Painting: Seal top and bottom edges with primer.

3.03 PROTECTION

A. Protect elements surrounding the work of this Section from damage or disfiguration.

B. Repair damage to other surfaces caused by work of this Section.

C. Furnish drop cloths, shields, and protective methods to prevent spray or droppings from disfiguring other surfaces.

D. Remove empty paint containers from site.

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.

D. Apply each coat of paint slightly darker than preceeding coat unless otherwise approved.

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. Apply first coat of masonry sealer as a mist coat to break surface tension; apply second coat per manufacturer’s recommendations, assuring a completely saturated application. Take care to thoroughly seal all sides of horizontal and vertical grout joints.

3.05 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

A. Paint shop primed equipment. Paint shop prefinished items exposed to view in inhabited areas.

B. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

C. Prime and paint insulated and exposed-to-view pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports.

D. Replace identification markings on mechanical or electrical equipment when painted accidently.

E. Paint exposed conduit and electrical equipment occuring in finished areas.

F. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment with fire retardant coating as required by utility companies.

G. Replace electrical plates, hardware, light fixture trim, and fittings removed prior to finishing.

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 MATERIALS SCHEDULE - EXTERIOR SURFACES

A. Primed or Galvanized Metal:
   1. Two coats direct to metal acrylic semi-gloss trim paint.

B. Unfinished Wood:
   1. One coat stain-blocking, mildew resistant latex primer.
   2. Two coats satin acrylic latex paint.

C. Previously Finished Wood:
   1. One coat acrylic latex primer, pigmented.
   2. One coat satin acrylic latex paint.

D. Damaged Wood:
   1. Preparation, sealing per Section 06 40 00.
   2. Two coats satin acrylic latex paint.

E. Pre-primed Metal Exterior Door Frames:
   1. Two coats satin acrylic latex paint.

F. Exterior Exposed-to-View New Concrete Unit Masonry:
   1. Two coats flat water-based, silicone fortified masonry stain.

G. Exterior Plaster:
   1. One coat acrylic sealer/conditioner.
   2. Two coats satin acrylic latex paint.

3.08 MATERIALS SCHEDULE - INTERIOR SURFACES

A. Painted Interior Doors, Softwood Trim and Unfinished Casework Surfaces:
   1. One coat acrylic primer.
   2. Two coats semi-gloss acrylic paint.

B. Gypsum Board Walls and Ceilings:
   1. One coat high solids acrylic drywall primer.
   2. Two coats semi-gloss acrylic paint.

C. Miscellaneous Metals:
   1. One coat acrylic primer.
   2. Two coats semi-gloss acrylic paint.

END OF SECTION

SECTION 10 40 00
SIGNAGE

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Site and parking lot signage.

B. Dimensional letters and numbers.

C. Vinyl lettering applied to door or window glass.

D. Exterior and interior wall mounted signage.

D. All labor and materials necessary for a complete installation of the work of this section, whether or not specifically described.

1.02 RELATED WORK

A. Section 08 20 00 - Wood and Fiberglass Doors

B. Section 08 80 00 – Glass and Glazing

1.03 SUBMITTALS

A. Submit shop drawings, product data and materials list under provisions of Section 01300. Include manufacturer's installation instructions.

B. Indicate on shop drawings all dimensions, thicknesses and mounting details, as well as copies of composited artwork for all painted, screened, or fabricated images.

C. Accompanying product data and materials list submit one letter and one numeral of each size, and a sample of each type of sign and plaque. Following approval, samples may be installed in the Work.

1.04 DELIVERY, STORAGE AND PROTECTION

A. Protect products under provisions of Section 01600.

B. Protect signs and letters prior to and after installation. Repair damage at no additional cost to Owner.

PART 2 - PRODUCTS

2.01 PARKING LOT SIGNS (Fire Lane, Accessible Parking)

A. Manufacturer: Any

B. Characteristics:
1. Type: Painted metal; white-on-blue, blue-on-white, black-on-white image per Drawings.
2. Material: Galvanized sheet steel, minimum 18 gage.
3. Depth: 3/4 inch to 1-1/2 inch, based on manufacturer's standard for character size.
4. Mounting: Bolted to galvanized steel pipe (accessible parking space signs only).
5. Copy, Quantity: Refer to Drawings and San Luis Obispo City requirements.

2.02 DIMENSIONAL LETTERS AND NUMBERS (Project Identification, Unit Addresses)

A. Acceptable Manufacturer: Gemini Formed Plastic Letters

B. Alternate products may be used if approved on the basis of submittals made under provisions of Section 01 30 00.

C. Characteristics:
1. Type: Integrally colored, channel section plastic.
2. Material: Fade resistant unbreakable butyrate.
3. Finish/Color: As selected by Architect from standard range.
4. Typeface: Futura Medium or approved equivalent as selected by Architect from standard options.
5. Mounting: Mastic adhered, standard spacing.
6. Size/Count: As described on Drawings.
7. Copy: Per Signage Schedule, following.

2.03 DOOR PLAQUE SIGNS

A. Acceptable Manufacturer: Best Sign Systems (sales@bestsigns.com).

B. Alternate products may be used if approved on the basis of submittals made under provisions of Section 01 30 00.

C. Characteristics:
1. Product: Best HC200 ADA System
2. Construction: Multi-layer melamine.
3. Graphics: Graphic Blast etching, image raised 1/32”.
4. Typeface: Upper case, sans serif letters with a width-to-height ratio between 3:5 and 1:1 and a stroke width-to-height ratio between 1:5 and 1:10; Gill Sans Condensed, or approved equivalent, as selected by Architect.
5. Mounting: Vinyl adhesive tape on door or wall surface
6. Colors: White on standard background color selected by Architect.
7. Shape: square corners, 6” x 9” or 9“ x 9” unless otherwise noted.
8. Copy Size/Position: per approved shop drawings.
9. Braille: Grade 2 (contracted) Braille block per CBC.
10. Location/ Copy: Per Drawings and Sign Schedule.

2.04 VINYL LETTERING

A. Acceptable Manufacturer: any

B. Vinyl Lettering Characteristics:
1. Product: vinyl letters and symbols.
2. Typeface: Futura Medium or approved equivalent as selected by Architect from standard options.
3. Color: white.
4. Location/Size/Copy: per Sign Schedule and Drawings.
5. Mounting: Reverse mounted to inside glass surface.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are suitable and installed work of other trades is complete to the point where work of this section may properly proceed.

B. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION

A. Install all material in accordance with Sign Schedule in Drawings, signage locations and descriptions below, and approved shop drawings.

B. Install all exterior signage attachments in a manner resistant to tampering and vandalism.

C. Install all signage level, plumb and true to sign edges. Limit deviation from level to 1/8 inch over the length of complete image.

3.03 SIGNAGE LOCATIONS AND DESCRIPTIONS

A. Project Entry Sign, per 2.02 above.

Location: Madonna Road frontage, perpendicular to sidewalk, per Drawings.

Description: Dimensional letters, numbers, and "equal opportunity housing" symbol on plastered and painted concrete block monument.

B. Parking Lot Signs, per 2.01 above.

Location: Accessible parking spaces, right side of easterly entrance to site, per City standards.

Description: Painted metals sign per Drawings.

C. Address Letters and Numbers, per 2.02 above.

Location: Plaster wall surface at building corners, two per building.

Description: Dimensional plastic numbers, 6” tall.

D. Interior and Exterior Plaque Signs, per 2.03 above.

Location: Common building, unit entry breezeways, per Drawings.

Description: Plastic plaques with raised or flush letters and numbers, Braille where required by code, size and copy per Drawings.

E. Vinyl Lettering, per 2.04 above.

Location: Common building glazed doors.

Description: International Symbol of Accessibility, letters and numbers applied to inside surface of glass to face exterior per Drawings.

END OF SECTION

SECTION 10 44 00
FIRE EXTINGUISHERS AND CABINETS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Fire extinguishers.

B. Cabinets.

1.02 RELATED WORK

A. Section 06 10 00 - Rough Carpentry

B. Section 07 90 00 - Joint Sealants

C. Section 09 10 00 - Lath and Plaster

D. Section 09 90 00 - Painting

1.03 REFERENCES

A. NFPA 10 - Portable Fire Extinguishers.

1.04 SUBMITTALS

A. Submit product data under provisions of Section 01 30 00.

1.05 OPERATION AND MAINTENANCE DATA

A. Submit manufacturer's operation and maintenance data under provisions of Section 01 70 00.

B. Include test, refill or recharge schedules, procedures, and re-certification requirements.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Potter-Roemer

B. Alternate products may be used if approved on the basis of submittals made under provisions of Section 01 30 00.

2.02 EXTINGUISHERS

A. Model 3005; Type 2A10-B-C, hand held 5 pound.

2.03 INTERIOR CABINETS

A. Model 7320-BA-A, steel recessed cabinet, factory white paint, recoatable.

B. Glazing: Clear acryllic bubble.

C. Hardware: Full piano hinge, cam latch without lock, wall bracket.

2.04 EXTERIOR CABINETS

A. Model 9731-V, galvanized steel semi-recessed cabinet, factory white polyester finished for field painting (red).

B. Glazing: Clear breakable glass.

C. Hardware: Top cam lock, tamper resistant mounting screws.

PART 3 - EXECUTION

3.01 INSPECTION

A. Verify rough openings for cabinet are correctly sized and located.

B. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION

A. Install cabinet plumb and level in wall openings as shown on drawings.

B. Secure rigidly in place in accordance with manufacturer's instructions.

C. Calk all around exterior cabinets.

C. Install cabinet and extinguisher such that neither the top of the extinguisher nor the cabinet handle are more than 48 inches above the finished floor.

END OF SECTION

SECTION 10 55 00
POSTAL SPECIALTIES

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Provide and Install New Outdoor Parcel Lockers.

B. Refurbish and Re-install Existing Outdoor Mailboxes .

1.02 RELATED WORK

A. Section 05 50 00 - Metal Fabrications

B. Section 32 10 15 – Concrete Paving and Flatwork

1.03 REFERENCES

A. United States Postal Service – requirements for mail receptacles.

1.04 SUBMITTALS

A. Submit product data under provisions of Section 01 30 00.

B. Include all product options and mounting hardware.

1.05 OPERATION AND MAINTENANCE DATA

A. Submit manufacturer's operation and maintenance data under provisions of Section 01 70 00.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS - MAILBOXES

A. Salisbury.

B. American Locker Security Systems.

C. Alternate products may be used if approved on the basis of submittals made under provisions of Section 01300.

2.02 MAILBOXES

A. Provide 2 parcel lockers on a single pedestal, standard Salisbury CBU Model #3302GRY-U, USPS access.

B. Construction:
1. Pedestal: Aluminum, Salisbury Model #3385GRY.
2. Locker Body: Aluminum.
3. Box Components: Stainless steel.

PART 3 - EXECUTION

3.01 INSPECTION

A. Verify mail structure concrete slab is complete and ready to receive mailbox and mounting bolts conform to base template.

B. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION

A. Mount new parcel locker unit securely in accordance with manufacturer's instructions.

B. Relocate existing CBU mailbox and parcel locker units and mount to modified pedestal bases in compliance with CBC and ADA accessibility requirements.

C. Clean, adjust, and lubricate existing mailbox and parcel locker units to new function.

D. Secure all postal specialties in a plumb, level, and aligned condition.

E. Deliver cluster box keys as directed by the local Postmaster.

END OF SECTION

SECTION 10 80 00
BATHROOM ACCESSORIES

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Toilet and bath accessories.

1.02 RELATED WORK

A. Section 06 10 00 - Rough Carpentry

B. Section 09 25 00 - Gypsum Board

1.03 REFERENCES

A. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

1.04 SUBMITTALS

A. Submit manufacturer's product data under provisions of Section 01300.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Receive, store, and protect accessories under provisions of Section 01600.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS - BATHROOM ACCESSORIES

A. Residential Accessory Manufacturers

1. Amerock

2. Franklin Brass

B. Commercial Accessory Manufacturers

1. Bobrick

2. American Specialties Inc.

C. Alternate products may be used if approved on the basis of submittals made under provisions of Section 01 30 00.

2.02 RESIDENTIAL BATHROOM ACCESSORIES

A. Mirrored medicine cabinet: Nutone Styline 401ADJ.

B. Surface toilet paper dispenser: Amerock Arrondi BH26540SS.

C. Towel bar: Amerock Arrondi series.

D. Shower rod: by shower surround manufacturer.

2.03 COMMERCIAL BATHROOM ACCESSORIES

A. A-1: Surface mounted toilet paper dispenser: Bobrick B-7685.

B. A-2: Surface mounted toilet seat cover dispenser: Bobrick B-221.

C. A-3: 36" grab bar: Bobrick B-5806.

D. A-4: 54" grab bar: Bobrick B-5806.

E. A-5: Wall recessed combination paper towel dispenser and waste receptacle: Bobrick B-369.

F. A-6: Counter mounted soap dispenser: Bobrick B-822.

G. A-7: Wall mounted coat hook: Bobrick B-2116.

H. A-9: Wall mounted baby changing table: Koala Bear Care KB200-01 Gray.

I. A-10: 48"W x 32"H mirror: Bobrick B-165 Series.

2.04 FASTENERS

A. Provide anchors and fasteners as recommended by the manufacturer.

PART 3 - EXECUTION

3.01 PREPARATION

A. Deliver any inserts and rough-in frames to jobsite at appropriate time for building-in. Provide templates and rough-in measurements as required.

B. Confirm required backing is in place for all grab bars.

C. Before starting work notify Architect in writing of any conflicts detrimental to installation or operation of accessories.

3.02 INSTALLATION

A. Install accessories and trim in accordance with manufacturer's instructions.

B. Install true, plumb, and level, securely and rigidly anchored to substrate.

END OF SECTION

SECTION 11 31 00
APPLIANCES

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Appliances for residential units.

B. Appliances for common buildings.

1.02 RELATED WORK

A. Section 23 05 00 - Common Work Results for HVAC

B. Section 26 05 00 - Common Work Results for Electrical

1.03 REGULATORY REQUIREMENTS

A. Appliances must be listed by Underwriters Laboratories, Inc. (UL).

1.04 SUBMITTALS

A. Submit product data under provisions of Section 01 30 00.

B. Product data shall include all requirements for water, gas, or electrical connections.

1.05 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data under provisions of Section 01 70 00.

B. Include data on care of finished surfaces.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver store, and protect products under provisions of Section 01600.

1.07 WARRANTY

A. Provide manufacturer's warranty under provisions of Section 01 70 00.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS - KITCHEN APPLIANCES

A. As listed for individual appliance

B. Alternate products may be used if approved on the basis of submittals made under provisions of Section 01300.

2.02 RESIDENTIAL KITCHEN APPLIANCES

A. Refrigerator: General Electric Model GTN18CBDWW, 18.1 cubic foot, no frost top-mount, white finish, CEE Tier 1 energy efficiency.

B. Range: General Electric Model JGB250DETWW, 30" slide-in gas, self cleaning, white.

C. Range Hood: Broan Model 403001, 30” wide, 160 cfm 2 speed, with 75W lamp, white finish.

D. Garbage Disposer: GE Model GFC320V, 1/3 HP Continuous Feed Disposer, 120v, 60HZ, 4.0 Amp (Only Replace If existing disposer is not functioning properly)

2.03 COMMON BUILDING KITCHEN APPLIANCES

A. Refrigerator: Re-use existing.

B. Range: General Electric Model JGAS02SENSS, 24" slide-in gas, standard cleaning, stainless.

C. Range Hood: Broan Model 402404, 24” wide, 160 cfm 2 speed, with 75W lamp, stainless.

PART 3 - EXECUTION

3.01 INSPECTION

A. Verify power connections and supports are in required location and ready to accept appliance installation.

B. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION

A. Use anchoring devices appropriate for equipment and expected usage; install ranges with anti-tip anchors.

B. Install appliances, fittings, and accessories in accordance with manufacturers' instructions under provisions of Section 01 40 00.

C. Accommodate extension of switching for range exhaust hoods at accessible units to front of cabinet per Drawings; coordinate with electrical contractor as required.

3.03 ADJUSTING AND CLEANING

A. Adjust equipment and apparatus to ensure proper working order and conditions.

B. Remove masking or protective covering from stainless steel and other finished surfaces.

C. Wash and clean equipment.

D. Damage to appliance finishes may be remedied by replacement or repair, at the Owner's sole discretion.

END OF SECTION

SECTION 12 21 00
WINDOW COVERINGS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Vertical vinyl louver blinds at exterior windows.

1.02 SUBMITTALS

A. Submit product data under provisions of Section 01300.

B. Submit samples of window covering hardware and full range of vane and blade materials and colors under provisions of Section 01300.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Deliver window coverings to site wrapped and crated in a manner to prevent damage to components or marring of surfaces.

B. Store in a clean, dry area, laid flat and blocked off ground to prevent deformation or wrinkling.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS - ROLLER SHADES

A. Graber

B. Bali

C. Alternate products may be used if approved on the basis of submittals made under provisions of Section 01 30 00.

2.02 VERTICAL LOUVER BLINDS

A. Manufacturer/Model: Graber Vinyl Vertical Blinds

B. Mounting: G-85 Duraview headrail.

C. Controls: Standard cord and chain.

D. Stacking: Split stacking unless otherwise noted.

E. Louvers: White vinyl "crown" style.

F. Valance: Standard valance.

G. Locations/Sizes: Per window covering contractor's takeoff, per unit matrix by General Contractor's.

PART 3 - EXECUTION

3.01 PREPARATION

A. Take confirming measurements of "as-built" openings prior to ordering window coverings.

B. Ensure that window coverings may be mounted as indicated and will function properly.

C. Notify Architect or Owner's representative in writing of any discrepancies which would affect proper installation and operation of window coverings

D. Beginning of installation means acceptance of existing substrate conditions.

3.02 FABRICATION

A. Window coverings shall be fabricated of matching, prefinished components, sized according to manufacturer's recommendations to provide proper clearances for mounting and operation.

B. Install louvers for entire blind from single production lot.

3.03 INSTALLATION

A. Install blinds in accordance with manufacturer's instructions, providing all necessary adaptors and mounting hardware.

B. Secure in place with flush mechanical fasteners.

C. Adjust parts for smooth operation.

END OF SECTION

SECTION 22 00 00
GENERAL PLUMBING REQUIREMENTS

PART 1. - GENERAL

1.01 DESCRIPTION

A. Related Documents:

1. The other Contract Documents complement the requirements of this Section.
2. Division 01 - General Requirements applies to the Work of this Section.
3. Where requirements of this Section exceed those in other Contract Documents, Contractor shall comply with the requirements of this Section.

B. Codes and Regulations:

1. In addition to complying with the specified requirements, comply with pertinent regulations of governmental agencies having jurisdiction.

C. Included: Work includes, but is not limited to the following:

1. Plumbing
2. Carpentry and metal Work required for Work of this Section and not specifically shown under another Section. Openings in concrete or masonry construction shall be either core drilled or saw cut unless indicated otherwise on Drawings.
3. Excavation and Backfill
4. Coordination Drawings
5. Demolition:

a) The Demolition Plans were prepared for the convenience of the Contractor. The Engineer does not represent that all items, which may require demolition, have been shown. It shall be the responsibility of the Contractor to carefully examine the site and the Contract Documents and to perform all demolition and reconstruction, which may be required for the proper execution, and completion of work.

1.02 DEFINITIONS

A. Furnish: Purchase and deliver to job site in new condition.

B. Install: Receive and store at job site until required; place secure and connect; furnish required appurtenances.

C. Provide: Furnish and install as defined above.

D. Section: Refers to a Section of these Specifications.

E. Standards: The issue in effect as of the date of the contract documents.

1.03 PROJECT RECORD DRAWINGS

A. Comply with pertinent provisions of Architectural Sections (Division 01).

1.04 SERVICE INTERRUPTIONS

A. When Work of this Section requires temporary shutdown of existing systems for connections, the shutdown shall be made only during pre-arranged time agreeable to the Owner.

1.05 CORRELATION, INTERPRETATION AND INTENT OF CONTRACT DOCUMENTS

A. The Mechanical Drawings are, in general, made to scale and the Contractor may obtain approximate distances and dimensions by scaling the Plans. It is distinctly understood,

however, that it is done entirely at the Contractor's responsibility. Refer to Architect's Plans and Specifications for construction details, which will affect the Work and equipment. Examine the Architectural, Civil, Structural, Mechanical, Electrical, Landscape, Irrigation, Data, Fire Protection and Plumbing Plans and Specifications to ensure that this work does not conflict with the above trades. Plumbing, Mechanical and Electrical Plans are diagrammatic and, therefore, do not necessarily represent the exact installation. However, pipe sizing for utility services and ductwork are calculated per their respective codes and Standard Engineering Practice and shall be installed as sized from point of origin to terminal point. It shall remain the Contractor's responsibility to submit Shop Drawings if he/she has any questions about the final arrangement. Nothing on these Plans or Specifications shall be construed to permit work not conforming to all applicable codes and regulations.

PART 2. - EXECUTION

2.01 DEMOLITION

A. Remove all plumbing fixtures and fittings, water piping, gas piping, equipment, and supports as indicated on plans. Dispose of as directed by Owner.

B. Any piping to be reused to complete the project shall be capped immediately after removal of the demolished piping.

C. All existing piping "to remain" shall be firmly secured with temporary supports approved by the Architect until final supports or installation is complete.

D. Any waste piping including vents and drains, to be reused to complete the project shall be capped immediately after removal of the demolished piping. Cap or cover any open drains “to remain” prior to demolition work.

E. All existing water and waste pipe "to remain” shall be flushed out prior to connection to any new work.

F. All mechanical or plumbing equipment or fixtures to be reused shall be stored and protected in a clean area. The items shall be thoroughly cleaned before reinstallation.

G. Any existing piping in a demolished area, and not shown on the plans, shall be rerouted and reconnected to piping outside of the demolished area.

2.02 GENERAL EQUIPMENT INSTALLATION REQUIREMENTS

A. Install equipment to provide neat appearance, required manufacturer’s access, and required space to allow replacement or maintenance. Provide bases, supports, anchor bolts, and other items required to install equipment. Installation shall be level and braced per CBC.

B. Equipment shall operate quietly and without objectionable vibration. Excessive vibration, other than from specified equipment operating at optimum conditions, shall be the Contractor's responsibility and shall be eliminated as directed by Architect.

2.03 COORDINATION OF WORK

A. Coordinate Work of this Section with Work of other Sections to avoid conflicts. If required, provide shop drawings and submit to Architect for approval.

B. Insure that Work of other Sections is suitable to accommodate Work of this Section.

2.04 ADEQUACY OF FURRING

A. Conceal piping in spaces provided unless specifically shown otherwise. If spaces are inadequate, notify Architect prior to ordering materials and fabrication of components.

2.05 PROTECTION AND CLEANING

A. Protect equipment from dirt, moisture, and mechanical damage during construction. Restore or replace damaged equipment to original condition.

B. Keep interior of piping free of foreign material during construction. Flush piping systems with test medium specified under Piping Tests before installing equipment and appurtenances or making final connections.

2.06 CLOSING-IN OF UNINSPECTED WORK

A. Do not conceal or cover Work before tests and observations are completed. Uncover Work prematurely closed in and repair resulting damage to all Work, if requested by Architect, Engineer, or Project Inspector.

2.07 DAMAGE

A. Repair or replace items damaged by leaks or overflow from Work provided under this Section and for any damage to any part of the project site, for a period of 1 year after notice of completion date. This is in addition to and not a limitation of other rights the Owner may have against the contractor under the Contract Documents.

2.08 SYSTEM TESTING

A. Furnish all test pumps, gauges, and equipment. Test all safety controls and devices.

B. For air tests, install a calibrated test pressure gauge in the piping system to observe any loss in pressure. Calibrate the test pressure gauge with a dead weight tester within 15 days before use and certify by initial and date on a sticker applied to the dial face. Maintain the required test pressure for the time indicated. Brush joints with a soapy water solution to check for leaks if the required pressure cannot be maintained.

C. After any test, repair all leaks found as directed and re-test as necessary until the system is proven tight.

D. Before applying test pressure to any piping systems the Contractor shall be responsible for isolating all equipment e.g. control valves, regulators, relief devices, tanks and any other line accessories, which would otherwise be damaged by the test pressure.

1. Soil, Waste, Vent, Roof, and Condensate Drainage:

a) Entire System: Tightly close all openings except the highest one. Fill to overflowing with water.

b) Sections of System: Tightly close all openings except the highest opening of the section under test. Fill section with water to test each section with a minimum 10-foot head of water except for the uppermost 10 feet of the system.

c) Allow to stand for (4) hours or longer, as required to complete the inspection.

2. Domestic Water: Fill with water and test at 150 psig. Retain for (4) hours.

3. Gas Piping: Air test to pressure equal to one and one-half times the design pressure, but in no case less than 50 psig. Retain for four hours.

E. The equipment and installations shall be operated by the Contractor and he shall demonstrate that all Systems are performing according to the requirements of the Plans and Specifications and to the satisfaction of the Architect, Engineer and Owner.

2.09 CUTTING AND PATCHING

A. The Contractor shall do all cutting and patching which may be required for the installation of the Work under this Division of the Specifications. Patching shall be of the same quality, materials and finish as, and shall match accurately, all surrounding construction. No cutting of the Structure shall be permitted without the approval of the Architect.

B. Wherever concrete or paved surfaces are cut to provide for the installation under this Section, the Contractor shall restore the surfaces to their original condition. Subgrade materials, concrete, and paving materials, along with the placement of same, shall be in accordance with the respective Sections of this Specification as they apply to the installation of such material.

2.10 EXCAVATION AND BACKFILL: (BURIED PIPES WITHIN THE BUILDING WALLS AND TO 5 FEET FROM THE BUILDING.)

A. Dig trenches straight and true to line and grade; bottom shall be left smoothed of rock points. Pipe shall be supported for the entire length on undisturbed, original earth. The minimum trench width shall be 16" and all pipe shall be 2 feet below the finished grade, minimum, wherever conditions permit. Sewer pipes to be below grade a s necessary to meet the slope and invert on the Drawing. Whenever substantial variations of pipe bury is indicated by field conditions, the proposed changes in depth of bury shall be submitted, in writing, to the Architect for approval.

B. All piping shall be laid on a bed of clean dry sand not less than 6" thick. The space between the pipe and the sides of the trench shall be backfilled with clean dry sand to a point 6" above the crown of the pipe. Both sides of the pipe shall be filled at the same time.

C. The remainder of the trench shall be backfilled with native soil in lifts no greater than 12" and shall be mechanically compacted by tamping so to maintain a minimum relative dry density of 95%, determined by California Impact Test Method No. 216.

D. All backfilling shall be brought flush with finished subgrade.

E. Excess material shall be removed from the site. Trenches shall be backfilled immediately after approval.

2.11 INSTALLATION OF PIPING AND EQUIPMENT

A. The installation of piping and equipment shall be made in such a manner to clear beams and obstructions. Do not cut into or reduce the size of plates or any load carrying members without approval of the Architect. Check Drawings and Work of others to prevent interference. Deviations of the Work determined by the Architect shall be installed by the Contractor without additional cost.

B. Install piping promptly, cap or plug open ends of pipe. No piping shall be permanently covered by construction before inspection and approval. Piping shall be installed in accordance with best practice and recommendations of the manufacturer.

C. Conceal piping unless indicated otherwise. Inspect each piece of pipe, tubing, fittings, and equipment for defects and obstructions. Remove defective material from site. Install piping generally level, free of traps and unnecessary bends to conform with building requirements, and provide space for other work. Piping to be free of unusual noises. Avoid any possible galvanic action by isolating dissimilar metals with suitable Dielectric Insulating Fittings.

D. Unless called for otherwise, hereinafter in this Specification or by specific detail on the Drawings, all water pipes in contact with structure and/or hangers shall be suitably isolated. In the case of uninsulated pipe, "Trisolators" or equal shall be used.

E. Protect enameled or polished equipment from damage, tool marks, etc.

2.12 STERILIZATION OF PIPES

A. After preliminary purging of the Systems, the entire domestic potable water system pertaining to Work under this Contract shall be chlorinated in accordance with American Water Works Association, State of California Health and Safety Code procedure for disinfecting water mains. A thorough flushing operation shall be run upon completion of sterilization. Contractor shall then arrange with local health authority for test on mains and water systems and provide three (3) copies of test results to the Architect.

2.13 OPERATION AND INSTRUCTION

A. The Contractor shall furnish competent Technicians to supervise start-up operations of equipment specified by the Architect or Engineer and to instruct Owner's operators. The Contractor shall furnish six complete sets of operating instructions and service manuals to the Architect.

B. Instruction period shall be started after instruction books and service manuals have been submitted to and approved by the Architect and shall be at hours (regular and non-regular) arranged by the Architect.

C. Service manuals shall include oiling, cleaning, and servicing data, compiled in clearly and easily understood form and in a durable binder. Data shall show all serial numbers of every piece of equipment and complete list of replacement parts.

2.14 WARRANTY

A. The contractor shall warranty all of the systems for proper operation installed by the contractor for not less than one calendar year from date of project completion. This completion date shall be set by the Architect or Owner.

END OF SECTION

SECTION 22 10 00
PLUMBING

PART 1. - GENERAL

1.01 DESCRIPTION

A. Related Documents:

1. The other Contract Documents complement the requirements of this Section and apply to this Section
2. Division 1 - General Requirements and Section 20 00 00 apply to the Work of this Section.
3. Where requirements of this Section exceed those in other Contract Documents, Contractor shall comply with the requirements of this Section.

B. Codes and Regulations:

1. California Plumbing Code (CPC).
2. California Mechanical Code (CMC).
3. California Building Code (CBC).
4. National Fire Code (NFC).
5. National Fire Protection Association (NFPA).
6. Local Building Department.
7. Local Fire Marshal.
8. Office of the State Fire Marshall.
9. California Energy Commission.
10. In the event of conflict between or among specified requirements and pertinent regulations, the more stringent requirements will govern when so directed by the Architect.

C. Scope of Work: (Plumbing Section 22 00 00)

1. Material and labor including rough-in for and connection to fixtures, appliances and equipment are:
   a) WASTE AND VENT
      1) Soil piping
      2) Drain waste and vent piping (DWV)
      3) Floor drains.
      4) Traps.
      5) Vent flashings.
   b) SEWERS (To five feet beyond building)
      1) Including metallic or non-metallic piping used to convey sewage and other waste to, and including, connection with offsite utility or onsite treatment and disposal system.
   c) WATER
      1) Potable water piping systems.
      2) Isolation, Zone and Control Valves.
      3) Piping for water service.

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4) Backflow preventers.

5) Disinfecting of water systems.

6) Insulation of piping and equipment for heat, sound, and vibration.

d) ALL PLUMBING FIXTURES AND SUPPORTS

1) Including, but not limited to:

(a) Lavatories, water closets, urinals, service sinks, etc., - all materials

(b) Supports (backing) for all plumbing fixtures and accessories

e) FUEL GAS PIPING

1) Natural and manufactured gas distribution and connections to all gas fired equipment.

f) CONNECTIONS

1) Utilities-Sanitary sewer, storm drain, water, gas

2) The joining of pipe by any mode or method including, but not limited to, acetylene and arc welding, brazing, lead burning, plastics welding, soldering, wiped joints, caulked joints expanded or rolled joints, etc., used in connection with any of the work listed herein.

g) LAYOUT AND CUTTING

1) Holes, chases, channels, the setting and erection of bolts, inserts, stands, brackets, stanchions, supports, sleeves, escutcheon plates, thimbles, hangers, conduits, and boxes.

h) EXCAVATION, TRENCHING AND BACKFILL

1) In connection with plumbing and piping work shown herein

i) TEMPORARY PIPING in connection with:

1) Building and construction work

2) Excavating and underground construction

3) Demolition work

j) PIPE HANGERS, SUPPORTS, ANCHORS, GUIDES, EXPANSION JOINTS

1) Including:

(a) Supports for equipment to which pipe is connected, such as tank supports

(b) Isolators-dielectric and vibration

(c) Anchors and thrust blocks of concrete, metal, etc.

(d) Seismic bracing

(1) TOLCO or approved equal.

k) SIGNS AND NOTICES

l) TESTS

1) Piping, for tightness

2) Equipment for performance

3) Operating instructions

4) Final operation

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1.02 ACCESSIBLE PLUMBING FIXTURES

A. Accessible plumbing fixtures shall comply with all of the requirements of CBC Section 1115B. Heights and location of all fixtures shall be according to CBC Table 1115B-1. Fixture controls shall comply with CBC Section 1118B.

1.03 QUALITY ASSURANCE

A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.

B. Without additional cost to the Owner, provide such other labor and materials as are required to complete the Work of this Section in accordance with the requirements of governmental agencies having jurisdiction, regardless of whether such materials and associated labor are called for elsewhere in these Contract Documents.

1.04 SUBMITTALS

A. Comply with pertinent provisions of Architectural Sections.

B. Product Data: Within 35 calendar days after the Contractor has received the Notice to Proceed, submit 6 copies of the following to the Architect for approval prior to acquisition:

1. Materials list of items proposed to be provided under this Section.

2. Manufacturer's specifications, catalog cuts, and other data needed to prove compliance with the specified requirements. All pieces of equipment shall be clearly identified on corresponding manufacturer's literature being submitted.

3. Shop Drawings or other data as required to indicate method of installing and attaching equipment, except where such details are fully shown on the Drawings.

4. All submittals for the entire project shall be submitted at the same time. Submittals shall be provided in a tabulated three ring binder. Incomplete or noncompliant submittals may be rejected.

1.05 DESIGN CHANGES CAUSED BY PRODUCT SUBSTITUTIONS

A. Contractor shall pay costs of design and installation for changes resulting from substitution of alternate products.

B. Acceptance of alternate products by Architect does not change this requirement.

1.06 PRODUCT HANDLING

A. Comply with pertinent provisions of Architectural Sections.

PART 2. PRODUCTS

2.01 WASTE, VENT AND SEWER

A. Above and Below Grade

1. PVC plastic sewer pipe with solvent-cemented drainage pattern fittings complying with ASTM D-2665 - Latest Issue.

2. ABS Sch. 40 plastic drain, waste and vent pipe with solvent-cemented fittings complying with ASTM D-2661 - Latest Issue.

2.02 DOMESTIC WATER PIPING

A. Below Grade (Water Service)

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1. 2" NPS and smaller, Type K Soft Annealed Temper Copper Tube ASTM B88 with Wrought Copper pressure fittings, ANSI B16.22. SIL-FOS - High temperature Brazing Metal Filler.

B. Above Grade (Distribution System)

1. Piping

a) For soldered, brazed and mechanical joints, 4" and smaller Copper Water Tube Type L Annealed Temper (Hard Drawn) ASTM B75 or ASTM B88.

2. Fittings

a) Wrought Copper Pressure Solder Fittings, ASME B16.22 or ASME B16-25, 95-5 Tin-Antimony Filler Metal.

b) Press Fitting: Copper press fittings shall conform to the material and sizing requirements of ASME B16.18 or ASME B16.22. O-rings for copper press fittings shall be EPDM. Press fittings shall have an inboard bead design.

1) Copper Press Fittings: Viega/Rigid Tool Company, NIBCO, or approved equal.

c) All underground water piping within the building boundaries shall be ASTM B88-93a Type "L" annealed (soft) copper tube made up without fittings below the floor level.

2.03 GAS PIPING

A. Below Ground

1. Schedule 40, Seamless, Black Steel Pipe, 2 1/2" and under ASTM A-120 with Malleable-Iron Threaded fittings ANSI-B16.3, Class 150. Pipe and fittings shall be coated and wrapped per IAPMO IS 13-91 or provide factory applied plastic coated pipe.

B. Above Ground

1. Schedule 40, Seamless Black Steel Pipe ASTM A 120 2- 1/2" and smaller with Malleable Iron Threaded fittings ANSI B16.3 Class 150

2.04 VALVES

A. Acceptable Manufacturers: Milwaukee, Apollo, NIBCO, others as noted.

Type:	Size Range:	Part Number:
Ball	2” and smaller (2pc)	Milwaukee UPBA400 NSF APOLLO 77CLF140 NIBCO 685-66-LF
Check	2” and smaller	Milwaukee 509T APOLLO 163T-LF NIBCO 413-Y-LF
Check-Vertical	2” and smaller	Milwaukee 548B APOLLO 61-LF NIBCO 480-Y-LF

B. All valves in copper piping shall be soldered in or have screwed threads. Threaded valves shall be installed with sweat to screwed adapters.

2.05 HANGERS AND SUPPORTS

A. In general, all pipe hangers and supports shall conform to the following except where special pipe hangers and supports are detailed on the Drawings. In all cases hanger and support details on the Drawings shall take precedent over the following:

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Piping 6" Size and smaller:

Items	Superstrut Number	TOLCO Figure
Pipe Hanger	710	1; 2; 200
Side Beam Clamp for Wood Joist	540	58
Beam Coupling for Steel Beams	U563-U562	65
Rod Coupling for Connection to "Hilti"	H-119	70
Inserts in Concrete Decks		107;109A;109AF
Trapeze Hangers	A1200-A1202	Tolstruct A12
Pipe Clamp	A716 or 701W/S-716	Tolco Cush Clamp

B. Similar items by Unistrut, Securstrut, Michigan, or B-Line will be acceptable.

C. Hanger Rods shall conform to the following table:

Tube/Pipe Size	Rod Diameter
½" to 4"	⅜"

D. Trapeze hangers may be used where parallel runs of pipe occur. All rods on trapeze hangers shall be 1/2" minimum size.

E. Hanger Support Spacing shall be as follows unless shown otherwise on the Drawings:

1. Horizontal:
   a) Cast Iron: Every other joint unless over 4 feet, then at every joint.
   b) Copper: Every 6 feet for 1-1/2 inch and smaller, and 10 feet for 2 inch and larger.
   c) Steel, Gas: Every 6 feet for 1/2 inch, 8 feet for 3/4 inch and 1 inch, and 10 feet for 1-1/4 inch and larger.
2. Vertical:
   a) Cast Iron: Base and every floor not to exceed 15 feet.
   b) Copper: Every floor not to exceed 10 feet.
   c) Steel, Gas: Same as horizontal spacing except 1-1/4" and larger at every floor.

F. Refer to the plumbing code for materials not listed above.

G. At all points where insulated pipe contacts a hanger or support, the point of contact shall be protected by a metal insulation pipe shield #B3153 as manufactured by B-Line. Equivalent pipe protectors as manufactured by Unistrut, or Securstrut will be considered provided the substitute item meets the same standard of quality and performance as the specified item.

2.06 WALL AND FLOOR PENETRATIONS

A. Fire walls and floors:

1. Wall and floor penetrations shall be protected with a U.L. approved fire rated system. The system shall be per the Drawing Details, or other manufacturer's installation instructions.
2. Fire stopping materials by Hilti, Metacaulk, or 3M are considered equal. The material shall be the same as called out for in the U.L. approved system.

B. Poured concrete floors.

1. Pipes penetrating poured concrete floors shall be protected by providing the following:
   a) A Schedule 40 PVC sleeve one (1) size larger than the pipe or one quarter (1/4) inch of foam material wrapped around and secured to the pipe or packed and caulked with mineral wool.
   b) Protection shall end flush with the wall or floor surface.

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C. All walls and floors:

1. Piping passing through walls and floors exposed to view shall be provided with chrome plated split-ring escutcheon plates in finished areas. Brass or galvanized escutcheon plates may be used elsewhere.

2.07 FLASHING

A. All flashing shall be 4 lb. sheet lead and all vents penetrating the roof shall be flashed and counter-flashed. Stoneman Co. roof flashing assembly with 10" skirt or equal may be used.

B. The flashing for vents penetrating a metal roof shall have a corrosion resistant aluminum base compatible with the roofing system. A rubber type flashing by "Tech Specialties" shall be installed between the flashing and pipe.

2.08 CLEANOUTS

A. Provide cleanouts per Drawings and details on Drawings. Cleanouts as manufactured by Jay R. Smith, Mifab, Josam or Zurn are approved equals.

B. Cleanout tops to be installed with tamper-proof screws.

2.09 FLOOR DRAINS, FLOOR SINKS AND ROOF DRAINS

A. Provide drains as specified on the Plumbing Schedule. However, drains as manufactured by J.R. Smith, Mifab, Josam and Zurn will be acceptable provided they are equal.

B. Floor sinks by Commercial Enameling Company, Mifab and Zurn are acceptable.

2.10 WATER HAMMER ARRESTORS

A. Provide Wilkins Piston Model #1200, Sioux Chief #65X-X or equal, as sized on the Drawings or required by PDI. Install per manufacturer’s instructions.

2.11 AUTOMATIC TRAP PRIMERS

A. Provide Precision Plumbing Products, J.R. Smith, Mifab or Sloan as specified on the Drawings. Install per manufacturer's instructions.

2.12 PLUMBING FIXTURES

A. Fixture locations, quantities, types, sizes and connections shall be as shown on both the Plumbing and Architectural Drawings. If a conflict in fixture location is noted between the Plumbing and Architectural Drawings, the Architectural Drawings shall take precedence.

B. Fixtures shall be thoroughly protected against damage to the chrome plate or enamel, by chipping, scratching or other damage during the entire period of construction. Roof drains, floor sinks and drains, toilet and sink drains, plumbing vents, and all other similar fixtures shall be covered to prevent trash from entering the pipes until final installation of grates, domes, fixtures or other protective devices.

C. Provide fixtures as specified in the Plumbing Schedule. American Standard, Kohler, or Just are acceptable substitutes as equal if approved by Engineer.

D. Fixture carrier numbers listed are as specified on the Plumbing Schedule; however, carriers as manufactured by J.R. Smith, Mifab or Zurn are acceptable provided they are equal.

2.13 CONNECTORS

A. Provide Brass Craft "Speedway" or equal heavy pattern iron pipe size brass stops, rigid or flexible supplies and chrome plated brass "P" traps. Stops in "Public" areas to have screwdriver slots and those in "Private" areas to have all cross handles.

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B. Provide Brass Craft or equal flexible stainless steel braided water supplies to appliances. They may also be used to fixtures as an option to rigid supplies. Aquaflo is an acceptable substitute.

C. Provide Brass Craft flexible or equal, stainless steel gas appliance connectors. Dormont is an acceptable substitute.

2.14 ACCESS BOXES

A. See section 22 00 00 for access panels.

2.15 PRESSURE REGULATORS AND BACKFLOW PREVENTORS

A. Provide the pressure regulator(s) and backflow preventor(s) as specified on the drawings and/or as required by the governmental authority having jurisdiction.

B. Pressure regulators and/or backflow preventors by Febco, Hersey, Watts or Wilkins are considered equal when their pressure fall-off/loss is equal to or less than the specified regulators/preventor's loss for the given flow rate.

C. Provide all potable water outlets with hose attachments with non-removable hose bibb backflow preventors per the C.P.C.

2.16 WATER HEATERS

A. Provide water heaters as specified in Plumbing Schedule or approved equal of size, capacity, recovery, BTUH input. American, A.O. Smith and State are considered equal. Heater shall be A.G.A. or U.L. listed.

1. Heater storage tank shall be provided with magnesium anodes, approved standard pressure/temperature relief valve and all standard factory trim.

2. Gas heaters shall be provided with an A.G.A. approved 100% safety shut-off.

3. Provide approved flexible copper supplies for the water heater water connections.

B. Provide a Smitty Co., Benjamin Co. with 1” drain outlet or equal, water heater pan as specified in the Water Heater Schedule.

2.17 PRESSURE-TEMPERATURE RELIEF VALVE

A. Pressure-temperature relief valve shall be Wilkins TP220, or TP3000 Series or equal.

2.18 EXPANSION TANK

A. Expansion tank shall be Wilkins WXTP series as specified on the Drawings or approved equal in size and capacity. Amtrol and Watts expansion tanks are considered equal.

2.19 WATER HEATER SEISMIC RESTRAINTS

A. Seismic restraints shall be Holdrite “Quick Strap” restraint system Model QS-50 or equal.

2.20 PROTECTIVE INSULATION (ADA FIXTURES)

A. Provide approved manufactured, molded antimicrobial vinyl protective pipe and fitting covering for exposed waste and drain assembly and for hot and cold water supplies and stops. Protective system shall consist of pre-formed pipe or tubing sleeve and pre-formed fitting patterns for trap and stops. Assembly shall have integral snap fasteners.

B. Provide protective covering for off-set drain assembly and disposer at kitchen sinks.

C. Foam pipe wrap, duct tape, baggy-type covers, tie-strap fasteners are not acceptable.

D. Acceptable manufacturers:

1. Truebro “Lav-Guard”

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2. Plumberex “Pro-Xtreme”

2.21 INSULATION

A. All pipe insulation shall conform to Section 123 of the California Energy Efficiency Standards except to the extent that this Specification supersedes the minimum standards as established by the Code, in which case this Specification shall take precedent. Outside insulation shall be protected with a hard plastic or metal shell covering.

B. Domestic cold water piping shall be insulated with a minimum 1" insulation in unheated areas of the building and where exposed outside of the building.

C. Domestic hot water piping shall be insulated with Owens-Corning Fiberglass heavy density pipe insulation 25 ASJ/SSL-II (All Service Jacket/Double/ Self-Sealing Lap). Insulation shall be UL rated non-combustible pipe insulation with a k factor of 0.24-0.28 @ 100 degrees F. mean temperature, an embossed vapor barrier laminated and pressure sealing lap adhesive. All lap and butt strips shall have integral pressure-sensitive strips and shall be applied in strict accordance with manufacturer's instructions.

1. Closed cell polyethylene foam by IMCOA or equal may be used at Contractor's option provided it meets the above requirements.

D. Insulation thickness’ shown below are based on insulation having a conductivity range of 0.24 to 0.28 per BTU/inch per hour per square foot per °F temperature of 100 degrees F.

1. Temperature Range: Above 105°F

Pipe Size	Minimum Insulation Thickness
Runouts* up to 2”	0.5”
1” and less	1.0”
1.25” to 2”	1.0”
2.5” to 4”	1.5”
5” and larger	1.5”

*Runouts are defined as being less than 2” in diameter, less than 12 feet long, and connected to fixtures or individual terminal units.

E. Insulation materials not meeting the specified conductivity range shall be submitted for approval and determination of the insulation thickness required.

PART 3. EXECUTION

3.01 GENERAL CONDITIONS

A. Examine the areas and conditions under which Work of this Section will be performed. Conditions detrimental to timely and proper completion of the Work shall be brought to the attention of the Architect before the installation of materials. Do not proceed until unsatisfactory conditions are corrected. Incorrectly installed materials requiring changes will be at Contractor's expense.

B. All plumbing fixtures, appliances, and appurtenances furnished with manufacturer's installation instructions shall be installed per those instructions.

3.02 PLUMBING SYSTEM LAYOUT

A. Lay out the plumbing system in careful coordination with the Drawings. Determine proper elevations for all components of the system and use only the minimum number of bends to produce a satisfactorily functioning system.

B. Follow the general layout shown on the Drawings in all cases except where other Work may interfere.

C. Lay out pipes to fall within partitions, walls, or roof cavities, and to not require furring other than as shown on the Drawings.

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3.03 PIPING INSTALLATION

A. Pipe sizes as shown on drawings are Nominal Pipe Size (NPS) or Iron Pipe Size (IPS). Drawings and fixture schedule indicate pipe sizing per the CPC and Standard Engineering Practice. Pipe sizes shall be maintained to fixtures, appliances and equipment. Approved reducing fittings shall be installed at all points of connections.

B. Install piping generally square with building, free of traps or air pockets, and true to line and grade. Keep all piping tight to the building structure, unless pipe slope is required. Do not install piping in any locations where, in the Architect's opinion, it will interfere with the use of the building or create a safety hazard. Where space is inadequate, notify the Architect in time to avoid unnecessary Work. Install all exposed piping as high as possible without interfering with other trades.

C. Make changes in direction with manufactured fittings; use long radius elbows. Street elbows, bushings, close nipples and bending of pipe or tubing will not be allowed.

D. Provide "P" traps at sanitary sewer drainage devices without integral traps.

E. All natural gas piping under structures or concrete slabs will be installed in a protective vent sleeve. Sleeves under a building will be vented to outside the building per detail on Plans. Sleeves under concrete slabs will extend a minimum of 1 foot beyond the slab. All sleeves will be sloped 1/8" per foot up toward the vented end. The vent end of sleeves under slabs will terminate under a landscaped or asphalted area.

F. Gas piping shall be tapped off the top or side of pipe and ends of mains shall be provided with dirt legs.

G. Underground plastic pipe will horizontally transition to metal pipe 5 feet before the above ground riser. Install plastic pipe with a minimum of 36" of cover when located under areas of possible vehicle traffic. Approved metallic pipe must be used if the minimum depth is not met. A tracer wire, terminating at each end at an exposed location, will be installed with all underground plastic pipe. Gas piping will also have a continuous tape marked "Gas" laid 6" above it.

1. Piping may terminate a maximum of one foot above ground when encased in a listed metallic transition riser.

H. Use friction wrenches when installing brass, polished, or soft metal piping, and when installing piping exposed in finished areas. Replace piping showing wrench marks.

I. Attach escutcheon plates to pipes with set screws or spring clamps with concealed hinges. Continue insulation through escutcheon plates.

J. General:

1. Proceed as rapidly as the building construction will permit.

2. Thoroughly clean items before installation. Cap pipe openings to exclude dirt until fixtures are installed and final connections have been made.

3. Cut pipe accurately, and work into place without springing or forcing, properly clearing windows, doors, and other openings. Excessive cutting or other weakening of the building will not be permitted.

4. Show no tool marks or threads on exposed plated, polished, or enameled connections from fixtures. Tape all finished surfaces to prevent damage during construction.

5. Provide sufficient swing joints, ball joints, expansion loops, and devices necessary for a flexible piping system, whether or not shown on the Drawings.

6. Support piping independently at pumps, coils, tanks, and similar locations, so that weight of pipe will not be supported by the equipment. Support the equipment independently from the pipe.

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7. Pipe the drains from mechanical equipment, drip pans, relief valves, air vents and similar locations, to an open sight drain, floor drain, or other acceptable discharge point, and terminate with an air break or air gap per C.P.C.

8. Securely bolt all equipment, isolators, hangers, and similar items in place.

3.04 PIPE SUPPORT INSTALLATION

A. Support pipes from structure with assemblies specified. Provide auxiliary members, anchors, guides, and sway braces necessary to maintain pipe alignment and prevent excessive movement or strain on piping system or components; allow for expansion and contraction of piping. Provide at least one hanger for each branch. Do not use powder driven fasteners, wire, perforated tape, nails, wood blocking, or other makeshift devices to support pipe.

B. Attach supports to structure with bolts, screws or concrete anchors, per support manufacturer’s requirements.

3.05 JOINTS AND CONNECTIONS

A. Cut pipe shall be reamed to full inside diameter of pipe. Cut threads straight and true. Insure all filings have been removed from inside of the pipe. Apply liquid Teflon to male pipe threads and not inside fittings. Use graphite on cleanout plug threads.

B. Joints in copper tube shall be made with 95-5 tin-antimony or lead-free solder, applied in strict accordance with the manufacturer's directions.

C. Dissimilar metals shall be isolated with dielectric couplings, "EPCO" or approved equal. Provide access panels at all hidden couplings.

D. Pipe Protection: Provide protection against abrasion where copper tubing is in contact with other building members by wrapping with an approved tape, pipe insulation or otherwise suitable method of isolation..

E. Penetration Protection: Provide allowance for thermal expansion and contraction of copper tubing passing through a wall, floor, ceiling or partition by wrapping with an approved tape or pipe insulation, or by installing through an appropriately sized sleeve. Penetrations of fire resistance rated assemblies shall maintain the rating of the assembly

3.06 SANITARY SEWER, VENT AND INDIRECT WASTE SYSTEM INSTALLATION

A. Install horizontal drainage piping at a minimum 2%, condensate 1%, slope unless otherwise noted. Where this is impractical notify the Architect before installing the pipes.

B. Install vent piping to drain back into the sewer system.

C. Provide cleanouts where shown on Drawings and where required by governmental agencies having jurisdiction.

1. All cleanouts to grade shall be firmly secured by means of a concrete block 20" square by 5" thick, and shall be flush with finished grade, unless otherwise noted on the plans.

D. Provide automatic trap primers as specified at floor sinks and drains as indicated on Drawings or where required by governmental agencies having jurisdiction. Provide access panels for all hidden mechanical trap primers.

3.07 FLUE VENT PIPE INSTALLATION

A. All flues or vents shall terminate above the roof with flashing and a listed vent cap installed in accordance with its listing and the manufacturer's instructions. Vent cap shall be of the same manufacturer as the flue pipe. Flues or vents shall terminate per the latest Edition of the C.P.C..

3.08 VALVE INSTALLATION

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A. Provide valves in the water, air, and gas systems. Locate and arrange so as to give a complete regulation of apparatus, equipment, and fixtures.

B. Provide valves in at least the following locations:

1. In branches and/or headers of water piping serving a group of fixtures.
2. On both sides of apparatus and equipment.
3. For shutoff of risers and branch mains.
4. For flushing and sterilizing the system.
5. Where shown on the Drawings.

C. Locate valves for easy accessibility and maintenance. Provide access panels for all hidden valves.

D. Unions shall be installed downstream of all screwed valves.

E. All gas pressure regulating valves shall be vented to the atmosphere.

3.09 WATER HAMMER ARRESTOR INSTALLATION

A. Provide water hammer arrestor on hot and cold water lines.

1. Install at all quick closing valves, solenoids, and supply headers at plumbing fixture groups.
2. Locate and size as shown on Drawings, and where not shown, locate in accordance with Plumbing and Drainage Institute Standard WH-201.
3. Install water hammer arrestor behind access panels.

3.10 BACKFLOW PREVENTION INSTALLATION

A. Protect plumbing fixtures, faucets, hose connections, and other equipment having plumbing connection, against possible back-siphonage.

B. Arrange for testing of backflow devices as required by the governmental agencies having jurisdiction.

3.11 PLUMBING FIXTURE INSTALLATION

A. Connect plumbing services to fixtures as shown on Drawings and as specified.

B. Install compression stops and flexible supplies per fixture manufacturer’s recommendation or as high as possible on wall directly below fixtures.

C. Install fixtures at right angles to, and tightly against, building surfaces, and in proper alignment. Fill gaps between fixtures and building surfaces with white grout. Mounting heights and locations shall be as shown on the Drawings, or, if not shown, as directed by the Architect.

3.12 INSULATION INSTALLATION

A. Clean and dry surfaces prior to application of insulation or adhesives.

B. Insulate piping, fittings, valves, and strainers. Leave unions exposed. Where insulation terminates, bevel ends of insulation and continue jacket over insulation and secure to pipe. Do not interrupt insulation at hangers, supports, clamps, or penetrations through structure. Fittings shall be finished with "Zeston" or approved equal fitting closures. If fitting closures not available, use 8 oz. canvas dipped in "Seal-Fas".

C. Attach longitudinal jacket laps and butt strips with factory applied pressure sensitive adhesive. On concealed piping only, outward clinching coated staples at two inch spacing may be used. Cover elbows with one piece polyvinyl chloride covers. Secure with tack fasteners. Tape

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ends of covers with matching tape on exposed piping. Seal off all cut ends with canvas and Benjamin Foster 30-36.

D. Install closed cell polyethylene foam per manufacturer's instructions.

3.13 TESTING AND ADJUSTING

A. Provide personnel and equipment, and arrange for and pay the costs of, all required tests and inspections required by governmental agencies having jurisdiction. See Section 22 00 00 for test requirements.

B. Where tests show materials or workmanship to be deficient, replace or repair as necessary, and repeat the tests until the specified standards are achieved.

C. Adjust the system to optimum standards of operation.

3.14 CLEANING (FOR POTABLE WATER SYSTEMS.)

A. Disinfection: The copper hot and cold water distribution system shall be disinfected prior to being placed in service. The system shall be disinfected in accordance with AWWA C651 or the following requirements:

1. The piping system shall be flushed with potable water until discolored water does not appear at any of the outlets.
2. The system shall be filled with a water chlorine solution containing at least 50 parts per million of chlorine. The system shall be valved off and allowed to stand for 24 hours. Or, the system shall be filled with a water chlorine solution containing at least 200 parts per million of chlorine. The system shall be valved off and allowed to stand for 3 hours.
3. Following the standing time, the system shall be flushed with water until the chlorine is purged from the system.

3.15 WARRANTY

A. The contractor shall warranty all of the systems for proper operation installed by the contractor for not less than one calendar year from date of project completion. This completion date shall be set by the Architect or owner.

END OF SECTION

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SECTION 23 00 00
GENERAL HVAC REQUIREMENTS

PART 1. - GENERAL

1.01 DESCRIPTION

A. Related Documents:

1. The other Contract Documents complement the requirements of this Section.
2. Division 1 - General Requirements applies to the Work of this Section.
3. Where requirements of this Section exceed those in other Contract Documents, Contractor shall comply with the requirements of this Section.

B. Codes and Regulations:

1. In addition to complying with the specified requirements, comply with pertinent regulations of governmental agencies having jurisdiction.

C. Included: Work includes, but is not limited to the following:

1. Heating, Ventilating, Air Conditioning and System Balancing
2. Carpentry and metal Work required for Work of this Section and not specifically shown under another Section. Openings in concrete or masonry construction shall be either core drilled or saw cut unless indicated otherwise on Drawings.
3. Coordination Drawings
4. Demolition:
   a) The Demolition Plans were prepared for the convenience of the Contractor. The Engineer does not represent that all items, which may require demolition, have been shown. It shall be the responsibility of the Contractor to carefully examine the site and the Contract Documents and to perform all demolition and reconstruction, which may be required for the proper execution, and completion of work.

1.02 DEFINITIONS

A. Furnish: Purchase and deliver to job site in new condition.

B. Install: Receive and store at job site until required; place secure and connect; furnish required appurtenances.

C. Provide: Furnish and install as defined above.

D. Section: Refers to a Section of these Specifications.

E. Standards: The issue in effect as of the date of the contract documents.

1.03 PROJECT RECORD DRAWINGS

A. Comply with pertinent provisions of Architectural Sections (Division 1).

1.04 SERVICE INTERRUPTIONS

A. When Work of this Section requires temporary shutdown of existing systems for connections, the shutdown shall be made only during pre-arranged time agreeable to the Owner.

1.05 CORRELATION, INTERPRETATION AND INTENT OF CONTRACT DOCUMENTS

A. The Mechanical Drawings are, in general, made to scale and the Contractor may obtain approximate distances and dimensions by scaling the Plans. It is distinctly understood, however, that it is done entirely at the Contractor's responsibility. Refer to Architect's Plans and Specifications for construction details, which will affect the Work and equipment. Examine

the Architectural, Civil, Structural, Mechanical, Electrical, Landscape, Irrigation, Data, Fire Protection and Plumbing Plans and Specifications to ensure that this work does not conflict with the above trades. Plumbing, Mechanical and Electrical Plans are diagrammatic and, therefore, do not necessarily represent the exact installation. However, pipe sizing for utility services and ductwork are calculated per their respective codes and Standard Engineering Practice and shall be installed as sized from point of origin to terminal point. It shall remain the Contractor's responsibility to submit Shop Drawings if he/she has any questions about the final arrangement. Nothing on these Plans or Specifications shall be construed to permit work not conforming to all applicable codes and regulations.

PART 2. - PRODUCTS

2.01 ACCESS PANELS

A. If not called for under other Sections, furnish Milcor, Elmdor, or Jay R. Smith access panels where shown on the Drawings or required for maintenance access to completed Work of this Section. Submit size, type, and location of proposed access panels not specifically shown, for review by Architect.

B. Access panels shall be constructed of 16 gauge prime coated steel or stainless steel with screwdriver operated cam latch, concealed hinges, and fire rating equal to adjacent construction.

C. Provide flush type doors with:

1. Stainless steel finish for tiled surfaces.

2. Prime coated finish for other surfaces.

2.02 FLASHING

A. Provide watertight flashing at all openings through exterior walls and roof. Refer to Architectural Drawings.

2.03 ELECTRIC MOTORS AND ELECTRICAL DEVICES

A. All Electric motor current characteristics are as shown in equipment schedules on drawings and as specified hereinafter in this Specification. The Contractor shall refer to the Electrical Plans and shall confirm all motor voltage, amperage and phase characteristics before processing submittals or ordering equipment. If any equipment is installed different from the supplied electrical power, it is the contractor’s responsibility to correct equipment to the required electrical characteristics.

B. All electrical devices of a type normally listed by Underwriters Laboratories, Inc. shall bear U.L. label of approval.

PART 3. - EXECUTION

3.01 DEMOLITION

A. Remove all heating, ventilation, and air conditioning equipment, fans, ductwork, supply, return and exhaust grilles, supports, controls including thermostats, control wire, conduits, control panels and any related equipment as indicated or noted on plans. Dispose of as directed by Owner.

B. Any ductwork to be reused to complete the project shall be capped immediately after removal of the demolished piping.

C. All existing ductwork "to remain" shall be firmly secured with temporary supports approved by the Architect until final supports or installation is complete.

D. All ductwork shall be blown out prior to the installation of new diffusers and grilles.

E. All mechanical equipment to be reused shall be stored and protected in a clean area. The items shall be thoroughly cleaned before reinstallation.

3.02 GENERAL EQUIPMENT INSTALLATION REQUIREMENTS

A. Install equipment to provide neat appearance, required manufacturer's access, and required space to allow replacement or maintenance. Provide bases, supports, anchor bolts, and other items required to install equipment. Installation shall be level and braced per CBC.

B. Equipment shall operate quietly and without objectionable vibration. Excessive vibration, other than from specified equipment operating at optimum conditions, shall be the Contractor's responsibility and shall be eliminated as directed by Architect.

3.03 COORDINATION OF WORK

A. Coordinate Work of this Section with Work of other Sections to avoid conflicts. If required, provide shop drawings and submit to Architect for approval.

B. Insure that Work of other Sections is suitable to accommodate Work of this Section.

3.04 ADEQUACY OF FURRING

A. Conceal piping and ductwork in spaces provided unless specifically shown otherwise. If spaces are inadequate, notify Architect prior to ordering materials and fabrication of components.

3.05 PROTECTION AND CLEANING

A. Protect equipment from dirt, moisture, and mechanical damage during construction. Restore or replace damaged equipment to original condition.

B. Keep interior of ductwork free of foreign material during construction.

3.06 CLOSING-IN OF UNINSPECTED WORK

A. Do not conceal or cover Work before tests and observations are completed. Uncover Work prematurely closed in and repair resulting damage to all Work, if requested by Architect, Engineer, or Project Inspector.

3.07 DAMAGE

A. Repair or replace items damaged by leaks or overflow from Work provided under this Section and for any damage to any part of the project site, for a period of 1 year after notice of completion date. This is in addition to and not a limitation of other rights the Owner may have against the contractor under the Contract Documents.

3.08 MECHANICAL SYSTEM TESTING

A. Furnish all test pumps, gauges, and equipment. Test all safety controls and devices.

B. For air tests, install a calibrated test pressure gauge in the piping system to observe any loss in pressure. Calibrate the test pressure gauge with a dead weight tester within 15 days before use and certify by initial and date on a sticker applied to the dial face. Maintain the required test pressure for the time indicated. Brush joints with a soapy water solution to check for leaks if the required pressure cannot be maintained.

C. After any test, repair all leaks found as directed and re-test as necessary until the system is proven tight.

D. After all Systems have been tested as outlined, all flow rates shall be balanced, and all control devices adjusted. See Section 231000.

E. The equipment and installations shall be operated by the Contractor and he shall demonstrate that all Systems are performing according to the requirements of the Plans and Specifications and to the satisfaction of the Architect, Engineer and Owner.

3.09 CUTTING AND PATCHING

A. The Contractor shall do all cutting and patching which may be required for the installation of the Work under this Division of the Specifications. Patching shall be of the same quality, materials and finish as, and shall match accurately, all surrounding construction. No cutting of the Structure shall be permitted without the approval of the Architect.

B. Wherever concrete or paved surfaces are cut to provide for the installation under this Section, the Contractor shall restore the surfaces to their original condition. Subgrade materials, concrete, and paving materials, along with the placement of same, shall be in accordance with the respective Sections of this Specification as they apply to the installation of such material.

3.10 INSTALLATION OF DUCTWORK AND EQUIPMENT

A. The installation of ductwork and equipment shall be made in such a manner to clear beams and obstructions. Do not cut into or reduce the size of plates or any load carrying members without approval of the Architect. Check Drawings and Work of others to prevent interference. Deviations of the Work determined by the Architect shall be installed by the Contractor without additional cost.

B. Install ductwork promptly, cap or plug open ends of pipe. Ductwork shall be installed in accordance with best practice and recommendations of the manufacturer.

C. Conceal ductwork unless indicated otherwise. Inspect each piece of ductwork and equipment for defects and obstructions. Remove defective material from site.

3.11 OPERATION AND INSTRUCTION

A. The Contractor shall furnish competent Technicians to supervise start-up operations of equipment specified by the Architect or Engineer and to instruct Owner's operators. The Contractor shall furnish six complete sets of operating instructions and service manuals to the Architect.

B. Instruction period shall be started after instruction books and service manuals have been submitted to and approved by the Architect and shall be at hours (regular and non-regular) arranged by the Architect.

C. Service manuals shall include oiling, cleaning, and servicing data, compiled in clearly and easily understood form and in a durable binder. Data shall show all serial numbers of every piece of equipment and complete list of replacement parts.

3.12 WARRANTY

A. The contractor shall warranty all of the systems for proper operation installed by the contractor for not less than one calendar year from date of project completion. This completion date shall be set by the Architect or Owner.

END OF SECTION

SECTION 23 10 00
HEATING, VENTILATION, AND AIR CONDITIONING EQUIPMENT AND ACCESSORIES

PART 1. - GENERAL

1.01 DESCRIPTION:

A. Related Documents:

1. The other Contract Documents complement the requirements of this Section and apply to this Section.
2. Division 1 - General Requirements and Section 230000 apply to the Work of this Section.
3. Where requirements of the Section exceed those in other Contract Documents, Contractor shall comply with the requirements of this Section.

B. Codes and Regulations:

1. In addition to complying with the specified requirements, comply with pertinent regulations of governmental agencies having jurisdiction.
2. In the event of conflict between or among specified requirements and pertinent regulations, the more stringent requirements will govern when so directed by the Architect.

C. Included: Work includes, but is not necessarily limited to, the following.

1. The Work covered by this Specification shall include furnishing labor, material, equipment and services to construct, install and place in operation, the complete Heating, Ventilating and Air Conditioning Systems to the extent as indicated, and as shown on the Drawings and specified herein. The Work covered under this Section shall hereinafter be referred to as the Mechanical System.
2. Gas Fired Wall Furnaces
3. Upflow Gas Furnace and air cooled condensing unit
4. Grills, registers, and diffusers
5. Duct, Pipe and Equipment Insulation
6. Space Temperature Controls
7. Refrigerant Piping

D. Work Not Included In This Section:

1. Blocking, framing and supports required for the purpose of accommodating the Mechanical System unless specifically called for under this Division. The contractor is responsible for the correct location of such items and shall bear the expenses covering their omission or improper location.
2. Electrical connections to motors, disconnect and over-current protective devices, unless specifically called for by this Section, or unless the equipment is furnished as an integral part of the Mechanical System Equipment, as hereinafter specified or noted on the Drawings.
3. Line voltage electrical wiring and conduit, except where specifically called for on the Drawings or hereinafter in this Section.
4. Painting, except when supplied as factory finish, or specifically called for in this Section or on Drawings.

1.02 QUALITY ASSURANCE

A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.

B. Without additional cost to the Owner, provide such other labor and materials as are required to complete the Work of this Section in accordance with the requirements of governmental agencies having jurisdiction, regardless of whether such materials and associated labor are called for elsewhere in these Contract Documents.

1.03 SUBMITTALS

A. Comply with pertinent provisions of Architectural Section.

B. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit 6 copies of the following to the Architect for approval prior to acquisition:

1. Materials list of items proposed to be provided under this Section including, but not limited to heating, ventilating and air conditioning equipment and mountings, air distribution equipment, ductwork and fittings, flexible ductwork, flue vent pipe, duct specialties, flexible connections, insulation, lining and adhesive, duct joint sealer, temperature controls, piping and accessories.

2. Manufacturer's specifications, catalog cuts, and other data needed to prove compliance with the specified requirements. All pieces of equipment shall be clearly identified on corresponding manufacturer's literature being submitted.

3. Shop Drawings or other data as required to indicate method of installing and attaching equipment, except where such details are fully shown on the Drawings.

4. Submittals for entire Project shall be submitted at the same time or may be rejected until all are included in one submittal package.

5. Submittals shall be bound together in a three-hole folder or a three ring binder.

1.04 DESIGN CHANGES CAUSED BY PRODUCT SUBSTITUTIONS

A. Contractor shall pay costs of design and installation for changes resulting from substitution of alternate products.

B. Acceptance of alternate products by Architect does not change this requirement.

1.05 PRODUCT HANDLING

A. Comply with pertinent provisions of Architectural Sections.

PART 2. - PRODUCTS

2.01 HEATING, VENTILATING AND AIR CONDITIONING EQUIPMENT

A. Heating, Ventilating, and Air Conditioning Equipment: Equipment shall be as specified on the Drawings. All other equipment shall be pre-approved by the Mechanical Engineer.

B. It shall be the responsibility of the Contractor to see that any substituted equipment performs similarly to that which is specified and fits in the same area as specified. Cost of any additional Work caused by the substitution of equipment shall be borne by the Contractor.

2.02 AIR DISTRIBUTION EQUIPMENT

A. Grilles, registers and ceiling diffusers and other accessory equipment shown on the Drawings and "Grille, Register and Diffuser Schedule" shall be manufactured by Anemostat unless shown otherwise.

B. Any substitutions of the above equipment which may be proposed by the Contractor shall be re-sized to suit his equipment by the proposed manufacturer and submitted in tabular form listing components proposed for each location in the System, identifying each as to location, design, air quantity passing through the devices, pressure drop, noise criteria data, velocities of air leaving the device and "K" flow factors for each item. Manufacturer's data sheets showing dimensions and recommended method of installation for each component must also be included.

2.03 ELECTRICAL EQUIPMENT

A. Motor starters shall be provided complete with properly sized thermal overload protection and other appurtenances necessary for motor control specified. Mount starter adjacent to equipment. See electrical drawing. Maintain minimum of 3' clearance to front of device.

B. Motor Starters: Shall be NEMA I or III as appropriate, general purpose, weather-resistant, with watertight enclosure where required.

2.04 INSULATION

A. General: Insulation and lining material shall meet requirements of flame spread not to exceed 25 and smoke developed not to exceed 50 as tested by Procedure ASTM-E-84, NFPA 255 or U.L. 723 and shall conform to NFPA 90A and 90B.

B. Heating and cooling duct and related heating and cooling equipment insulation shall conform to 2005 Building Energy Efficiency Standards, Administrative Regulations, Title 24, Part I, Section 124, except to the extent that this Specification supersedes the minimum standards as established by the Code, in which case this Specification shall take precedent.

C. Unless noted otherwise, insulation shall be Fiberglass, or approved equal material. Application Work shall be performed in accordance with the best accepted practice of the trade and the manufacturer's recommendations. The performance of insulation Work shall be by experienced insulation applicators. Insulation shall be installed after the specified tests have been applied to the piping and duct systems, and the systems have been inspected and approved. Fiberglass trade names and/or numbers have been used to establish a standard of quality.

D. External Duct Insulation – Outdoors, in a space between the roof and an insulated ceiling, in a space directly under a roof with fixed vents or openings to the outside or unconditioned spaces, in an unconditioned crawlspace; or other unconditional spaces: Shall be applied to concealed heating and cooling, supply and return duct except duct that is internally lined. Insulation on duct shall be Manville Microlite FSK duct insulation, 3" thick, minimum installed R value of 8.0 or greater, FSK aluminum foil reinforced with fiberglass, scrim laminated to U.L. rated Kraft, or approved equal. Adhere to duct surfaces with Foster's 85-62 or approved equal, adhesive applied in strips of 6" wide on approximately 12" centers. Circumferential seams shall be butted together and sealed over joints with 3" wide pressure sensitive foil vapor barrier tape. Longitudinal edges shall be lapped 2" and secured with outward clinching staple 6" on center then sealed with pressure sensitive foil vapor barrier tape. Duct wrap shall be installed to allow maximum fullness at corners (avoid excessive compression) minimum thickness at corners shall be 1". Where ducts are over 24" in width, the duct wrap shall be additionally secured to the bottom of the rectangular ducts with mechanical fasteners spaced on 18" centers (Max.) to prevent sagging insulation.

E. Ducts: Ducts shall be constructed, installed, sealed and insulated in accordance with the 2007 California State Mechanical Code. Insulation requirements are shown in Table 6-6-A of the CMC. The above paragraph(s) shall supersede if more stringent.

2.05 REFRIGERANT PIPING

A. Refrigerant piping shall be flushed clean with nitrogen and the ends capped prior to installation. Refrigerant piping shall be Type L copper with wrought copper fittings. Use 45% minimum silver brazing alloy with melting point higher than 1100 F. for making the joints.

B. Insulate refrigerant suction line with 3/4" thick Owens-Corning Fiberglass or Armstrong Armaflex foamed plastic flexible tubing insulation applied with No. 500 adhesive. Slip insulation over open end of pipe as Work progresses. Do not slit insulation. Use multiple layers and miter insulation to cover joints and all other items as required to prevent condensation. Finish with 2 coats of Armstrong Armaflex finish, white in color.

2.06 REFRIGERANT PIPING ACCESSORIES

A. Stop valves shall be Henry Type 622, 500 psi pressure rating brass, soldered, packless diaphragm, globe shut-off pattern.

B. Solenoid valves shall be Sporlan Type MA14, 450 psi rating, brass body.

C. Filter dryer shall be Sporlan "Catch-All" with soldered connections.

PART 3. - EXECUTION

3.01 SURFACE CONDITIONS

A. Examine the areas and conditions under which Work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 COORDINATION

A. Coordinate as required with other trades to assure proper and adequate provision in the Work of those trades for interface with the Work of this Section.

3.03 PREPARATION

A. Holes in concrete:

1. Provide sleeves, accurately dimensioned and shaped to permit passage of items of this Section.

2. Deliver such sleeves, with accurate setting drawings and setting information, to the trades providing the surfaces through which such items must penetrate, and in a timely manner to assure inclusion in the Work.

B. Flashing:

1. Where items of this Section penetrate the roof, outer walls, or waterproofing of any kind, provide under this Section base flashing and counterflashing required at such penetration.

2. Provide on each pipe passing through the roof a 4 pound seamless lead flashing and counterflashing assembly.

3.04 GENERAL INSTALLATION REQUIREMENTS

A. Conceal piping, ductwork, and equipment in spaces provided unless specifically shown otherwise. If spaces are inadequate, notify Architect in time to avoid unnecessary Work. Do not cut or notch structural members without specific approval of the Architect.

B. Follow manufacturer's instructions on items not specifically covered in drawings and specifications. Report discrepancies to Architect for clarification before starting Work.

3.05 EQUIPMENT INTERFACE

A. Provide required shut off valves, unions, and final connections of piping to the Work of this Section.

B. For electrically operated equipment, verify the electrical characteristics actually available for the Work of this Section and provide equipment meeting those characteristics.

3.06 PAINTING

A. Paint inside of air outlets and connecting plenums with one coat of black paint, or provide all such items factory prepainted.

B. For roof-mounted equipment, provide factory pre-finish on exposed surfaces.

C. Touch-up scratches and abrasions to be invisible to the unaided eye from a distance of 5 feet.

3.07 TEMPERATURE CONTROL INSTALLATION

A. Install wiring and tubing parallel to walls and floors and securely clipped to structure or mechanical system components. Group parallel runs for neat appearance.

B. Install room thermostats and other control devices at 48 inches above finished floor unless a lower mounting height is required for access by handicapped.

C. Install outside air sensor in a location where it is not directly effected by radiation from the sun or any heat generating device or by a conditioned air stream or any other location that would produce a false reading.

D. Upon completion of the installation calibrate all equipment and adjust controls for proper operation.

3.08 REFRIGERANT SYSTEM CHARGING PROCEDURE

A. Pressurize the system with refrigerant and hold for 24 hours with no drop in pressure; test joints and equipment for evidence of leaks after satisfactory pressure test.

B. Provide 1/2" angle type charging and purging valves adjacent to high and low side of the condensing unit to accomplish the procedure described hereinafter. Connect the vacuum pump to both the high and low side of the system. Do Work when ambient air temperature is above 60 degrees F during the evacuation process.

C. Operate the vacuum pump until the system is evacuated to 2.5 mm Hg absolute. Break the system vacuum with nitrogen or refrigerant.

D. After the system has been evacuated to 2.5 mm Hg absolute, close the vacuum pump suction valve and stop the pump.

E. Charge system to required capacity with specified refrigerant.

3.09 WARRANTY

A. The contractor shall warranty all of the systems for proper operation installed by the contractor for not less than one calendar year from date of project completion. This completion date shall be set by the Architect or owner.

3.10 MECHANICAL SYSTEM START-UP RESPONSIBILITY

A. Start up Mechanical Systems, and perform any such Work as may be required to adjust the systems to meet the requirements of the Contract Documents. Air distribution balancing shall be performed in accordance with Article "MECHANICAL SYSTEMS BALANCING".

B. Install new clean specified filters in equipment containing filters immediately prior to owner occupancy. Contractor to bear all costs for this work.

3.11 MECHANICAL SYSTEMS BALANCING

A. Testing and air balancing shall be performed by the installing contractor.

B. Conduct tests in presence of Architect/Engineer, if requested.

C. After Systems have been tested as outlined, air and water flow rates shall be balanced, and control devices adjusted. Balance and testing shall not begin until systems have been completed and are in full working order. Upon completion of the balancing operation and prior to final acceptance of the systems, the balancing firm shall submit a report, with six (6) copies, certifying to the proper performance of the system for approval by the Mechanical Engineer.

1. The following information shall be included in the Air Side Report:

a) Fan speeds.

b) Motor current readings and voltage readings.

c) Air quantities in CFM at supply, return, exhaust terminals, and outside air intakes, both at design value and actual measured value. Test and adjust each terminal to within +10% of design requirements.

d) Air velocities in FPM at supply, return, and exhaust terminals at design value and actual measured value.

e) Positive static pressure, negative and total pressures and total air quantities for each fan system.

f) Equipment nameplate data.

END OF SECTION

SECTION 23 31 13
METAL DUCTS

PART 1. - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Single-wall rectangular ducts and fittings.
2. Single-wall round ducts and fittings.
3. Sheet metal materials.
4. Sealants and gaskets.
5. Hangers and supports.

B. Related Sections:

1. Retain Sections in subparagraphs below that contain requirements Contractor might expect to find in this Section but are specified in other Sections.
2. Division 23 Section "General HVAC Requirements”.
3. Division 23 Section "Heating, Ventilation, and Air Conditioning Equipment and Accessories.
4. Division 23 Section "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.03 PERFORMANCE REQUIREMENTS

A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article. Retain first paragraph below if Contractor is required to assume responsibility for duct construction design.

B. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

1.04 SUBMITTALS

A. Product Data: For each type of the following products:

1. Sealants and gaskets.

PART 2. - PRODUCTS

2.01 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated and 2007 CMC, Chapter 6.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-

support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and 2007 CMC, Chapter 6.

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and 2007 CMC, Chapter 6.

D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and 2007 CMC, Chapter 6.

2.02 SINGLE-WALL ROUND DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a) Lindab Inc.

b) McGill AirFlow LLC.

c) SEMCO Incorporated.

d) Sheet Metal Connectors, Inc.

e) Spiral Manufacturing Co., Inc.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and 2007 CMC, Chapter 6.

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and 2007 CMC, Chapter 6.

D. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and 2007 CMC, Chapter 6.

2.03 SHEET METAL MATERIALS

A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

1. Galvanized Coating Designation: G60 (Z180) or G90 (Z275).

2. Finishes for Surfaces Exposed to View: Mill phosphatized.

2.04 SLELANT AND GASKETS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

B. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg (2500 Pa), positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

2.05 HANGERS AND SUPPORTS

A. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1 (Table 5-1M), "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct" and 2007 CMC, Chapter 6.

B. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

PART 3. - EXECUTION

3.01 DUCT INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.

B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

C. Install round ducts in maximum practical lengths.

D. Install ducts with fewest possible joints.

E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

H. Install ducts with a clearance of 1 inch (25 mm), plus allowance for insulation thickness.

I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.

J. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction," Appendix G, "Duct Cleanliness for New Construction Guidelines."

3.02 DUCT SEALING

A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and 2007 CMC, Chapter 6.

B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":

3.03 CONNECTIONS

A. Make connections to equipment with flexible connectors complying with Division 23 Section "Air Duct Accessories."

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections and 2007 CMC, Chapter 6.

3.04 PAINTING

A. Paint interior of metal ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized-steel primer. Paint materials and application requirements are specified in Division 09 painting Sections.

3.05 FIELD QUALITY CONTROL

A. Perform tests and inspections.

3.06 START UP

A. Air Balance: Comply with requirements in Division 23 Section "Testing, Adjusting, and Balancing for HVAC."

3.07 DUCT SCHEDULE

A. Fabricate ducts with galvanized sheet steel except as otherwise indicated and as follows:

B. Supply Ducts:

1. Ducts Connected to Air-Handling Units:

a) Pressure Class: Positive 2-inch wg (500 Pa).

b) Minimum SMACNA Seal Class: B.

c) SMACNA Leakage Class for Rectangular: 12

d) SMACNA Leakage Class for Round and Flat Oval: 12

C. Return Ducts:

1. Ducts Connected to Air-Handling Units:

a) Pressure Class: Positive or negative 2-inch wg (500 Pa).

b) Minimum SMACNA Seal Class: A.

c) SMACNA Leakage Class for Rectangular: 12.

d) SMACNA Leakage Class for Round and Flat Oval: 12.

D. Exhaust Ducts:

1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:
   a) Pressure Class: Negative 2-inch wg (500 Pa).
   b) Minimum SMACNA Seal Class: B if negative pressure.
   c) SMACNA Leakage Class for Rectangular: 12.
   d) SMACNA Leakage Class for Round and Flat Oval: 12.

E. Elbow Configuration:
1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
   a) Velocity 1000 fpm (5 m/s) or Lower:
      1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
      2) Mitered Type RE 4 without vanes.
2. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows" and 2007 CMC, Chapter 6.
   a) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
   b) Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
   c) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
3. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "Round Duct Elbows" and 2007 CMC, Chapter 6.
   a) Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
      1) Retain first three subparagraphs below, or delete and retain fourth subparagraph.
      2) Velocity 1000 fpm (5 m/s) or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
      3) Velocity 1000 to 1500 fpm (5 to 7.6 m/s): 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.
      4) Velocity 1500 fpm (7.6 m/s) or Higher: 1.5 radius-to-diameter ratio and five segments for 90-degree elbow.
      5) Radius-to Diameter Ratio: 1.5.
   b) Round Elbows, 12 Inches (305 mm) and Smaller in Diameter: Stamped or pleated.
   c) Round Elbows, 14 Inches (356 mm) and Larger in Diameter: Standing seam or Welded.

F. Branch Configuration:
1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-6, "Branch Connection."
   a) Rectangular Main to Rectangular Branch: 45-degree entry.
   b) Rectangular Main to Round Branch: Spin in.

2. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees." Saddle taps are permitted in existing duct.
   a) Velocity 1000 fpm (5 m/s) or Lower: 90-degree tap.
   b) Velocity 1000 to 1500 fpm (5 to 7.6 m/s): Conical tap.
   c) Velocity 1500 fpm (7.6 m/s) or Higher: 45-degree lateral.

END OF SECTION

SECTION 233300
AIR DUCT ACCESSORIES

PART 1. - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Manual volume dampers.
2. Turning vanes.
3. Flexible ducts.
4. Duct accessory hardware.

1.03 QUALITY ASSURANCE

A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems", and 2007 CMC, Chapter 6.

PART 2. - PRODUCTS

2.01 MATERIALS

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

1. Galvanized Coating Designation: G60 (Z180).
2. Exposed-Surface Finish: Mill phosphatized.

2.02 MANUAL VOLUME DAMPERS

A. Show dampers on Drawings. If both standard and low-leakage volume dampers are required, identify each damper type on Drawings.

B. Standard, Steel, Manual Volume Dampers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a) Air Balance Inc.; a division of Mestek, Inc.

b) Duro-Dync, Inc.

c) McGill AirFlow LLC.

d) METALAIRE, Inc.

e) Nailor Industries Inc.

f) Pottorff; a division of PCI Industries, Inc.

g) Ruskin Company.

2. Standard leakage rating.

3. Suitable for horizontal or vertical applications.

4. Frames:

a) Hat-shaped, galvanized-steel channels, 0.064-inch minimum thickness.

b) Mitered and welded corners.

c) Flanges for attaching to walls and flangeless frames for installing in ducts.

5. Blades:

a) Multiple or single blade.

b) Parallel- or opposed-blade design.

c) Stiffen damper blades for stability.

d) Galvanized-steel, 0.064 inch thick.

6. Blade Axles: Plated steel.

7. Bearings:

a) Molded synthetic.

b) Dampers in ducts with pressure classes of 3-inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.

8. Tie Bars and Brackets: Galvanized steel.

C. Damper Hardware:

1. Zinc-plated, die-cast core with dial and handle made of 3/32-inch thick zinc-plated steel, and a 3/4-inch (19-mm) hexagon locking nut.

2. Include center hole to suit damper operating-rod size.

3. Include elevated platform for insulated duct mounting.

2.03 FLANGE CONNECTORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Ductmate Industries, Inc.

B. Description: Add-on or roll-formed, factory-fabricated, slide-on transverse flange connectors, gaskets, and components.

C. Material: Galvanized steel.

D. Gage and Shape: Match connecting ductwork.

2.04 TURNING VANES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Ductmate Industries, Inc.
2. Duro Dyne Inc.
3. METALAIRE, Inc.

B. Manufactured Turning Vanes for Metal Ducts: Curved blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.

1. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.

C. Manufactured Turning Vanes for Nonmetal Ducts: Fabricate curved blades of resin-bonded fiberglass with acrylic polymer coating; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.

D. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 4-3, "Vanes and Vane Runners," and 4-4, "Vane Support in Elbows."

E. Vane Construction: [Single] [Double] wall.

F. Vane Construction: Single wall for ducts up to [48 inches] wide and double wall for larger dimensions.

2.05 FLEXIBLE DUCTS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Hart & Cooley, Inc.
2. J.P. Lamborn

B. Insulated, Flexible Duct: UL 181, Class 1, black polymer film supported by helically wound, spring-steel wire; fibrous-glass insulation; aluminized vapor-barrier film.

1. Pressure Rating: 2-inch wg positive and 0.5-inch wg negative.
2. Maximum Air Velocity: 4000 fpm.
3. Temperature Range: 0 to plus 175 deg F.
4. LEED Prerequisite EA 2 requires that duct insulation R-value comply with ASHRAE/IESNA 90.1-2004 tables titled "Minimum Duct Insulation R-Value, Cooling and Heating Only Supply Ducts and Return Ducts" and "Minimum Duct Insulation R-Value, Combined Heating and Cooling Supply Ducts and Return Ducts."
5. Insulation R-Value: R-2.2.

C. Flexible Duct Connectors:

1. Clamps: Nylon strap in sizes 3 through 18 inches, to suit duct size.

2.06 DUCT ACCESSORY HARDWARE

A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.

B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

PART 3. – EXECUTION

3.01 INSTALLATION

A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.

B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.

C. Install backdraft or control dampers at inlet of exhaust fans or exhaust ducts as close as possible to exhaust fan unless otherwise indicated.

D. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.

1. Install steel volume dampers in steel ducts.
2. Install aluminum volume dampers in aluminum ducts.

E. Set dampers to fully open position before testing, adjusting, and balancing.

F. Install test holes at fan inlets and outlets and elsewhere as indicated.

G. Install fire and smoke dampers according to UL listing.

H. Connect ducts to duct silencers rigidly.

I. Install access doors with swing against duct static pressure.

J. Install flexible connectors to connect ducts to equipment.

K. Connect flexible ducts to metal ducts with draw bands.

L. Install duct test holes where required for testing and balancing purposes.

3.02 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Operate dampers to verify full range of movement.
2. Inspect locations of access doors and verify that purpose of access door can be performed.
3. Operate fire, smoke, and combination fire and smoke dampers to verify full range of movement and verify that proper heat-response device is installed.
4. Inspect turning vanes for proper and secure installation.
5. Operate remote damper operators to verify full range of movement of operator and damper.

END OF SECTION

SECTION 26 05 00
COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section Includes:
   1. Materials and equipment shall be furnished and installed in support of electrical work described in these plans and specifications including but not limited to, raceways, boxes, enclosures, feeders, branch circuiting, supports, terminal cabinets, panels, lighting fixtures, controls, relays, contactors, in order to complete and make fully functional the systems described.
   2. Lighting systems, both interior and exterior as shown on the plans and as specified herein, including controls, occupancy sensors, lumen sensors, photocell controls, lamps, dimmers, racks, dimming ballasts, supports, fasteners, straps, and miscellaneous mounting hardware and support structures for such equipment.
   3. HVAC and plumbing electrical: Conduit, conductors and terminations for all line voltage power, line voltage controls and fusible and/or non-fusible safety disconnect switches for HVAC equipment, including but not limited to air conditioners, furnaces, fans, heat pumps, cooling towers, system pumps, condensing units. Provide protective equipment unless otherwise noted, etc. including protective devices.
   4. Power and Lighting Distribution: Furnish and install power and lighting distribution systems including but not limited to panels, feeders, branch circuits, devices, fixtures, disconnect switches, contactors, controls, etc. for a complete working system.
   5. Lighting acceptance testing, documentation and completion of required forms as specified in Section 26 56 70, LIGHTING ACCEPTANCE TESTING.
   6. Allocation of time to adequately train the Owner on the use and operation of all systems installed within the facility or on the property. Minimum two week advance notice shall be coordinated with the Owner and his representatives. Training shall be as outlined in individual system specifications identified to follow.

B. Related Sections Under Other Divisions:
   1. Mechanical Wiring: Control circuit wiring, energy management controls and interlocks for mechanical equipment shall be installed by Mechanical Contractor.
   2. Painting of electrical equipment where exposed and required by the Architect to be painted as described elsewhere in the specification.
   3. Irrigation System: Provide all line voltage (50 volts or above) connections to irrigation system equipment, time clocks and or powered satellite controls. Coordinate locations of this work with the Landscape Contractor.
   4. Pole Bases: Contractor shall be responsible to furnish light standard concrete pole bases, rebar, bolt templates and anchor bolt kits for a complete installation. Concrete, rebar, excavation shall be by Contractor in accordance with all parts of this specification.

5. HVAC Control Raceway: Raceways, boxes, and control wiring for thermostats, temperature sensors and control components specified within the mechanical specifications, shall be furnished and installed as required by Division 25 and installed in accordance with the minimum wiring methods allowed for branch circuit wiring in Division 26.

1.03 SYSTEM DESCRIPTION

A. The electrical plans indicate the general layout and arrangement; the architectural drawings and field conditions shall determine exact locations. Field verify all conditions and modify as required to satisfy design requirements as well as code minimums. Maintain all required working clearances as described in CEC Article 110 as well as other applicable articles.

B. Discrepancies shall be brought immediately to the attention of the Architect for clarification. The Architect shall approve any changes. Prior to rough-in, refer to architectural plans that shall take precedence over electrical plans with respect to locations.

C. Verify all power and communications utility company requirements prior to commencement of utility work. Make proper adjustments to the construction to satisfy the serving utility requirements if they differ from the construction documents. It shall be the Contractor's responsibility to contact each utility company for obtaining finalized utility design drawings and/or approval, and for scheduling inspection of utility infrastructure installations.

D. Charges imposed by the electric and communications utility companies shall be paid by Owner directly to utility companies.

1.04 SUBMITTALS AND SHOP DRAWINGS

A. Before construction, submit in accordance with the General Conditions of this Specification: A complete list of all materials proposed to be furnished and installed under this section.

B. Manufacturers' specifications, catalog cuts and shop drawings as required to demonstrate compliance with the specifications. Identify specific intended use for each component where submittal may be ambiguous. Submit entire bound submittal at one time; partial submittals will not be accepted. At a minimum, submittals will be required for the following:
1. Utility service/site work equipment including conduits, fittings, concrete pull, boxes, etc.
2. Distribution equipment including distribution and branch circuit panels, grounding, transient voltage surge suppressors, etc.
3. Electrical equipment including disconnects, fuses, raceways, straps and racks, fittings, conductors, boxes, gutters, devices, plates, etc.
4. Lighting equipment including fixtures, ballasts, lamps, mounting accessories, color charts (where required), etc.
5. Lighting control equipment including low voltage switching system, dimmer switchbank / accessories, occupancy sensing equipment, time clocks, contactors, photocells, lumen sensors, etc.
6. Constructability review letter/comments for lighting acceptance testing as required by Section 26 56 70, LIGHTING ACCEPTANCE TESTING.
7. Complete system component submittals and shop drawings for:
   a. Fire Alarm System
8. Conduit including all fittings, etc.

9. Wiring and cable, terminations, etc.
10. Fire rating penetration materials, details, etc.

C. The intent of these specifications is to establish a standard of quality for materials and equipment. Therefore, some items are identified by manufacturer or trade name designation. Substitutions shall be subject to the Architect's approval. Samples of the proposed and substitute materials may be required for inspection prior to approval. Costs, if any, for evaluation of substitutions shall be the Contractor's responsibility. The decision of the Architect shall be final. Where the substitution will affect other trades, coordinate all changes with those trades concerned and pay any additional costs incurred by them as a result of this substitution. Approval of substitutions shall not relieve the Contractor from providing an operational system in accordance with all applicable codes and ordinances.

1.05 DELIVERY, STORAGE AND HANDLING

A. Storage of equipment for the job is the responsibility of the Electrical Contractor and shall be scheduled for delivery to the site, as the equipment is required. Damage to the equipment delivered to the site or in transport to the job shall be the responsibility of the Electrical Contractor.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Materials shall be new and bear the label of or be listed by a nationally recognized testing laboratory. The quality and suitability of all materials shall conform to the standards and practices of this trade.

B. Supplied materials shall be of a current manufactured product line. Discontinued products are not acceptable. Where products are identified on the contract documents by part number, supply the current product model or series which meets the specification and intended use of the specified component.

2.02 SUPPORTING DEVICES

A. Hangers: Kindorf B-905-2A Channel, H-119-D washer, C105 strap, 3/8” rod with ceiling flange.

B. Concrete Inserts: Kindorf D-255, cast in concrete for support fasteners for loads up to 800 lbs.

C. Pipe Straps: Two-hole galvanized or malleable iron.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Professionalism and appearance of installations shall be in accordance with accepted practices of this trade. Installation methods shall conform to manufacturers' specifications and recommendations. The Contractor shall man the job with qualified journeymen and helpers in this trade for the duration of the job. It is the Contractor's responsibility to communicate with and keep the job superintendent appraised of changes or clarifications, etc.

B. Employment of any person on any job in the capacity of an electrician is not permitted unless such person has qualified for and holds a valid Journeyman Electrician Pocket Card or General Journeyman Electrician Certificate issued by the State of California Division of Apprenticeship Standards except, Contractor may employ electrical helpers or apprentices on any job of electrical construction, new or existing, when the work of such helpers or apprentices is performed under the direct and constant personal supervision of a journeyman electrician holding a valid Pocket Card accepted by the State of California Division of Apprenticeship Standards.
   1. Each Pocket Card carrying journeyman electrician will be permitted to be responsible for the quality of workmanship for a maximum of one helper or apprentice during any same time period, provided the nature of work is such that good supervision can be maintained and the quality of workmanship is the best, as expected by Owner and implied by the latest edition of the National Electrical Code.
   2. Before each journeyman electrician commences work, deliver to Owner at the project site, a photocopy of the journeyman’s valid Pocket Card.

C. Materials shall be installed in accordance with the manufacturers' specification and recommendations. They must conform to the approval AHJ adopted codes and standards, but not less than the 2010 CEC and all applicable codes and standards, including but not necessarily limited to California Code of Regulations Title 24, NFPA, National Electrical Manufacturers Association, ANSI, CBC, and any other adopted ordinances of applicable agencies having jurisdiction. Refer to general conditions of specifications.

D. Electrical Contractor shall lay work out in advance in order to avoid unnecessary cutting, chasing, and drilling of floors, walls, ceilings and other surfaces. Work of this nature shall be carefully done so as not to damage work already performed by other trades. Any damage which results must be properly repaired at no extra cost to the Owner. Such alterations shall not depreciate the integrity of the structure. Approval for cuts or penetrations in structural members shall be by the Architect.

E. Supporting Devices:
   1. Verify mounting height of all luminaires or items prior to installation when heights are not detailed.
   2. Install vertical support members for equipment and luminaires, straight and parallel to building walls. Provide independent supports to structural member for electrical luminaires, materials, or equipment installed in or on ceiling, walls or in void spaces or over furred or suspended ceilings.
   3. Do not use other trade’s fastening devices as supporting means for electrical equipment, materials or luminaires. Do not use supports or fastening devices to support other than one particular item.

4. Support conduits within 18” of outlets, boxes, panels, cabinets and deflections. Maximum distance between supports not to exceed 8’ spacing.
5. Securely suspend all junction boxes, pull boxes or other conduit terminating housings located above suspended ceiling from the floor above or roof structure to prevent sagging and swaying.
6. \

F. Coordinate work with other trades as required to eliminate any delays during construction. Coordinate changes with other prime contractors to avoid construction conflicts.

G. Engineer's Field Observation: When Electrical Engineering representative performs a field observation, the Electrical Contractor shall be present and available to remove equipment covers as needed.

H. Drawings of Record: Provide a full and accurate set of field record drawings marked up in a neat and understandable manner submitted to the Owner Representative, Construction Manager, or Architect upon completion of the work and prior to issuance of a certificate of completion. The drawings shall dimension all electrical facilities including but not limited to underground conduit, vaults, boxes as well as conduit routing scaled to within 12" of actual field conditions and shall be kept up to date on a daily basis reflecting changes or deviations. Electrical facilities shall be accurately drawn on the plan to scale. Refer to the general conditions of these specifications for additional requirements. Record drawings shall be required to identify both horizontal and vertical dimensions to visible and fixed points such as concrete, asphalt, buildings, sidewalks, etc.

I. Identification: Provide engraved laminated plastic nameplates for all switchboards, panelboards, fire alarm terminal cabinets, telephone and cable television backboards, main devices, control panels, time clocks, contactors and safety disconnect switches accurately identifying each device. Labels shall be attached to the equipment by means of screws or rivets. Self-adhering labels will not be acceptable. Refer to Section 26 05 53, IDENTIFICATION OF ELECTRICAL SYSTEMS.

J. Safety: The Electrical Contractor is responsible to maintain equipment in a safe and responsible manner. Keep dead front equipment in place while equipment is energized. Conduct construction operations in a safe manner for employees as well as other work persons or anyone visiting the job site. Provide barriers, trench plates, flags, tape, etc. The Contractor shall hold all parties harmless of negligent safety practices that may cause injury to others on or near the job site.

K. Guarantees: Equipment and labor shall be guaranteed and warranted free of defects, unless otherwise stated to be more restrictive, for a period of one year from the date of final acceptance by the Owner. A written warranty shall be presented to the Architect at the time of completion prior to final acceptance. Equipment deemed to be damaged, broken or failed should be repaired or replaced at no additional cost to the Owner. Materials or system requiring longer than a one-year warranty as described herein shall be separately warranted in separate letters of guarantee stating the duration of warranty.

L. Operating and Installation Manuals: Provide two copies each of manuals, operating and installation instructions for equipment indicated in submittal packages. Instruct the Owner's representative as to the operation and location of equipment necessary to allow them to operate the facility upon final acceptance. This instruction period shall be prearranged with the Owner's representative prior to occupancy of the facility and the weeks prior to training scheduled.

M. Lighting Acceptance Testing: Provide two copies of lighting acceptance testing results and equipment operating manuals as specified in Section 26 56 70, LIGHTING ACCEPTANCE TESTING. Instruct the Owner on operation of control systems as noted in Paragraph J above.

END OF SECTION

SECTION 26 05 01
SELECTIVE ELECTRICAL DEMOLITION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section Includes:
1. Electrical demolition.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. Materials and equipment for patching and extending work shall be as specified in individual sections.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Contractor to walk job to observe existing conditions and account for variance as needed.

B. Verify field measurements and circuiting arrangements as shown on drawings.

C. Verify that abandoned wiring and equipment serve only abandoned facilities.

D. Demolition Drawings are based on limited field observation and existing record documents. Report discrepancies to Owner/Architect before disturbing existing installation.

3.02 PREPARATION

A. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.

B. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, observe provisions of NFPA 70E and CALOSHA, use personnel experienced in such operations.

C. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Obtain permission from Owner at least 48 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area as required.

D. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Coordinate outages with Owner and local fire service. Notify Owner/Owner's representative at least 48 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.

E. Existing Telephone System: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Notify Owner at least 48 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.

3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

A. Demolish and extend existing electrical work under provisions of this section.

B. Remove, relocate, and extend existing installations to accommodate new construction.

C. Allow the owner first right to retain ownership of salvaged materials, otherwise the Electrical Contractor is responsible for its removal from the site and proper disposal or recycling.

D. Remove abandoned wiring to source of supply.

E. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.

F. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets which are not removed.

G. Disconnect and remove abandoned panelboards and distribution equipment.

H. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.

I. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.

J. Discarded electrical components and lamps containing hazardous waste (i.e., mercury in fluorescent lamps) shall be disposed of as required by the State Laws and Local Ordinances regarding hazardous materials.

K. Repair adjacent construction and finishes damaged during demolition and extension work.

L. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.

M. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified.

3.04 CLEANING AND REPAIR

A. Clean and repair existing materials and equipment which remain or are to be reused.

B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.

C. Luminaires: Cleaning light fixtures. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace ballasts and broken electrical parts as required for any inoperative fixtures. Provide new lamps for all fixtures that are to remain.

3.05 INSTALLATION

A. Install relocated materials and equipment as shown and/or as required.

END OF SECTION

SECTION 26 05 19
LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:
   1. Wires and cables.
   2. Connectors.
   3. Lugs and pads.
   4. MC cable.

1.03 SYSTEM DESCRIPTION

A. Provide wires, cables, connectors, lugs, strain reliefs, racking insulators for a complete and operational electrical system.

1.04 SUBMITTALS

A. Provide product data for the following equipment:
   1. Wires.
   2. Cables.
   3. Connectors.
   4. Lugs.
   5. Splice Kits.
   6. Strain Relief Fittings.
   7. Cable Racking and Insulators.

B. Provide the insulation cable testing report in the project closeout documentation, refer to Closeout Requirements in the General Conditions portion of this specification.

1.05 REGULATORY REQUIREMENTS

A. Conform to requirements of the CEC, latest adopted version with amendments by local Authority Having Jurisdiction (AHJ).

B. Furnish products listed by UL or other testing firm acceptable to AHJ.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Wires and Cables: General Cable, Okonite, Southwire, or approved equal.

B. Connectors: Burndy, Ilsco, Thomas & Betts, or approved equal.

C. Wire connectors shall be minimum 75 degree centigrade rated and properly sized for the number of conductors being connected, terminated, spliced etc. All above grade connectors shall be solderless lug or plastic wire nut type, screw on, pressure cable type (wire nut or spring nut type), 600 volt, 105 degree C, with skirt to cover all portions of stripped wires. Connector shall be U.L. rated for number and size of conductors being joined together as a splice.

D. Splices:
1. Branch Circuit Splices: Ideal, Scotch-Lock, 3M, or approved.
2. Feeder Splices: Compression barrel splice with two layers Scotch 23 and four layers of Scotch 33+ as vapor barrier.
3. Screw Terminal Lugs.
4. Kearney Split Bolt.

E. MC and HFC Cable: Alflex, AFC, or approved and shall meet all CEC Article 334 provisions.

2.02 WIRES AND CABLES FOR LINE VOLTAGE SYSTEM AND CONTROLS. WIRE AND CABLE SHALL BE:

A. Copper, 600 volt rated throughout. Conductors 14AWG to 10AWG, solid or stranded. Conductors 8AWG and larger, stranded.

B. Phase color to be consistent at all feeder terminations; A-B-C, top to bottom, left to right, front to back. Phasing tape shall be permitted on sizes #6 and larger.

C. Color Code Conductors as Follows:

2.03

PHASE	240 VOLT DELTA
A	Black
B.	Orange (High Leg)
Neutral	White
Ground	Green

A. All conductors shall be copper unless otherwise noted. Minimum size for individual conductors shall be #12 AWG unless otherwise noted. Sizes #8 AWG and larger shall be stranded conductor. Individual conductors shall be insulated with type, XHHW, THW, THHN/THWN 600-volt insulation unless otherwise noted. Control, signal, communication conductors shall be as dictated by the vendor of that equipment or as specified here-in. Proper insulation type shall be used for the proper environmental application (i.e., waterproof, wet location, plenum, temperature rated). If a condition exists where the application is uncertain, contact the Engineer for direction. Contractor is responsible to follow specific cabling requirements described in other

sections of this specification relative to various communications and controls systems as well as the respective riser diagrams shown on plans. If a discrepancy occurs, communicate such discrepancy to the Architect and Engineer immediately for resolution.

B. Insulation types THWN, THHN or XHHW. Minimum insulation rating of 90C for branch circuits.

C. MC Cable: High strength galvanized steel or aluminum flexible armor. Full length minimum size No. 12 copper ground wire, THHN 90C conductors, full length tape marker. Overall PVC or nylon cable tape. Short circuit throat insulators, mechanical compression termination. Manufacturers: Alflex, AFC

2.04 CONNECTORS

A. Copper Pads: Drilled and tapped for multiple conductor terminals.

B. Lugs: Indent/compression type for use with stranded branch circuit or control conductors.

C. Solid Conductor Branch Circuits: Spring connectors, wire nuts, for conductors 18 through 8AWG.

2.05 LUGS AND PADS

A. Ampacity: Cross-sectional area of pad for multiple conductor terminations to match ampere rating of panelboard bus or equipment line terminals.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Installation: Conductors shall not be installed until after conduit systems are permanently in place. Use an approved non hardening type wire pulling lubricant if lubricant is to be used. Maintain all conduits and wire pulls free from foreign material. If due to field conditions, more than a total of 300 degrees of bend are required; a pull box shall be furnished and installed for ease of installation. Said pull boxes must be sized and rated for the appropriate application and must remain easily accessible upon completion of the project (approval of the location shall be obtained from the Architect prior to installation). Show these pullboxes on the field record drawings. Conductors installed in underground raceways on site shall be duct sealed and taped where they exit the raceway to prevent the entrance of foreign material and moisture after the conductors are installed. Proper drainage shall be provided for underground pull and splice boxes.

B. Insulation: Use proper insulation types where temperature and environment are a factor.

C. Splices at or below grade level shall be made with wet location rated and approved mechanical connectors and shall be encapsulated in epoxy or plastic molded poured kits. The connections must be assured to be watertight. Splices at or below grade shall always be avoided and

minimized. Prior approval is required for feeder splices below grade. Submit proposed materials and exhibit showing location of intended splices for Engineer's review and approval if granted.

D. Labeling: All conductors in panels, switchboards, terminal cabinets, vaults, pull boxes, and junction boxes shall be labeled with tape number markers indicating circuit number and identifying system. All labeling shall be permanent. In manholes and vaults, provide embossed brass tags identifying system serviced and function. See Section 26 05 53 IDENTIFICATION OF ELECTRICAL SYSTEMS.

E. All conductors, wiring, cable where installed below floor, slab or underground shall be considered wet locations, and shall be rated accordingly. Non waterproof cabling is not allowed in any below grade or wet application.

F. Cables routed together in cable tray shall be stacked, organized and tie wrapped together in a neat and workman like manner. Random cable routing is not acceptable.

G. Cable and conductors routed through pull boxes and vaults shall be properly supported on porcelain or equal insulators mounted on steel rack inserts. Bend radius of cable or conductor shall not be less than six times the overall cable diameter.

H. Wires and Cables:
   1. Conductor Installation:
      a. Install conductors in raceways having adequate, code size cross-sectional area for wires indicated.
      b. Install conductors with care to avoid damage to insulation.
      c. Do not apply greater tension on conductors than recommended by manufacturer during installation.
      d. Use of pulling compounds is permitted. Clean residue from exposed conductors and raceway entrances after conductor installation.
   2. Conductor Size and Quantity:
      a. Install no conductors smaller than 12AWG unless otherwise shown.
      b. Provide all required conductors for a fully operable system.
   3. Provide dedicated neutrals (one neutral conductor for each phase conductor) in the following single phase circuits:
      a. Dimmer controlled circuits.
      b. Ground fault and arc fault protected circuits where a GFI and arc fault breakers are used in panelboards.
      c. Other electronic equipment which produces a high level of harmonic distortion including but not limited to computers, printers, plotters, copy machines, fax machines, where indicated.
   4. MC Cable shall be allowed for lighting branch circuiting in non-exposed but accessible ceiling areas. Ceilings that are not accessible by definition shall not allow MC cable use. Power feeders, and electrical branch circuit wiring shall utilize raceways as specified and allowed by Section 26 05 33, RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS.
   5. Conductors in Cabinets:
      a. Cable and train all wires in panels and cabinets for power and control neatly and uniformly. Use plastic ties in panels and cabinets.
      b. Tie and bundle feeder conductors in wireways of panelboards.
      c. Hold conductors away from sharp metal edges.

d. Connectors: Retighten mechanical type lugs and connectors for conductors to equipment prior to Notice of Completion.

END OF SECTION

SECTION 26 05 26
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section Includes:
   1. Grounding and bonding requirements of electrical installations for personnel safety and to provide a low impedance path for possible ground fault currents as described in CEC Article 250.
   2. “Grounding electrode system” refers to all electrodes required by CEC, as well as including made, supplementary, lightning protection system and telecommunications system grounding electrodes.
   3. The terms “connect” and “bond” are used interchangeably in this specification and have the same meaning.

B. Related Work:
   1. Section 26 05 00, COMMON WORK RESULTS FOR ELECTRICAL.
   2. Section 26 05 19, LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES.

PART 2 - PRODUCTS

2.01 GROUNDING AND BONDING CONDUCTORS

A. Equipment grounding conductors shall be UL 83 insulated stranded copper, except that sizes No. 10 AWG and smaller shall be solid copper. Insulation color shall be continuous green for all equipment grounding conductors, except that wire sizes No. 4 AWG and larger shall be permitted to be identified per CEC.

B. Bonding conductors shall be ASTM B8 bare stranded copper, except that sizes No. 10 AWG and smaller shall be ASTM B1 solid bare copper wire.

C. Conductor sizes shall not be less than what is shown on the drawings and not less than required by the CEC, whichever is greater.

2.02 GROUND RODS

A. Copperclad steel, 3/4" diameter by 10’ long, conforming to UL 467 unless otherwise noted on drawings and details.

B. Quantity of rods shall be as required to obtain the specified ground resistance or additional rods shall be driven to obtain specified resistance or less.

2.03 SPLICES AND TERMINATION COMPONENTS

A. Components shall meet or exceed UL 467 and be clearly marked with the manufacturer, catalog number, and permitted conductor size(s).

PART 3 - EXECUTION

3.01 GENERAL

A. Ground in accordance with the CEC, as shown on drawings, and as hereinafter specified.

B. System Grounding:
1. Secondary service neutrals: Ground at the supply side of the secondary disconnecting means and at the related transformers.
2. Separately derived systems (transformers downstream from the service entrance): Ground the secondary neutral.

C. Equipment Grounding: Metallic structures (including ductwork and building steel), enclosures, fire sprinklers, plumbing piping, raceways, junction boxes, outlet boxes, cabinets, machine frames, and other conductive items in close proximity with electrical circuits shall be bonded and grounded.

3.02 INACCESSIBLE GROUNDING CONNECTIONS

A. Make grounding connections which are buried or otherwise normally inaccessible (except connections for which periodic testing access is required) by exothermic weld.

3.03 SECONDARY EQUIPMENT AND CIRCUITS

A. Main Bonding Jumper: Bond the secondary service neutral to the ground bus in the service equipment.

B. Metallic Piping, Building Steel, and Supplemental Electrode(s):
1. Provide a grounding electrode conductor sized per CEC between the service equipment ground bus and all metallic water and gas pipe systems, building steel, and supplemental or made electrodes. Jumper insulating joints in the metallic piping. All connections to electrodes shall be made with fittings that conform to UL 467.
2. Provide a supplemental ground electrode and bond to the grounding electrode system.

C. Service Disconnect: Provide a ground bar bolted to the enclosure with lugs for connecting the various grounding conductors.

D. Conduit Systems:

1. Ground all metallic conduit systems. All metallic conduit systems shall contain an equipment grounding conductor sized per CEC.
2. Non metallic conduit systems shall contain an equipment grounding conductor, except that non-metallic feeder conduits which carry a grounded conductor from exterior transformers to interior or building-mounted service entrance equipment need not contain an equipment grounding conductor.
3. Metal conduit containing only a grounding conductor, and which is provided for mechanical protection of the conductor, shall be bonded to that conductor at the entrance and exit from the conduit.

E. Feeders and Branch Circuits: Install equipment grounding conductors with all feeders, power and lighting branch circuits.

F. Boxes, Cabinets, Enclosures, and Panelboards:
1. Bond the equipment grounding conductor to each pullbox, junction box, outlet box, device box, cabinets, and other enclosures through which the conductor passes.
2. Provide lugs in each box and enclosure for equipment grounding conductor termination.
3. Provide ground bars in panelboards, bolted to the housing, with sufficient lugs to terminate the equipment grounding conductors.

G. Receptacles shall not be grounded through their mounting screws. Ground with a jumper from the receptacle green ground terminal to the device box ground screw and the branch circuit equipment grounding conductor.

H. Ground lighting fixtures to the equipment grounding conductor of the wiring system when the green ground is provided; otherwise, ground the fixtures through the conduit systems. Fixtures connected with flexible conduit shall have a green ground wire included with the power wires from the fixture through the flexible conduit to the first outlet box.

I. Panelboard Bonding: The equipment grounding terminal buses of the normal and emergency branch circuit panelboards shall be bonded together with an insulated continuous copper conductor not less than No. 8 AWG where panels are in same room together or within 25’ of each other. These conductors shall be installed in rigid metal conduit.

3.04 CONDUCTIVE PIPING

A. Bond all conductive piping systems, interior and exterior, to the building to the grounding electrode system. Bonding connections shall be made as close as practical to the equipment ground bus.

3.05 GROUND ROD INSTALLATION

A. Drive each rod vertically in the earth, not less than 9 1/2’ in depth.

B. Where permanently concealed ground connections are required, make the connections by the exothermic process to form solid metal joints. Make accessible ground connections with mechanical pressure type ground connectors.

C. Where rock prevents the driving of vertical ground rods, install angled ground rods or grounding electrodes in horizontal trenches to achieve the specified resistance.

END OF SECTION

SECTION 26 05 33
RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:
   1. Conduit and fittings.
   2. Outlet boxes.
   3. Weatherproof outlet boxes.
   4. Junction and pull boxes.
   5. Gutters.
   6. Concrete boxes and vaults.

B. Related Work:
   1. Installation of all wire, cable, conductor, boxes/gutters, pull ropes, fiber optic cable raceway, conduit, innerduct, cable sleeve and duct as described on the plans and/or as specified here-in. This scope shall include pathways to be installed underground on site and offsite, underslab, above grade, both concealed and exposed, overhead concealed and exposed as appropriately applied. Raceways/boxes shall be installed in accordance with their intended and allowed uses and as specified here-in whichever is more restrictive. Size and capacity of all raceway/boxes shall be as specified here-in or as depicted on the drawings, but shall not be less than that required by code. Larger raceway sizes may be specified than code would permit. The specifications shall govern.
   2. Listed products for termination, coupling, extending, benching supports of raceways shall be used.
   3. Raceways/boxes described by this section shall include, but not be limited to, power for site utilities and lighting, site and building communications, controls, fire alarm, power distribution, lighting, lighting controls, HVAC and other building low voltage/communications systems controls as may be required. Raceways, boxes and duct paths required for utility companies shall be installed per plans unless utility company requirements are more restrictive at which time those requirements shall take precedence.
   4. Protection of and cleanliness of pathways and raceways must be assured during the construction process in order to eliminate the possibility of debris entering the conduit, duct, pathway resulting in decreased wire capacity and potential damage to installed conductors and cables.
   5. Pathways are shown in a diagrammatic way and are generally accurate as to routing, however, it is the Contractor’s responsibility as a means and methods process to coordinate with all other trades that require space within a building. The Contractor shall obtain approval for installation of raceways routing through structural footings, retaining walls, columns, beams, perlins, grade beams, etc.

6. It is the Contractor's responsibility to insure that all raceway and boxes systems penetrate fire assemblies and sound rated assemblies in an approved manner using the appropriate and listed products for the purpose.
7. Trenching and backfilling for all underground conduit systems installed by the Electrical Contractor shall be the responsibility of the Contractor. Conduits shall have minimum cover requirement of 36" below finish grade with the exception of site lighting conduits which may be 24" below finish grade minimum. More stringent depth requirements may be imposed by the local agency and utility company and shall be adhered to, and / or this specification or as detailed on the plans. Joint trenching may be utilized where practicable and where permitted by this specification. Concrete, native material and sand shall be used as backfill material and shall be compacted in accordance with and coordinated with the grading and site preparation requirements. Conduits shall rest in a minimum of 4" bed of sand prior to backfill and compaction. Locations of existing underground (UG) utility systems shall be determined by calling Underground Service Alert (USA) at least 48 hours prior to any excavation. Also refer to Section 26 05 46.13, ELECTRIC UTILITY SYSTEMS.
8. Minimum conduit size shall be 1/2" except if plan shows or code requires larger size. Exception: Use minimum 3/4" for underslab and below grade applications outside of building exterior walls.
9. All electrical, control, communications systems shall be installed in metallic conduit system. This shall include but not be limited to all systems described in Section B.3 above, except for voice and data systems which shall be installed as described on these plans and as specified here-in but shall not be less than the recommendations of EIA/TIA standards.
10. All line voltage wiring within the building shall be installed in metallic conduit.
11. All conduit, concrete pads, underground concrete or fiberglass substructures shall be furnished and installed with the approved materials and type for the application. Provide proper traffic control during construction as well as barriers and protection of all excavations and trenching.
12. Empty or future conduits shall be properly plugged with plastic caps or inserts with a 3/8" polyethylene pull rope. Plastic or "duct" tape will not be acceptable.
13. Exterior installations: After conductors are installed, seal conduit ends to prevent entrance of foreign material using pliable duct seal, caps or waterproof expanding foam.
14. All low voltage systems including fire alarm, etc. shall be in dedicated conduit systems.
15. Underground conduits entering building shall have the open end of conduit within building above the elevation of the conduit outside the building such that water cannot enter building through conduit. If such a condition exists, a pull box outside of building footprint shall be installed in conduit route before conduit enters building whereby top of pull box is below finish floor of building and moisture may exit box before entering building.
16. No single conduit run of any type shall exceed 300 degrees of radius bend from termination box to termination box.
17. Separate Raceway System: Provide a separate dedicated raceway system for each system installed, do not combine different systems into a raceway or cable tray system, unless otherwise noted or allowed.
18. Spare, Future Conduits: Conduits labeled conduit only, spare, or for future use, shall be provided with a pullrope, capped at each end, labeled as spare with destination marked, and turned over to the Owner in an unused state. Contractor shall not utilize these conduits for the installation of cabling or conductors as part of this scope of work. Contractor to verify and install at no additional cost to the Owner, additional conduits as required for the installation of the systems being installed.

19. Outlet System: Provide electrical boxes and fittings as required for a complete installation. Including but not limited to outlet boxes, junction boxes, pull boxes, bushings, locknuts, covers and all other necessary components.
20. Code Compliance: Comply with CEC as applicable to construction and installation of electrical boxes and fittings and size boxes according to CEC 312, 314 and 366 except as noted otherwise.
21. Outlets to be flush mounted: Maintain integrity of insulation and vapor barrier. Unless otherwise noted, flush mount all outlet boxes.
22. Provide putty pads of proper type around outlet boxes and/or as detailed on plan to meet sound transmission restrictions and fire ratings of walls.

1.03 SUBMITTALS

A. Provide Shop Drawings and Product Data for the Following Equipment:
1. Conduit and fittings.
2. Outlet boxes.
3. Weatherproof outlet boxes.
4. Junction and pull boxes.
5. Cabinets, termination cabinets.
6. Gutters.
7. Concrete boxes and vaults.
8. Raceways

1.04 REGULATORY REQUIREMENTS

A. Conform to requirements of the CEC, latest adopted version with amendments by local AHJs.

B. Furnish products listed by UL or other independent and nationally recognized testing firm.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Heavy wall Rigid Non-Metallic Conduit, shall be PVC schedule 40 manufactured in accordance with NEMA Standard TC-2, UL-651 and WC 1094A specifications.

B. Extra heavy wall non-metallic conduit, shall be PVC schedule 80 manufactured in accordance with NEMA Standard TC-2, UL-651 and WC 1094A specifications.

C. Galvanized Rigid Steel (GRS) conduit shall be hot dipped galvanized, zinc coated and shall comply with Underwriters Laboratories UL-6, ANSI Specification C-80.1 and Federal Specification WW-C-581E.

D. Electrical Metallic Tubing (EMT) shall be zinc coated, with a protective coating applied to the inside surface and shall comply with Underwriter Laboratories UL-797 ANSI Specification C-80.3 and Federal Specification WW-C-563A.

E. Electrical Non-Metallic Tubing (ENT), shall be listed to requirements of U.L. 1653, in accordance with CEC Article 362, and meet requirements of BI National Standard CAN/CSA-C22.2 No. 227.1-U.L. 1653. ENT shall be rated for 90 degrees C conductors and shall be recognized for use in 2-hour fire resistance non-load bearing and load bearing wall assemblies. ENT shall be recognized for through-penetration firestop systems as classified to meet U.L. and ICC building codes.

F. Flexible Metal Conduit (FMC) shall be continuous wound reduced wall galvanized steel produced to UL standards.

G. Liquid tight flexible metal conduit shall have a thermoplastic cover over a galvanized steel core containing an integral copper ground in sizes to 1 1/4" and shall be in compliance with UL standards and CEC Article 350.

H. Cable runway tray shall be 12” wide with 4” side rails unless otherwise noted. It shall be U.L. listed and use listed connectors, elbows, tees, etc. Material shall be hollow steel with gray painted finish.

I. Manufacturers:
1. Outlet Boxes: Bowers, Raco, Steel City or equal.
2. Weatherproof Outlet Boxes: Bell, Red Dot, [Carlon] or equal.
3. Junction and Pull Boxes: Circle AW, Hoffman, Wireguard or equal.
4. Box Extension Adapter: Bell, Red Dot, [Carlon] or equal.
5. Conduit Fittings: O-Z Gedney, Thomas & Betts, or equal.
6. Putty pads: 3M, Hilti, or equal.
7. Heavy wall rigid non-metallic conduit, Carlon, Certainteed, R&G Sloane or equal.
8. Extra heavy wall non-metallic conduit, Carlon, Certainteed, R&G Sloane or equal.
9. Galvanized Rigid Steel (GRS) conduit shall be hot dipped galvanized, zinc coated and shall comply with Underwriters Laboratories UL-6, ANSI Specification C-80.1 and Federal Specification WW-C-581E.
10. Electrical Metallic Tubing (EMT) shall be zinc coated, with a protective coating applied to the inside surface and shall comply with Underwriter Laboratories UL-797 ANSI Specification C-80.3 and Federal Specification WW-C-563A.
11. Electrical Non-Metallic Tubing (ENT), shall be listed to requirements of U.L. 1653, in accordance with CEC Article 362, and meet requirements of BI National Standard CAN/CSA-C22.2 No. 227.1-U.L. 1653. ENT shall be rated for 90 degrees C conductors and shall be recognized for use in 2-hour fire resistance non-load bearing and load bearing wall assemblies. ENT shall be recognized for through-penetration firestop systems as classified to meet U.L. and ICC building codes.
12. Flexible Metal Conduit (FMC), Alflex, American Flexible Conduit or equal.
13. Liquid tight flexible metal conduit, Anacanda (type UA), Electri-flex Liquatite or equal.
14. Exterior In-Grade Boxes for Non-Utility Company, Precast concrete or polymer concrete, Utility Vault and Christy.

2.02 OUTLET BOXES

A. NEMA 1 gutter, junction and pull boxes shall be fabricated from code gage steel finished in grey enamel with screw cover fronts and concentric knockouts in all sides.

B. NEMA 3R gutter, junction and pull boxes shall be fabricated from code gage galvanized steel with screw cover fronts and concentric knockouts in the bottom only. Any penetrations to the side, top or back shall be weatherproofed in an approved manner such as “MYERS” gasketed type hub or equal.

C. Steel outlet boxes and plaster rings shall be galvanized rigid assemblies, either one piece pressed or factory welded construction containing the size and number of knockouts required. Steel outlet boxes shall be manufactured, sized and installed in accordance with CEC Article 314. Device Outlet: Installation of one or two devices at common location, minimum 4” square, minimum 1 1/2" deep. Single or 2 gang flush device plaster ring. Raco Series 681 and 686 or equal.

D. Luminaire Outlet: minimum 4” square with correct plaster ring depth, minimum 1 1/2” deep with 3/8” luminaire stud if required. Provide proper depth plaster ring on bracket outlets and on ceiling outlets.

E. Multiple Devices: Three or more devices at common location. Install 1 piece gang boxes with 1 piece device plastering. Install one device per gang unless otherwise allowed.

F. Construction: Provide galvanized steel interior outlet wiring boxes, of the type, shape and size, including depth of box, to suit each respective location and installation; constructed with stamped knockouts in back and sides, and with threaded holes with screws for securing box covers or wiring devices. Boxes shall be properly secured to the structure such that they are flush with the finish surface. Boxes shall be made structurally secure by means of the proper fastening devices.

G. Accessories: Provide outlet box accessories as required for each installation, including mounting brackets, wallboard hangers, extension rings, plaster rings, luminaire studs, cable clamps and metal straps for supporting outlet boxes, compatible with outlet boxes being used and meeting requirements of individual wiring situations.

2.03 WEATHERPROOF OUTLET BOXES

A. Cover plates on outlet boxes mounted flush in the wall shall be gasketed to the wall in a watertight manner. Weatherproof boxes in wet locations as described in CEC 406.8 (B) shall be provided with a “while-in-use” cover; red dot ‘CK’ Series of aluminum die-cast construction, NEMA 3R, with lacquer finish.

2.04 JUNCTION AND PULL BOXES

A. Construction: Provide galvanized sheet steel junction and pull boxes, with screw-on covers; of the type shape and size, to suit each respective location and installation; with welded seams and equipped with steel nuts, bolts, screws and washers.

B. Location:
   1. Install junction boxes above accessible ceilings for drops into walls for receptacle outlets from overhead.

2. Install junction boxes and pull boxes as required to facilitate the installation of conductors and limiting the accumulated angular sum of bends between boxes, cabinets and appliances to 300 degrees.
3. Locations: Junction boxes shall be located only where necessary and only in equipment rooms, closets, and accessible attic and underfloor spaces. A horizontal distance of 24" shall separate outlet boxes on opposite sides of occupancy separation walls, fire-rated walls or partitions.
4. Labeling: Junction box covers shall be marked with indelible ink indicated the circuit numbers passing through the box.

2.05 BOX EXTENSION ADAPTER

A. Construction: [Diecast aluminum] or [cast iron with gasket].

B. Location: Install over flush wall outlet boxes to permit flexible raceway extension from flush outlet to fixed or movable equipment.

2.06 CONDUIT FITTINGS

A. Requirements: Provide corrosion-resistant punched-steel box knockout closures, conduit locknuts and plastic conduit bushings of the type and size to suit each respective use and installation.

B. Steel boxes may allow for field knock-out modifications, but shall in all other ways conform to code requirements.

2.07 EXTERIOR IN-GRADE BOXES FOR NON-UTILITY COMPANY USE SHALL BE:

A. Precast concrete or polymer concrete type with full bottoms and draining into gravel drywell. . Open bottom splice/pull boxes 24" x 36" and smaller shall be open bottom, with minimum 12" of gravel below for drainage.

B. Flushmount in hardscape and 1" above grade in softscape.

C. Provided with correct traffic type lid, i.e., full vehicular, intermediate incidental vehicular or pedestrian-rated as applicable stamped with "ELECTRIC", "LIGHTING", COMMUNICATIONS", etc. cover identification as shown on the drawings or as applicable. All boxes or vaults located in streets, driveways, sidewalks wider than 8', and turf areas where mowing takes place shall be traffic rated.

D. Provided with brass hold-down bolts in cover.

E. Provided with necessary box extensions to gain proper depth.

F. Seal all conduit in underground boxes with duct seal after conductors have been installed.

2.08 PUTTY PADS

A. Intumescent moldable firestop putty designed to protect electrical outlet boxes.

B. Designed to install around outside of outlet boxes.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Conduit systems listed below are for use in installations where they are permitted to be used by CEC and/or other occupancy restrictions. The below installation methods do not intend to suggest that these materials be installed in conflict with any applicable code. Special attention to applications shall be made in building types such as Educational, Health Care, wet location, hazardous locations, assembly occupancy and multi-story, but not limited to these. Requirements which are more restrictive than the CEC may be called for by the drawings and / or these specifications. These requirements must be adhered to. The Electrical Contractor shall be responsible to use the proper conduit system for the application. Exposed conduit is not allowed below ceilings or above slab of floor, without the permission and approval of the Architect. All conduits shall be concealed except in electrical and telecommunication rooms or where shown to be surface mounted. Exposed conduit (where allowed) shall be run square and plumb with building lines in an approved manner. Support roofmount conduits, where allowed, with minimum 12” wide redwood blocks set in mastic unless otherwise detailed in roof requirements or as specified in roofing specification, by the Architect. Strap conduits to blocks with proper sized conduit straps. Spacing of support shall be a minimum as provided for in the CEC. All exposed conduit mounted below 8’ above finished grade shall be strapped at a minimum of 5’ spacing.

B. Non-Metallic Rigid Conduit shall be used in concrete slabs, below concrete slabs on grade, or underground outside of a building slab or foundation. Maintain minimum depth requirements and cover with appropriate fill material. Minimum 4” of bedding and cover of backfill material 1/4" size grain and smaller maximum. Conduit shall be heavy wall Schedule 40 or 80, rigid PVC only. Rigid utility P&C duct shall not be used in any application. Properly sized grounding conductors shall be installed per CEC article 250, in all non-metallic conduit branch circuit and feeder runs. PVC conduit shall be formed or field bent only with the use of properly approved bending tools such as to not decrease the internal bore of the conduit. All conduits shall be cut square and reamed of burrs. Approved and compatible glue shall be used on all PVC fittings to attain watertight joints. All non-metallic conduit runs over 150’ in length and over 1 1/4" trade size conduit shall utilize galvanized rigid steel elbows.

C. Galvanized Rigid Steel (GRS) conduit shall be used where exposed less than 8’–0” above finished grade to 18” below finished grade and where subject to physical damage. Conduits shall be cut square and reamed to remove burrs and sharp edges. Strap conduit below 8’ above grade at 5’ intervals. Unless otherwise noted, threadless setscrew and threadless weathertight fittings may be used in lieu of threaded fittings. All threaded ends entering a junction box of any type shall require one locknut on the inside and one on the outside of the enclosure and be provided with a plastic bushing or grounding bushing where necessary for proper grounding. Where exposed to moisture, a watertight hub or other approved method shall be required. All conduits shall be stubbed up straight and uniform into junction boxes, panels,

cabinets, etc., and shall be (GRS) properly supported and strapped. All GRS conduit located below grade, shall be tape wrapped.

D. Electrical Metallic Tubing (EMT) shall be used as allowed by code and as permitted by this specification. It shall not be in contact with soil or the concrete slab on the ground floor of any structure. Connectors and couplings shall be [steel or diecast] [insulated/non-insulated] set screw type where installed in indoor dry locations not subject to moisture. Where the potential for moisture is present, compression type weathertight fittings are required. One hole conduit straps are permitted from 1/2" to 1" and two hole conduit straps are required for size 1 1/4" and larger. EMT shall not be allowed in areas subject to severe physical damage. Install copper ground wire sized per CEC 250-122 in all EMT conduits.

E. Electrical Non-Metallic Tubing (ENT) shall be installed in accordance with its listed application. Only listed cement shall be used for connectors, coupling, fittings requiring cement. Unless otherwise noted, ENT systems shall be color coded: Blue for branch and/or feeder power wiring, yellow for communications systems, and red for fire alarm and emergency power systems. Use only approved and listed accessories.
   1. Electrical Nonmetallic Tubing (ENT) is designed to replace EMT, flexible metal conduit or other raceway or cable systems, for installation in accordance with Article 362 of the National Electrical Code, Section 12-1500 of the CEC, other applicable sections of the Code, and local codes.
   2. Any ENT used shall be listed to the requirements of UL Standard UL 1653 in accordance with Article 362 of the NEC and Section 12-1500 of the CEC.
   3. Any ENT used shall meet the requirements of BI National Standard CAN/CSA-C22.2 No. 227.1-UL1653 and shall be Listed/Certified in accordance to the Electrical Codes.
   4. Carlon's ENT shall be installed per the technical assessment prepared by fire cause analysis for use in 1hour and 2-hour rated construction.
   5. Penetration of fire rated walls, floors or ceilings shall use Classified Through-Penetration Firestop Systems described in the current Underwriters Laboratories Fire Resistance Directory.
   6. Fittings and outlet boxes shall be designed for use with ENT shall be listed. All fittings, boxes and accessories shall be from one manufacturer.
   7. Only Carlon ENT Blue cement recommended specifically for use with ENT and rigid nonmetallic fittings shall be used.
   8. Unless indicated differently on drawings, ENT systems shall be color coded: BLUE for branch and feeder circuit wiring, YELLOW for communications, and RED for fire alarm and emergency systems, or colors can designate different voltages.
   9. ENT, fittings, and accessories shall be manufactured by Carlon.
   10. ENT shall not be used or allowed in any application where not allowed by CEC Article 362.

F. Flexible conduit may be used where concealed in building construction or above dropped ceilings, but shall meet the following criteria: No individual circuit path from distribution panel to last device shall exceed a cumulative length of 30' of flexible conduit from start to end. Flexible conduit shall not exceed a total directional change of 270 bending degrees in any one run between conduit terminations. Squeeze type or Jake type steel flex fittings of a grounding type are required. Flexible conduit must be supported in accordance with CEC. Where exposed to the weather, moisture, or spray down flexible conduit shall be of the liquidtight type. Fittings shall be manufactured for use with liquidtight flexible conduit. All motor connections shall be made with liquidtight flex. Flexible conduit may not be used where exposed except for last 2' of equipment connection and unless otherwise noted or approved. A copper ground wire sized

per CEC 250-122 shall be installed in all flexible conduit runs. Flexible conduit may not be used exposed. Weatherproof liquid tight conduit shall not be used at roof level for equipment connections with lengths exceeding 24" nor shall it be used to circumvent a rigid conduit system in a horizontal direction. Connect recessed lighting fixtures to conduit runs with a maximum of 6' of flexible metal conduit extending from junction box to fixture. "Master" "Slave" fixtures are permitted to use manufactured flexible cable of longer dimension up to 12' between "Master" and "Slave" only and only as a U.L. listed system component.

G. Underground conduits and transition to above grade/slab shall be as follows:
   1. PVC elbows allowed if top of elbow is minimum 18" BFG or below top of slab, otherwise GRS elbows are required.
   2. GRS elbows are required if conduit run is 150' or greater.
   3. GRS risers are required from elbow below grade to equipment (device, outlet, panel, cabinet, etc.) above grade.
   4. GRS elbows/risers to be PVC coated or 10 MIL taped wrapped (1/2" lapped) to 3" above finish grade or top of slab.

H. Conduit Supports: Conduit runs may be supported by one-hole and two-hole straps or supports as manufactured by Unistrut, Minerallac, Caddy or equals. Supports may be fastened by means of anchors, shields, beam clamps, toggle bolts, or other approved methods appropriate for the application and size of conduit. Pipe nailers (J-hooks) may only be used for 1" conduit and smaller and only in wood frame construction. Conduit support methods are subject to review by the engineer and authority having jurisdiction for adequacy. Installations deemed inadequate shall be corrected by the contractor at no cost to the Owner.

I. Bends and offsets shall be made with approved tools for the type of conduit being utilized. Bends shall be made without kinking or destroying the smooth bore of the conduit. Parallel conduits shall be run straight and true with bends uniform and symmetrical. Minimum radii shall be per CEC 344-24.

J. Conduit Stub-outs below grade shall be capped with plastic cap, and identified by placing a pull box marked with correctly identified utility such as "Elec", "Tel", etc. Dimension for exact location on field record drawings. Provide lids for proper field application (i.e. traffic, incidental, pedestrian).

K. Conduit Seals: Where below grade conduits enter structure through slab or retaining wall of building or basement, seal the inside of each conduit as follows:
   1. Provide damming material around conductors 3" into conduit.
   2. Fill 3" of conduit with 3M #2123 sealing compound.
   3. Wrap conductors where they exit the conduit with 3M #2229 "Scotch Seal" mastic tape. Lap tape to approximate diameter of the raceway and wrap outside of conduit opening with (minimum) one turn.
   4. Use conduit sealing bushings type CSB (O-Z/Gedney) or equal.
   5. Empty conduits shall be sealed with standard non-hardening duct seal compound and then capped to prevent entrance of moisture and gases and to meet fire resistance requirements.
   6. Provide cable drip loop minimum 12" high.

L. Marker tape: Place plastic yellow marker tape at 12" below finish grade along and above buried conduits. Label tape "CAUTION: ELECTRICAL LINES BELOW" or similar wording.

M. Electrical and communications systems raceways routed underground shall not occupy the same trench as plumbing utilities such as sewer, water, storm drain, gas or other wet or dry gaseous utility system. A minimum of 12" of undisturbed earth is required. Where utilities must cross in closer proximity to each other due to physical constraints, 6" minimum crossing distances are allowed, however 18" on all sides of a utility crossing must be concrete encased.

N. Conduits, routed below footings, slabs, grade beams, columns, and other structural elements shall be installed in strict compliance with structural details and criteria shown on structural plans. Clearances below structural elements and sleeves through structural elements must be carefully planned to avoid conflict and must be approved by the structural engineer if conflict arises.

O. All conduit or raceways passing through fire rated walls, floors, or ceilings shall be installed with a listed penetration method which protects the opening to the same rating as the assembly and is non hardening.

P. Location: Locate boxes and conduit bodies so as to ensure accessibility of electrical wiring.

Q. Anchoring: Secure boxes rigidly to the substrate upon which they are being mounted, or solidly embed boxes in concrete or masonry.

R. Special Application: Provide weatherproof outlets for locations exposed to weather or moisture.

S. Knockout Closures: Provide knockout closures to cap unused knockout holes where blanks have been removed.

T. Coordinate all electrical device locations with the architectural floor plan and interior and exterior elevations to prevent mounting devices within elements that they may conflict such as cabinetry, mirrors, planters, etc.

U. Size outlet and junction boxes to minimum wire fill space requirements. Upsize box as required to allow ease of wire installation and device installation.

V. Outlet and junction boxes in fire rated walls shall be gauged and spaced so as not to exceed the maximum penetration allowed by the assembly without compromising the fire rating. If a conflict arises relative to a specific condition, the contractor shall follow the requirements of the fire authority and ask for guidance from the design team. At no time should a larger box be installed prior to resolution of conflict.

END OF SECTION

SECTION 26 05 53
IDENTIFICATION OF ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section Includes:
   1. Nameplates and warning signs where specified herein and as shown on contract documents including the following:
      a. Nameplates and warning signs permanently installed on all electrical equipment and devices including, but not limited to, the following items:
         1) Enclosures for transformers, switchboards, motor control, panels, pullboxes, cabinets, motors, generators, transfer switches.
         2) Enclosures for all separately enclosed devices including, but not limited to, disconnect switches, circuit breakers, contactors, time switches, control stations and relays, fire alarm panels and lighting control panel.
         3) Wall switches not within sight of outlet controlled.
         4) Special systems such as, but not limited to, telephone, fire alarm, warning and signal systems. Identification shall be at each equipment rack, terminal cabinet, control panel, annunciator and pullbox.
         5) Devices mounted within and part of equipment including circuit breakers, switches, control devices, control transformers, relays, indication devices and instruments.

B. Related Work:
   1. Section 26 05 00, COMMON WORK RESULTS FOR ELECTRICAL.
   2. Section 26 24 16, PANELBOARDS.
   3. Section 26 05 34, CABINETS.

PART 2 - PRODUCTS

2.01 EQUIPMENT LABEL DESIGNATIONS

A. Equipment labels indicating equipment designations both emergency and normal. Designation data per drawings or to be supplied with shop drawings approval.

B. Panelboard labels showing panel designation, voltage, phase and source.

C. In accordance with CEC 110.16, provide arc flash protection warning labels on all switchboards, panelboards, distribution panels, transformers, safety switches, transfer equipment, etc. Labels shall be per ANSI Z535.4 guidelines.

2.02 MATERIALS

A. For Labels: Three layer laminated plastic or micarta with engraved white letters over black background.

B. For Emergency Equipment: Use engraved white letters over red background.

C. For Warning Signs: Minimum 18 gauge steel with red lettering on white porcelain enamel finish.

D. Arc flash labels shall be provided as required by CEC Article 70E.

PART 3 - EXECUTION

3.01 MOUNTING

A. Equipment labels shall be mounted by self-tapping, threaded screws and bolts, or by rivets. Adhesive types are not acceptable unless specifically noted in this section.

3.02 HEIGHTS ON LABELS

A. Panelboards, Switchboards and Motor Control Centers and Special Systems Enclosures: 1/4" identify equipment designation; 1/8” identify voltage rating and source.

B. Individual Circuit Breakers in Panelboards: 3/16” identify circuit and load served, including location of equipment.

3.03 WARNING SIGNS

A. Warning signs shall be permanently mounted with cadmium plated steel screws or nickel-plated brass bolts.

B. Warning signs to read "DANGER - HIGH VOLTAGE", with letters 1 1/2" high, 3/16” stroke minimum.

C. Provide warning sign on all doors or immediately next to door for equipment rooms, enclosures or closets containing equipment energized above 150 volts to ground as per CEC, and/or as directed by the Architect. For interior finish spaces and interior doors, signage shall be coordinated and approved with the Architect in advance of installation.

END OF SECTION

SECTION 26 09 00
CONTROLS AND INSTRUMENTATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section Includes:
   1. Control devices, shown on the drawings and/or required by other sections, to assure a complete and operating system.
   2. Furnish submittals/shop drawings for all equipment in this section as described in Section 26 05 00, 1.4, COMMON WORK RESULTS FOR ELECTRICAL.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Terminal and Control Cabinets shall be manufactured from code gauge galvanized steel with hinged locking covers finished in grey or hammer tone enamel. Knockouts, barriers and plywood backing shall be provided where required. Cabinets shall be of raintight construction where exposed to the weather. Approved manufacturers are Circle AW, Wireguard, Benner-Nawman, or equal.

B. Photocontrols and time switches shall be provided as indicated on the drawings. Approved manufacturers are Intermatic, Paragon, Tork or equal. Where indicated on the fixture schedule, photocells in outdoor fixtures shall be factory installed and wired.

C. Lighting Contactors shall be of the correct number of poles with suitable contact ampere ratings. Provide fusing protection for all lighting contactor control circuits. Verify all coil voltages prior to installation. Approved manufacturers are General Electric, Westinghouse, Square "D" or equal.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Power to all irrigation controllers shall be provided by the Electrical Contractor as required for the irrigation equipment. Also provide and install conduit sweeps as required to house low voltage wiring between controller and exterior below grade.

B. General Purpose Control Contactors shall be rated for the use with the correct ampere rating, voltage, size and horse power rating. Select the correct control coil voltage.

END OF SECTION

SECTION 26 24 16
PANELBOARDS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section Includes:
   1. Panelboards.

B. Related Work:
   1. Division 09 “PAINTING”: Identification and painting of panelboards.
   2. Section 26 05 00, COMMON WORK RESULTS FOR ELECTRICAL.
   3. Section 26 05 33, RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS.
   4. Section 26 05 19, LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW): Cables and wiring.
   5. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path for possible ground fault currents.

1.03 APPLICABLE PUBLICATIONS

A. Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

B. Underwriters Laboratories, Inc. (UL):
   1. No. 50-1995 Enclosures for Electrical Equipment
   2. No. 67-1993 Panelboards

C. National Fire Protection Association (NFPA):
   1. No. 70-2010 California Electrical Code (CEC)

D. National Electrical Manufacturers Association (NEMA):
   1. No. PB-1-2002 Panelboards.
   2. No. AB-3-1996 Molded Case Circuit Breakers and Their Application.

PART 2 - PRODUCTS

2.01 PANELBOARDS

A. Panelboards shall be in accordance with UL, NEMA, NEC, CEC and as shown on the drawings. Approved manufacturers are Cutler Hammer, Square D, Seimens, General Electric.

B. Panelboards shall be standard manufactured products. All components of the panelboards shall be the product and assembly of the same manufacturer. All similar units of all panelboards to be of the same manufacturer.

C. All panelboards shall be dead front safety type. Arrange sections for easy removal without disturbing other sections.

D. All panelboards shall be completely factory assembled with molded case circuit breakers. All factory wiring shall be checked for correct tightness and visually inspected to insure that bussing and terminations have not become loose in transit to job site.

E. Panelboards shall have main breaker or main lugs, bus size, voltage, phase, top or bottom feed, and flush or surface mounting as scheduled on the drawings. Refer to single line diagram and panel schedules on drawings. Terminals shall be minimum 75 degree rated. Back fed main circuit breakers are not allowed. Main circuit breakers shall be vertically mounted.

F. Panelboards shall have the following features:
   1. Nonreduced size copper bus bars, and connection straps bolted together and rigidly supported on molded insulators. Bus bar taps for panels with single pole branches shall be arranged for sequence phasing of branch circuit devices.
   2. Full size neutral bar, mounted on insulated supports.
   3. Ground bar and isolation ground bar (where called for in panel schedule) with sufficient terminals for all grounding wires. Buses braced for the available short circuit current.
   4. All breakers and phase bus connections shall be arranged so that it will be possible to substitute a 2-pole breaker for two single pole breakers, and a 3-pole breaker for three single pole breakers, when trip is 30 amps or less and frame size is 100 amperes or less, without having to drill and tap the main bus bars at bus straps. Where used for heating and air conditioning, and refrigeration equipment, use only HACR type U.L. listed circuit breakers.
   5. Design interior so that protective devices can be replaced without removing adjacent units, main bus connectors, and without drilling or tapping.
   6. Where designated on panel schedule as "space", include all necessary bussing, device support and connections. Provide blank cover for each space.
   7. Series rated panelboards are not permitted.
   8. Label all panels in accordance with Section 26 05 53, IDENTIFICATION OF ELECTRICAL SYSTEMS.
   9. Recessed panel space conduit: Provide (1) ¾ inch spare conduit stubbed to accessible ceiling space and/or interstitial space below floor for every (5) spaces and spares indicated on panel schedules.

G. Panelboards serving as building mains shall be “service entrance rated” and UL Listed as “service equipment”.

2.02 CABINETS AND TRIMS

A. Cabinets:
1. Provide galvanized steel cabinets to house panelboards. Cabinets for outdoor panels shall be factory primed and suitably treated with a corrosion-resisting paint finish meeting UL standard for outdoor applications.
2. All ventilated openings in panelboards and switchboards, shall be furnished with dust filters to prevent entrance of dust and debris.
3. Cabinets for panelboards may be of one piece formed steel or of formed sheet steel with end and side panels welded, riveted, or bolted as required.
4. Provide necessary hardware for "in" and "out" adjustment of panel interior.
5. Cabinets for two section panelboards shall be arranged side by side, and shall be the same height. Flush mounted cabinets should be 1 1/2" apart and coupled by conduit nipple if necessary.
6. Gutter size in panel boxes, on all sides, shall be in accordance with the CEC. Penetrations through gutter to live area of the panelboard shall incorporate approved non-metallic-grommet type of insulation to protect wire passing through.

B. Trims:
1. Fabricate trim of sheet steel consisting of frame with door attached by concealed hinges. Provide flush or surface trim as shown on the drawings.
2. Flush trims shall overlap the box by at least 3/4" all around.
3. Surface trim shall have the same width and height as the box.
4. Flush or surface trims shall not have ventilating openings.
5. Secure trims to back boxes by indicating trim clamps.
6. Provide a welded angle on rear of trim to support and align trim to cabinet.
7. Provide separate trims for each section of multiple section panelboards. Trims and doors of sections shall be of the same height.

C. Doors:
1. Provide doors with flush type latch and manufacturer's standard lock. Doors over 48 inches in height shall have a vault handle and a three-point catch, arranged to fasten door at top, bottom, and center.
2. In making switching devices accessible, doors shall not uncover any live parts.
3. Provide concealed hinges welded to the doors and trims.
4. For lighting or power contactors incorporated in panelboards, provide separate doors for the contactors.
5. Provide keyed alike system for all panelboards.
6. Provide a directory card, metal holder, and transparent cover. Permanently mount holders on inside of doors.

D. Painting:
1. Thoroughly clean and paint trims and doors at the factory with primer and manufacturer's standard finish.

2.03 MOLDED CASE CIRCUIT BREAKERS FOR PANELBOARDS

A. Breakers shall be UL listed and labeled, in accordance with the CEC, as shown on the drawings, and as specified.

B. Breaker features shall be as follows:

1. Integral housing of molded insulating material.
2. Silver alloy contacts.
3. Arc quenchers and phase barriers for each pole.
4. Quick-make, quick-break, operating mechanisms.
5. A trip element for each pole, thermal magnetic type with long time delay and instantaneous characteristics, a common trip bar for all poles and a single operator.
6. Electrically and mechanically trip free.
7. An operating handle which indicates ON, TRIPPED, and OFF positions.
   a. Line connections shall be bolted.
   b. Interrupting rating shall not be less than the maximum short circuit current available at the line terminals as indicated on the drawings, and as shown on the electrical system protective device study as required in Section 26 05 73 OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY. The interrupting rating shall not be less than the minimum identified requirement.
8. An overload on one pole of a multipole breaker shall automatically cause all the poles of the breaker to open.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Installation shall be in accordance with CEC, as shown on the drawings, and as specified.

B. Locate panelboards so that the present and future conduits can be conveniently connected. Coordinate the sizes and layout of cabinets within the designated spaces. All equipment must be dimensioned in order to physically fit in the spaces provided and to comply with all code required clearances.

C. Install a typewritten schedule of circuits in each panelboard. Include the room numbers (as finally described by the Owner) and items served on the cards. Obtain final room numbers from Architect prior to creating schedule.

D. Mount the panelboard so that maximum height of the top circuit breaker above finished floor shall not exceed 78 inches.

E. For panelboards located in areas accessible to the public, paint the exposed surfaces of the trims, doors, and boxes with finishes to match surrounding surfaces after the panelboards have been installed.

F. Circuit numbers shall correspond to the approved panel schedule. Provide as-built drawings showing the actual circuit numbers being used for each device on each branch circuit if changes are required.

G. Verify depth of all flushmounted enclosures in walls to be certain wall depth will accommodate panel depth prior to installation.

H. All openings in switchgear and panelboards that are unused shall be sealed with bolts and washers. Use caulking where holes or openings cannot be sealed by way of a washer, or bolts or conduit seals.

I. Contractor shall include the services of an independent testing company to test GFI circuit breakers in distribution and main panelboards.

END OF SECTION

SECTION 26 27 26
WIRING DEVICES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section Includes:
   1. Wiring devices.

B. Related Work:
   1. Section 26 05 00, COMMON WORK RESULTS FOR ELECTRICAL.
   2. Section 26 05 33, RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS.
   3. Section 26 05 19, LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES.
   4. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.

PART 2 - PRODUCTS

2.01 RECEPTACLES

A. General: All receptacles shall be listed by Underwriters Laboratories, Inc.
   1. Mounting straps shall be plated steel, with break-off plaster ears and shall include a self-grounding feature (this feature does not substitute for a grounding conductor terminated on grounding strap of device). Terminal screws shall be brass, brass plated or a copper alloy metal.
   2. Receptacles shall be of a screw terminal type, “pressure type quick wire” terminations are not allowed.

B. Duplex receptacles shall be commercial grade single phase, 20 ampere, 120 volts, 2-pole, 3-wire, and conform to the NEMA 5-20R configuration in NEMA WD 6. The duplex type shall have bussing break-off feature for two-circuit operation. The ungrounded pole of each receptacle shall be provided with a separate terminal.
   1. Bodies shall be white color. Contractor to verify device color with Architect prior to procurement.
   2. Switched duplex receptacles shall be wired so that only the top receptacle is switched. The remaining receptacle shall be unswitched.
   3. Ground Fault Interrupter Duplex Receptacles: Shall be an integral unit suitable for mounting in a standard outlet box.
      a. Ground fault interrupter shall be commercial grade and consist of a differential current transformer, solid state sensing circuitry and a circuit interrupter switch. It

shall be rated for operation on a 60 Hz, 120 volt, 20-ampere branch circuit. Device shall meet CEC requirements. Device shall have a minimum nominal tripping time of 1/30th of a second. Devices shall meet UL 943.

C. Receptacles; 20, 30 and 50 ampere, 250 volts: Shall be complete and match with appropriate cord grip plug. Devices shall meet UL 231.

D. Weatherproof Receptacles: Shall consist of a listed weather resistant duplex receptacle, mounted in box with a gasketed, while in use weatherproof, cast metal cover plate and cap receptacle opening. The cap shall be permanently attached to the cover plate by a spring-hinged flap. Approved manufacturers: Intermatic WP10 Series, Thomas & Betts/Red Dot 2CK Series, or engineer approved equal.

2.02 SWITCHES AND DIMMERS

A. Toggle switches shall be totally enclosed tumbler type with bodies of phenolic compound. Toggle handles color to match receptacle device color unless otherwise specified.
   1. Shall be single unit toggle, butt contact, quiet AC type, heavy-duty general-purpose use with an integral self grounding mounting strap with break-off plasters ears and be of a screw terminal type.
   2. Shall be color coded for current rating, listed by Underwriters Laboratories, Inc., and meet the requirements of NEMA WD 1, Heavy-Duty and UL 20.
   3. Ratings:
      a. 120 volt circuits: 20 amperes at 120-277 volts AC.
   4. The switches shall be mounted on the strike plate side of doors.
   5. Incorporate barriers between switches with multi-gang outlet boxes where required by the CEC.
   6. All toggle switches shall be of the same manufacturer.

2.03 WALL PLATES

A. Wall plates for switches and receptacles shall be thermo plastic.

B. Standard NEMA design, so that products of different manufacturers will be interchangeable. Dimensions for openings in wall plates shall be accordance with NEMA WD1.

C. For receptacles or switches ganged together, wall plates shall be a single ganged plate.

D. Wall plates for data, telephone or other communication outlets shall be as specified in the associated specification.

E. Surface mounted boxes, NEMA1, shall be industrial grade raised galvanized steel covers. In shop areas all receptacles shall be dust proof and or waterproof where applicable.

F. Waterproof device covers shall be cast iron, 4-corner screw type, for FS and FD type mounting. Device covers shall be zinc galvanized finish. Weatherproof covers shall be lockable.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Switches installed in hazardous areas shall be explosion proof type in accordance with the CEC and as shown on the drawings.

B. Installation shall be in accordance with the CEC, NECA “Standard of Installation”, and as shown as on the drawings.

C. Ground terminal of each receptacle shall be bonded to the outlet box with an approved green bonding jumper, and also be connected to the green equipment grounding conductor.

D. General: Devices shall be of the type specified herein. All devices shall be installed with “pigtailed” leads from the outlet box. No device shall be used in the “feed through” application. Screw terminals shall be used to connect all devices to the circuit and shall be grounded by means of a ground wire where grounding terminals are provided in the device.

E. Installation: Devices and plates shall be installed in a “plumb” condition and must be flush with the finish surface of the wall where boxes are recessed.

F. Mounting heights: All control and convenience devices shall comply with California Code of Regulations Title 24 and ADA with respect to accessibility requirements. Mounting heights indicated on plans shall have precedence.

G. Install switches with the off position down.

H. Clean debris from outlet boxes.

I. Provide extension rings as required to bring outlet boxes flush with finished surface or casework.

J. Test each receptacle device for proper polarity.

END OF SECTION

SECTION 26 51 00
INTERIOR LIGHTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section Includes:
   1. Interior lighting systems, including luminaires, ballasts, lamps and emergency lighting equipment.

B. Related Work:
   1. Section 26 05 00, COMMON WORK RESULTS FOR ELECTRICAL.
   2. Section 26 05 33, RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS: Conduits, fittings, and boxes for raceway systems.
   3. Section 26 05 19, LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW): Low voltage power and lighting wiring.
   4. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path for possible ground fault currents.
   5. Section 26 56 70, LIGHTING ACCEPTANCE TESTING.

1.03 SUBMITTALS

A. Submit in accordance with Section 26 05 00, COMMON WORK RESULTS FOR ELECTRICAL.

B. Shop Drawings:
   1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
   2. Include electrical ratings, dimensions, mounting, details, materials, terminations, wiring and connection diagrams, photometric data, ballasts, luminaires, lamps and controls.

1.04 APPLICABLE PUBLICATIONS

A. Publications listed below (including amendments, addenda, revisions, supplements) form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

B. American Society for Testing and Materials (ASTM).

C. American National Standards Institute (ANSI).

D. Aluminum Association Inc. (AA).

E. Illuminating Engineering Society of North America (IESNA).

F. National Electrical Manufacturers Association (NEMA).

G. National Fire Protection Association (NFPA).

H. Underwriters Laboratories, Inc. (UL).

1.05 DEFINITIONS

A. Lighting terminology used herein is defined in IES

B. Exception: The term “driver” is used herein to cover both drivers and power supplies, where applicable.

C. Clarification: The term “LED light source(s)” is used herein per IES to cover LED package(s), module(s), and array(s).

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. Materials and equipment shall be in accordance with CEC, UL, ANSI, and as shown on the drawings and specified.

2.02 LIGHTING FIXTURES (LUMINAIRES)

A. Shall be in accordance with NFPA 70, UL 1598 and shall be as shown on drawings and as specified. All luminaires shall have been certified to the California Energy Commission by its manufacturer to comply with the efficiency standards as per California Code of Regulations Title 24, Part 6, Section 111 referencing the Appliance Efficiency Regulations in Title 20. Post certification with building permit.

B. Sheet Metal:
   1. Shall be formed to prevent warping and sagging. Housing, trim and lens frame shall be true, straight (unless intentionally curved) and parallel to each other as designed.
   2. Wireways and fittings shall be free of burrs and sharp edges and shall accommodate internal and branch circuit wiring without damage to the wiring.
   3. When installed, any exposed fixture housing surface, trim frame, door frame and lens frame shall be free of light leaks; lens doors shall close in a light tight manner.
      a. Hinged door closure frames shall operate smoothly without binding when the fixture is in the installed position, and latches shall function easily by finger action without the use of tools.

C. Ballasts shall be serviceable while the fixture is in its normally installed position, and shall not be mounted to removable reflectors or wireway covers unless so specified.

D. Lamp Sockets:
   1. Fluorescent: Lampholder contacts shall be the biting edge type or phosphorous bronze with silver flash contact surface type and shall conform to the applicable requirements of UL 542. Contacts for recessed double contact lampholders and for slimline lampholders shall be silver plated. Lampholders for bi pin lamps, with the exception of those for "U" type lamps, shall be of the telescoping compression type, or of the single slot entry type requiring a one quarter turn of the lamp after insertion.

E. Recessed fixtures shall be of the type approved for the ceiling and insulation conditions and appropriate for the installation location. Insulation must be held back from the fixture to provide manufacturers' recommended clearances for proper operation. Thermal tripping shall be the installer's responsibility to correct. Where installed in fire rated ceilings, coordinate installation of fire rated enclosures around the ceiling penetrations. Fixtures shall contain the proper through wiring capacity for that which is shown on the plans.

F. Recessed fixtures shall be provided with the appropriate trims and hardware compatible with the ceiling type shown. Plaster frames are required where plaster or gypsum board ceilings are encountered.

G. Fluorescent fixtures with louvers or light transmitting panels shall have hinges, latches and safety catches to facilitate safe, convenient cleaning and relamping. Vapor tight fixtures shall have pressure clamping devices in lieu of the latches.

H. Mechanical Safety: Lighting fixture closures (lens doors, trim frame, hinged housings, etc.) shall be retained in a secure manner by captive screws, chains, captive hinges or fasteners such that they cannot be accidentally dislodged during normal operation or routine maintenance.

I. Metal Finishes:
   1. The manufacturer shall apply standard finish (unless otherwise specified) over a corrosion resistant primer, after cleaning to free the metal surfaces of rust, grease, dirt and other deposits. Edges of pre-finished sheet metal exposed during forming, stamping or shearing processes shall be finished in a similar corrosion resistant manner to match the adjacent surface(s). Fixture finish shall be free of stains or evidence of rusting, blistering, or flaking.
   2. Interior light reflecting finishes shall be white with not less than 85 percent reflectances, except where otherwise specified on the drawing.
   3. Exterior finishes shall be as shown on the drawings.

J. Provide all lighting fixtures with a specific means for grounding metallic wireways and housings to an equipment grounding conductor.

K. Light Transmitting Components for Fluorescent Fixtures:
   1. Shall be 100 percent virgin acrylic plastic or water white, annealed, crystal glass.
   2. Flat lens panels shall have not less than 1/8 inch of average thickness. The average thickness shall be determined by adding the maximum thickness to the minimum unpenetrated thickness and dividing the sum by 2.
   3. Unless otherwise specified, lenses, diffusers and louvers shall be retained firmly in a metal frame by clips or clamping ring in such a manner as to allow expansion and contraction of the lens without distortion or cracking.

L. Recessed compact fluorescent or LED fixtures shall be manufactured specifically for compact fluorescent or LED lamps with ballasts or drivers integral to the fixture. Assemblies designed to

retrofit fixtures are prohibited except when described in this fashion. Fixtures shall be designed for lamps as specified.

M. Provide wire lamp guard on all exposed lamp fixture/luminaires.

N. Provide fixtures with a U.L. listing for shower or shower rating above shower or tub areas.

2.03 LED LUMINAIRE REQUIREMENTS

A. General Requirements:
1. Luminaire shall have an external label per ANSI C136.15
2. Luminaire shall have an internal label per ANSI C136.22.
3. Luminaires shall start and operate in -20°C to +40°C ambient.
4. LED light source(s) and driver(s) shall be RoHS compliant.

2.04 EMERGENCY FLUORESCENT LAMP POWER SUPPLY

A. Self-contained battery-operated power supply for operating one T8, or compact fluorescent lamp for a minimum output of 90 minutes.

B. The power supply shall be installed within the luminaire ballast compartment or wireway. Provide with test switch and charge indicator installed integral to the luminaire. The test switch and charge indictor may be installed in a remote ceiling mounted flush J-box for recessed downlights which cannot accept integral components.

C. Performance: Emergency operation lumen output for linear fluorescent lamps shall be a minimum of 1100 lumens. Emergency operation lumen output for compact fluorescent lamps shall be a minimum of 640 lumens. Unless specifically noted otherwise on the associated electrical drawings.

D. Provide access hatches, for emergency battery backup ballasts, adjacent to recessed 6-inch or less diameter downlights installed in inaccessible ceilings.

E. Manufacturers: Bodine, Iota, or approved. Emergency fluorescent lamp power supplies may be provided as factory installed by the luminaire manufacturer provided the product meets the above specification criteria.

2.05 BALLASTS

A. Ballasts, General:
1. Provide ballasts rated for specified lamps, i.e., T-8 rated ballasts where T-8 lamps specified.
2. Thermal Protection: Internal UL Class P with automatic reset.
3. Power Factors: Not less than 90 percent unless otherwise indicated.
4. Sound Ratings: Rating A, except where not available as standard products from any manufacturer. Provide quietest ratings available.
5. Input Voltage: Match branch circuit supply voltage; refer to drawings.
6. Provide number of ballasts in luminaires to provide multilevel switching as indicated on drawings.

B. Fluorescent Electronic Ballasts:
   1. Provide ballasts which meet requirements of UL 935 listed Class P Type 1, UL Type CC anti-arc rated, thermally protected and recognized by Certified Ballast Manufacturer (CBM) and bear the appropriate UL label.
   2. Electrical Characteristics:
      a. Provide electronic ballasts which withstand input power line transients as defined in ANSI C62.41, Category-A and IEEE 587. Multi-voltage control capabilities from 108 volt to 305 volt.
      b. Power Factor: 95 percent or higher.
      c. 0.77 ballast factor.
      d. Total Harmonic Distortion: Not to exceed 10 percent of the input current.
      e. Comply with FCC rules and regulations Part 18, Class A concerning generation of both electromagnetic interference and radio frequency interference.
      f. Provide rated initial and mean lumen output with system configuration provided.

C. Manufacturer: GE Ultramax/L Series, Advance Optanium “LW” Series, Sylvania Octron “XTREME” Series, Universal Triad “EL” Series.

D. All ballasts shall have been certified to the California Energy Commission by its manufacturer to comply with the efficiency standards as per California Code or Regulation Title 24, Part 6, Section 111 referencing the Appliance Efficiency Regulations in Title 20. Post certification with building permit.

E. Performance: Ballasts shall carry a minimum full 5 year warranty. All ballasts shall have a Class A sound rating. Any ballast deemed noisy by the Architect shall be replaced at no charge to the Owner.

F. Shielding: All lens material shall be 100% virgin acrylic, .125” minimum thickness, unless otherwise indicated in the fixture schedule. Diffusers shall comply with UBC 5209.

G. Slimline and magnetic ballasts shall not be allowed.

H. Maintain accessibility of all ballast locations.

I. Fluorescent Dimming Ballasts:
   1. Dimming range 100 percent to 10 percent.
   2. Power factor greater than 95 percent.
   3. THD less than 10 percent.
   4. No visible lamp flicker.
   5. Manufacturer: Lutron ECO-10 Series.

J. HID Ballasts:
   1. Provide minus 20ºF minimum starting temperature.
   2. Constant wattage multitap autotransformer (CWA) types equal to Advance 73B Series except, high leakage-reactance high power factor (HX-HPF) equal to Advance 72C Series acceptable for up to 100 watt high pressure sodium lamp.
   3. Provide ballasts for luminaires installed indoors, and where otherwise indicated, encapsulated core and coil type or otherwise specifically designed by manufacturer for quiet operation.
   4. HID ballasts shall be manufactured by Advance, Universal or equal.

2.06 LED DRIVER

A. Driver
   1. Rated case temperature shall be suitable for operation in the luminaire operating in the ambient temperatures as indicated.
   2. Shall accept the voltage or voltage range indicated, and shall operate normally for input voltage fluctuations of plus or minus 10 percent. Consistent with NEMA SSL 1.
   3. Shall have a minimum Power Factor (PF) of 0.90 at full input power and across specified voltage range.

B. Electromagnetic interference
   1. Shall have a maximum Total Harmonic Distortion (THD) of 20% at full input power and across specified voltage range.
   2. Shall comply with FCC 47 CFR part 15 non-consumer RFI/EMI standards.

C. The following shall be in accordance with corresponding sections of ANSI C136.37
   1. Wiring and grounding
   2. All internal components shall be assembled and pre-wired using modular electrical connections.
   3. Mounting provisions
   4. Terminal blocks for incoming AC lines
   5. Latching and hinging
   6. Ingress protection

2.07 LAMPS

A. Provide lamps for all luminaires.

B. HID lamps.

C. Where lamps are used in open luminaires, equip mercury vapor, metal halide and high pressure sodium luminaires with an integral approved shield or self-extinguishing lamps.

D. Lamps, coated or clear as recommended by luminaire manufacturer to provide for maximum luminaire efficiency in luminaire used. Provide color improved mercury or metal halide lamps for indoor areas. Provide clear lamps for all exterior fixtures unless otherwise noted. Provide coated lamps for all interior luminaires.

E. For interior use, all metal halide lamps installed in a common area of building are of the same manufacturer's production run. Color discontinuities after initial "burn in" are unacceptable and shall be replaced if deemed unacceptable to Owner. All indoor HID lamps shall be coated unless otherwise noted.

F. HID lamp types as specified in luminaire schedule. General Electric, Osram/Sylvania, Philips, Venture.

G. Position oriented lamps shall be used in all horizontal mounted lamp position fixtures. Universal lamp is not acceptable in horizontal lamp position.

H. Fluorescent Lamps:

1. All fluorescent lamps shall be second generation T8 lamps rated at minimum 3100 lumen output, 4100K minimum CRI 85, length and wattage as noted in luminaire schedule. GE F32T8/XL/SPX41/HL/ECO, OSRAM/Sylvania F032/84XPS/ECO, Phillips F32T8/ADV841/ALTO, 24,000 hour rated minimum lamp life.
2. Compact Fluorescent Lamps: Quad Tube, 4100K minimum CRI 85 unless otherwise noted. General Electric, Osram/Sylvania, Philips, 10,000 hour life minimum.
3. Provide fluorescent lamps by same manufacturer General Electric, Osram/Sylvania, Philips.

I. LED LIGHT SOURCE
1. Minimum Color Rendering Index (CRI): 60.
2. Correlated Color Temperature (CCT)
   a. CCT shall be as listed in Table 1 below:

Table 1. Allowable CCT

Manufacturer-Rated Nominal CCT (K)	Allowable LM-79 Chromaticity Values
	Measured CCT (K)
2700	2580 to 2870
3000	2870 to 3220
3500	3220 to 3710
4000	3710 to 4260
4500	4260 to 4746
5000	4745 to 5311
5700	5310 to 6020
6500	6020 to 7040

PART 3 - EXECUTION

3.01 INSTALLATION

A. Installation and furnishing of lighting fixtures shall be in accordance with the CEC, manufacturer's instructions and as shown on the drawings or specified. Fixtures damaged in transit and storage prior to completion shall be replaced at Contractor’s expense.

B. Align, mount and level the lighting fixtures uniformly.

C. Avoid interference with and provide clearance for equipment. Where the indicated locations for the lighting fixtures conflict with the locations for equipment, change the locations for the lighting fixtures by the minimum distances necessary as approved by the Architect. The Architectural reflected ceiling plan will take precedence over electrical plans.

D. For suspended lighting fixtures, the mounting heights shall provide the clearances between the bottoms of the fixtures and the finished floors as shown on the drawings.

E. Lighting Fixture Supports:
1. Contractor shall provide support for all of the fixtures independent of suspended ceilings. Supports may be anchored to channels of the ceiling construction, to the structural slab or to structural members within a partition, or above a suspended ceiling.

2. Shall maintain the fixture positions after cleaning and relamping.
3. Shall support the lighting fixtures without causing the ceiling or partition to deflect.
4. Hardware for recessed fluorescent fixtures:
5. Fixtures shall be supported as detailed on drawings and as required by DSA standards.
6. Installation: Fixtures shall be securely mounted on ceilings and walls with appropriate fastening devices. "Drop-in" type T-bar fixtures shall be secured with #12 gauge safety "earthquake wires" as described by California Code of Regulations Title 24 Part 2, Chapter 47. "Earthquake clips" will be required for fastening to the T-bar system in addition to safety wire. Surface mounted fluorescent fixtures shall be solidly screwed or clipped into framing above drywall with 4-#10 sheet metal screws into each fixture. Provide blocking for screw supports behind all surface mounted lighting fixtures weighing more than 15 lbs.
7. Surface mounted lighting fixtures:
    a. Fixtures shall be bolted against the ceiling independent of the outlet box at four points spaced near the corners of each unit. The bolts shall be minimum ¼-20 bolt, secured to structural ceiling. Non-turning studs may be attached to the building structure by 12 gauge safety hangers.
8. Fixtures mounted in open construction shall be secured directly to the building structure with approved bolting and clamping devices.
9. Single or double pendent mounted lighting fixtures:
    a. Each stem shall be supported by an approved outlet box, mounted swivel joint and canopy which holds the stem captive and provides spring load (or approved equivalent) dampening of fixture oscillations. Outlet box shall be supported vertically from the building structure and be allowed to swing to a 45 degree angle.
10. Outlet boxes for support of lighting fixtures (where permitted) shall be secured directly to the building structure with approved devices or supported vertically in a hung ceiling from the building structure with a nine gauge wire hanger, and be secured by an approved device to a main ceiling runner or cross runner to prevent any horizontal movement relative to the ceiling.

F. Furnish and install the specified lamps for all lighting fixtures as part of this project.

G. Coordinate between the electrical and ceiling trades to ascertain that approved lighting fixtures are furnished in the proper sizes and installed with the proper devices (hangers, clips, trim frames, flanges), to match the ceiling system being installed.

H. Bond lighting fixtures and metal accessories to the grounding system as specified in Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.

I. At completion of project, relamp all fixtures which have failed/burned-out lamps. Clean all fixtures, lenses, diffusers and louvers that have accumulated dust/dirt during construction.

J. Provide unswitched leg of interior lighting branch circuit to integral emergency battery pack light fixtures, exit signs and night lights as applicable per lighting plans.

K. Wallmount fixtures in walkway areas shall not project more than 4 inches from wall when projection occurs lower than 80 inches.

END OF SECTION

SECTION 26 56 00
EXTERIOR LIGHTING

PART 1 - GENERAL

1.01 DESCRIPTION

A. This section specifies the furnishing, installation, and connection of exterior luminaires, controls, poles and supports.

1.02 RELATED WORK

A. Section 26 05 00, COMMON WORK RESULTS FOR ELECTRICAL.

B. Section 26 05 33, RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS: Conduits, fittings, and boxes for raceway systems.

C. Section 26 05 19, LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW): Low voltage power and lighting wiring.

D. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path for possible ground fault currents.

E. Section 26 51 00, INTERIOR LIGHTING.

F. Section 26 56 70, LIGHTING ACCEPTANCE TESTING.

1.03 SUBMITTALS

A. Submit in accordance with Section 26 05 00, COMMON WORK RESULTS FOR ELECTRICAL.

B. Shop Drawings:
   1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
   2. Include electrical ratings, dimensions, mounting, details, materials, required clearances, terminations, wiring and connection diagrams, photometric data, ballasts, poles, luminaires, effective projected area (EPA), lamps and controls.

1.04 APPLICABLE PUBLICATIONS

A. Publications listed below (including amendments, addenda, revisions, supplements) form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

B. American Society for Testing and Materials (ASTM).

C. American Concrete Institute (ACI).

D. American National Standards Institute (ANSI).

E. Aluminum Association Inc. (AA).

F. Illuminating Engineering Society of North America (IESNA).

G. National Electrical Manufacturers Association (NEMA).

H. National Fire Protection Association (NFPA).

I. Underwriters Laboratories, Inc. (UL).

1.05 DELIVERY, STORAGE, AND HANDLING

A. Poles: Do not store poles on ground. Store poles so they are at least one foot above ground level. Do not remove factory-applied pole wrappings until just prior to installation of pole.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. Materials and equipment shall be in accordance with CEC, UL, ANSI, and as shown on the drawings and specified.

2.02 POLES

A. General:
   1. Poles shall be aluminum as specified in fixture schedule and as shown on the drawings. Finish shall be as approved by the Architect. Assume custom color for bidding.
   2. The pole and arm assembly shall be designed for wind loading of 100 miles per hour, with an additional 30 percent gust factor, supporting luminaire(s) having the effective projected areas indicated per manufacturer data.
   3. Poles shall anchor-bolt type designed for use with underground supply conductors. Poles shall have handhole with a minimum clear opening of 2.5” x 5”. Handhole cover shall be secured by stainless steel captive screws.
   4. Provide a steel grounding stud opposite hand hole openings.

B. Provide a base cover matching the pole in material and color to conceal the mounting hardware pole-base welds and anchor bolts.

C. Hardware: All necessary hardware shall be 300 series tamperproof stainless steel.

D. Types:

2.03 FOUNDATIONS FOR POLES

A. Foundations shall be cast-in-place concrete.

B. Foundations shall support the effective projected area of the specified pole, arm(s), and luminaire(s) under wind conditions previously specified in this section.

C. Place concrete in spirally wrapped treated paper forms for round foundations, and construct forms for square foundations.

D. Rub-finish and round all above-grade concrete edges to approximately 1/4" radius unless otherwise detailed.

E. Concrete shall have 3000 psi minimum 28 day compressive strength.

F. Anchor bolt assemblies and reinforcing of concrete foundations shall be as shown on the drawings and meet ACI 318. Anchor bolts shall be in a welded cage or properly positioned by the tie wire to stirrups.

G. Install a copperclad ground rod, not less than 5/8" diameter by 10' long in pullbox adjacent to each fixture. Where rock or layered rock is present, drill a hole not less than 2" in diameter and 6' deep, backfill with tamped fine sand and drive the rod into the hole. Bond the rod to the pole with not less than number 6 AWG bare copper wires. The method of bonding shall be approved for the purpose.

H. After leveling of pole grout base solid between plate and footing with dry pack concrete for vibration reduction.

2.04 LUMINAIRES

A. UL 1598 and ANSI C136.17. Luminaries shall be weatherproof, heavy duty, outdoor types designed for efficient light utilization, adequate dissipation of lamp and ballast heat and safe cleaning and relamping.

B. Light emitting diode (LED)-based solid state lighting (SSL) products shall be factory tested in accordance to the International Engineering Society (IES) LM-79 recommendations and meet ANSI C78.377-2008 standards.

C. LED light sources shall be factory tested in accordance to IES LM-80 recommendations.

D. LED-based SSL product shall incorporate an external heat sink, integral to the luminaire.

E. IESNA HB-9 and RP-8 light distribution pattern types shall be as indicated on the drawings.

F. Incorporate associated ballasts and drivers within the luminaire housing.

G. Lenses shall be frame-mounted heat-resistant, borosilicate glass, prismatic refractors. Attach the frame to the luminaire housing by hinges or chain.

H. Pre-wire internal components to terminal strips at the factory.

I. Bracket mounted luminaries shall have leveling provisions and clamp type adjustable slip-fitters with locking screws.

J. Materials shall be rustproof. Latches and fittings shall be non-ferrous metal.

K. LED-based SSL luminaires shall be manufactured specifically for LED lamps with drivers integral to the luminaire housing.

2.05 LAMPS

A. Luminaires shall be listed for the lamp specified on the associated electrical plans. Install the proper lamps in every luminaire installed.

B. Lamps shall be clear or coated as recommended by luminaire manufacturer to provide for maximum luminaire efficiency in fixture used.

2.06 LED-BASED SOLID STATE DRIVERS

A. Shall be listed by either U.L. or equal listing agency and comply with IEEE C.62.41-1991, Class A operation.

B. Provide a minimum power factor of 0.9.

C. Minimum operating temperature appropriate for outdoor environments.

D. Shall operate at a frequency greater than or equal to 120Hz.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install lighting in accordance with the CEC, as shown on the drawings, and in accordance with manufacturer's recommendations.

B. Poles:
1. Provide pole foundations with galvanized steel anchor bolts, threaded at the top end and bent 1.57 rad 90 degrees at the bottom end. Provide galvanized nuts, washers, and ornamental covers for anchor bolts. Thoroughly compact backfill with compacting arranged to prevent pressure between conductor, jacket, or sheath and the end of conduit elbow. Adjust poles as necessary to provide a permanent vertical position with the bracket arm in proper position for luminaire location.
2. After the poles have been installed, shimmed and plumbed, grout the spaces between the pole bases and the concrete base with non-shrink concrete grout material. Provide a plastic or copper tube, of not less than 3/8" inside diameter, through the grout tight to the top of the concrete base for moisture weeping.

C. Foundation Excavation: Depth shall be as indicated on drawings. Dig holes large enough to permit the proper use of tampers to the full depth of the hole. Place backfill in the hole in 6"

maximum layers and thoroughly tamp. Place surplus earth around the pole in a conical shape and pack tightly to drain water away.

3.02 GROUNDING

A. Ground noncurrent-carrying parts of equipment including metal poles, luminaries, mounting arms, brackets, and metallic enclosures as specified in Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS. Where copper grounding conductor is connected to a metal other than copper, provide specially treated or alloyed connectors suitable and listed for this purpose.

END OF SECTION

SECTION 26 5670
LIGHTING ACCEPTANCE TESTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section Includes:
   1. A Certificate of Acceptance will be required to be filed (by the Contractor) with and approved by the enforcement agency prior to receiving a final occupancy permit. The Certificate of Acceptance will indicate that the Contractor has demonstrated acceptance requirements of the plans and specifications, that current requirements for installation certificates are met, and that currently required operating and maintenance information (as well as the Certificate of Acceptance) were provided to the building Owner.
   2. Testing, evaluation and calibration of lighting controls equipment provided, installed and connected in Division 26.
   3. Documentation of test results, completion of “Certificate of Acceptance” forms (included herein) and filing with the enforcement agency for approval.
   4. Specific Jobsite Conditions:
      a. Acceptance testing must be tailored for each specific design, job site, and climactic conditions. While the steps for conducting each test remain consistent, the application of the tests to a particular site may vary. The Contractor shall review the construction documents and include all required time, material, testing equipment, etc. as required to complete the requirements of this section.

B. Related Work:
   1. Section 26 05 00, COMMON WORK RESULTS FOR ELECTRICAL.
   2. Section 26 51 00, INTERIOR LIGHTING.
   3. Section 26 56 00, EXTERIOR LIGHTING.
   4. Section 26 09 26, LIGHTING CONTROL SYSTEM.
   5. Section 26 09 00, CONTROLS AND INSTRUMENTATION.
   6. Section 26 09 23, OCCUPANCY SENSORS.

1.03 REFERENCES

A. Acceptance Testing Criteria: 2008 Building Energy Efficiency Standards Non-Residential Compliance Manual (October 2009).

1.04 SYSTEM DESCRIPTION

A. Performance Requirements:
   1. All material, equipment, labor and technical supervision to perform tests, calibrations and documentation specified herein.

B. Scope of Testing, Evaluation and Calibration (as applicable):
   1. Automatic (master) time switches.
   2. Occupancy sensors.
   3. Automatic daylighting controls.
   4. Photo electric sensors.
   5. Daylighting controls.
   6. Outdoor astronomical time switches.
   7. Area controls.

1.05 SUBMITTALS

A. Test Reports:
   1. Written record of all tests and completion of forms included in this section.
   2. At completion of project, assemble a final test report. Submit report to the enforcement agency and the Owner prior to final occupancy to include:
      a. Summary of project.
      b. Description of systems and equipment tested.
      c. Visual inspection report.
      d. Description of tests.
      e. Test results.
      f. Conclusions and recommendations.
   3. Report shall be bound in booklet form, include on the Contractor's letterhead the title of the report and the systems tested.

B. Constructability Plan Review
   1. The Contractor shall review the construction drawings and specifications to understand the scope of the acceptance tests and raise critical issues that might affect the success of the acceptance tests prior to starting construction. Any constructability issues associated with the lighting system should be forwarded to the design team for review/modifications prior to equipment procurement and installation. The Contractor shall submit on company letterhead, with the lighting control equipment required by Section 26 05 00, COMMON WORK RESULTS FOR ELECTRICAL, 1.4B, a letter confirming that the constructability review has been completed and their company has reviewed and is prepared to complete the lighting acceptance testing required by this section. The lighting acceptance testing shall be included in this letter at the time of equipment submittals.

PART 2 - PRODUCTS

2.01 FORMS

A. Lighting acceptance testing forms and verification procedures for lighting systems that require acceptance testing are listed below and included as part of this section:[and can be downloaded from the following website:
   http://www.energy.ca.gov/title24/2008standards/nonresidential_manual.html
   1. Form LTG-2-A Certificate of Acceptance (1 of 3)
   2. Form LTG-2-A Certificate of Acceptance (2 of 3)
   3. Form LTG-2-A Certificate of Acceptance (3 of 3)
   4. Form OLTG-2-A Certificate of Acceptance (1 of 3)
   5. Form OLTG-2-A Certificate of Acceptance (2 of 3)
   6. Form OLTG-3-A Certificate of Acceptance (3 of 3)

B. These completed forms will be the deliverable product to the enforcement agency and Owner as described in 1.4 of this section.

PART 3 - EXECUTION

3.01 FIELD QUALITY CONTROL

A. Tests:
   1. Contractor's Responsibilities:
      a. Perform all required tests required by this section.
      b. Schedule testing with building Owner.
      c. Provide window/skylight masking material required to simulate dark conditions of test during evening hours.
      d. Calibration of equipment such as light meters, photo electric controls, etc.
      e. Programming of time switches (interior/exterior lighting) for operations as directed by the Owner.

3.02 ADJUSTING

A. Final Settings: The Contractor shall be responsible for implementing all final settings and adjustments on controls equipment as required for a complete and operating system.

CERTIFICATE OF ACCEPTANCE	**LTG-2A**
Lighting Control Acceptance Document	**(Page 1 of 3)**
Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

FIELD TECHNICIAN'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, the information provided on this form is true and correct.
- I am the person who performed the acceptance requirements verification reported on this Certificate of Acceptance (Field Technician).
- I certify that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
- I have confirmed that the Installation Certificate(s) for the construction/installation identified on this form has been completed and is posted or made available with the building permit(s) issued for the building.

Company Name:		
Field Technician's Name:		Field Technician's Signature:
	Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, that I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this form.
- I am a licensed contractor, architect, or engineer, who is eligible under Division 3 of the Business and Professions Code, in the applicable classification, to take responsibility for the scope of work specified on this document and attest to the declarations in this statement (responsible person).
- I certify that the information provided on this form substantiates that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
- I have confirmed that the Installation Certificate(s) for the construction/installation identified on this form has been completed and is posted or made available with the building permit(s) issued for the building.
- I will ensure that a completed, signed copy of this Certificate of Acceptance shall be posted, or made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a signed copy of this Certificate of Acceptance is required to be included with the documentation the builder provides to the building owner at occupancy.

Company Name:			Phone:
Responsible Person's Name:		Responsible Person's Signature:	
License:	Date Signed:	Position With Company (Title):	

Occupant Sensor, Manual Daylighting Control, and Automatic Time Switch Control		
Intent:	Lights are turned off when not needed per Section 119(d) & 131(d).	
Construction Inspection		
1	Instrumentation to perform test includes, but not limited to:	
	a.	Hand-held amperage and voltage meter
	b.	Power meter

continued on next page

CERTIFICATE OF ACCEPTANCE	**LTG-2A**
Lighting Control Acceptance Document	**(Page 2 of 3)**
Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

2	Occupancy Sensor Construction Inspection		
	☐	Occupancy sensor has been located to minimize false signals	
	☐	Light meter	
	☐	Ultrasonic occupancy sensors do not emit audible sound (119a) 5 feet from source	
3	Manual Daylighting Controls Construction Inspection		
	☐	If dimming ballasts are specified for light fixtures within the daylit area, make sure they meet all the Standards requirements, including "reduced flicker operation" for manual dimming control systems	
4	Automatic Time Switch Controls Construction Inspection		
	a.	Automatic time switch control is programmed for (check all):	
		☐	Weekdays
		☐	Weekend
		☐	Holidays
	b.	Document for the owner automatic time switch programming (check all):	
		☐	Weekdays settings
		☐	Weekend settings
		☐	Holidays settings
		☐	Set-up settings
		☐	Preference program setting
	☐	Verify the correct time and date is properly set in the time switch	
	☐	Verify the battery is installed and energized	
	☐	Override time limit is no more than 2 hours	
	☐	Occupant Sensors and Automatic Time Switch Controls have been certified to the Energy Commission in accordance with the applicable provision in Section 119 of the Standards, and model numbers for all such controls are listed on the Commission database as Certified Appliance and Control Devices	

A.	**Select Acceptance Test** (Indicate lighting control systems Names/Designations by the applicable tests below)	
☐	1	Occupancy Sensor
☐	2	Manual Daylighting Controls
☐	3	Automatic Time Switch Controls

B.	**Equipment Testing Requirements** Check and verify those items applicable to selected system:	Applicable Lighting Control Systems		
Occupancy Sensor - Step 1: Simulate an unoccupied condition		1	2	3
a.	Lights controlled by occupancy sensors turn off within a maximum of 30 minutes from start of an unoccupied condition per Standard Section 119(d)	Y / N	Y / N	Y / N
b.	The occupant sensor does not trigger a false "on" from movement in an area adjacent to the controlled space or from HVAC operation	Y / N	Y / N	Y / N
c.	Signal sensitivity is adequate to achieve desired control	Y / N	Y / N	Y / N
Occupant Sensor - Step 2: Simulate an occupied condition				
a.	Status indicator or annunciator operates correctly	Y / N	Y / N	Y / N
b.	Lights controlled by occupancy sensors turn on when Immediately upon an occupied condition *OR* (this requirement is mutually exclusive with Step 2.c.)	Y / N	Y / N	Y / N
c.	Sensor indicates space is "occupied" and lights turn on manually	Y / N	Y / N	Y / N

continued on next page

CERTIFICATE OF ACCEPTANCE	LTG-2A
Lighting Control Acceptance Document	**(Page 3 of 3)**
Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Occupant Sensor - Step 3: System returned to initial operating conditions		Y / N	Y / N	Y / N
Occupant Sensor - Step 4 - Sensor is also a multi-Level Occupant Sensor used to qualify for a Power Adjustment Factor in Section 146(a)2D of the Standards. If yes, then 'a,' 'b,' and 'c' must also be yes.		Y / N	Y / N	Y / N
a.	The first stage activates between 30 to 70% of the lighting either manually or automatically.	Y / N	Y / N	Y / N
b.	A reasonably uniform level of illuminance is achieved by dimming of all lamps or luminaires; or by switching alternate lamps in luminaires, alternate luminaires, or alternate rows of luminaires.	Y / N	Y / N	Y / N
c.	After the first stage occurs, manual switches have been provided to activate the alternate set of lights, activate 100% of the lighting power, and manually deactivate all of the lights.	Y / N	Y / N	Y / N
Manual Daylighting Controls - Step 1: Manual switching control				
a.	At least 50% of lighting power in daylit areas is separately controlled from other lights	Y / N	Y / N	Y / N
b.	The amount of light delivered to the space is uniformly reduced	Y / N	Y / N	Y / N
Manual Daylighting Controls - Step 2: System returned to initial operating conditions		Y / N	Y / N	Y / N
Automatic Time Switch Controls - Step 1: Simulate occupied condition				
a.	All lights can be turned on and off by their respective area control switch	Y / N	Y / N	Y / N
b.	Verify the switch only operates lighting in the ceiling-height partitioned area in which the switch is located	Y / N	Y / N	Y / N
Automatic Time Switch Controls - Step 2: Simulate unoccupied condition				
a.	All non-exempt lighting turn off per Section 131(d)1	Y / N	Y / N	Y / N
b.	Manual override switch allows only the lights in the selected ceiling height partitioned space where the override switch is located, to turn on or remain on until the next scheduled shut off occurs	Y / N	Y / N	Y / N
c.	All non-exempt lighting turns off	Y / N	Y / N	Y / N
Automatic Time Switch Controls - Step 3: System returned to initial operating conditions		Y / N	Y / N	Y / N
Note: Shaded areas do not apply for particular test procedure				

C.	**PASS / FAIL Evaluation (check one):**
☐	PASS: All applicable **Construction Inspection** responses are complete and all applicable **Equipment Testing Requirements** responses are positive (Y - yes)
☐	FAIL: Any applicable **Construction Inspection** responses are incomplete *OR* there is one or more negative (N - no) responses in any applicable **Equipment Testing Requirements** section. Provide explanation below. Use and attach additional pages if necessary.

CERTIFICATE OF ACCEPTANCE	**OLTG-2A**
NA7.7 Outdoor Lighting Acceptance Tests	**(Page 1 of 3)**
Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

FIELD TECHNICIAN'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, the information provided on this form is true and correct.
- I am the person who performed the acceptance requirements verification reported on this Certificate of Acceptance (Field Technician).
- I certify that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
- I have confirmed that the Installation Certificate(s) for the construction/installation identified on this form has been completed and is posted or made available with the building permit(s) issued for the building.

Company Name:		
Field Technician's Name:		Field Technician's Signature:
	Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, that I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this form.
- I am a licensed contractor, architect, or engineer, who is eligible under Division 3 of the Business and Professions Code, in the applicable classification, to take responsibility for the scope of work specified on this document and attest to the declarations in this statement (responsible person).
- I certify that the information provided on this form substantiates that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
- I have confirmed that the Installation Certificate(s) for the construction/installation identified on this form has been completed and is posted or made available with the building permit(s) issued for the building.
- I will ensure that a completed, signed copy of this Certificate of Acceptance shall be posted, or made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a signed copy of this Certificate of Acceptance is required to be included with the documentation the builder provides to the building owner at occupancy.

Company Name:			Phone:
Responsible Person's Name:		Responsible Person's Signature:	
License:	Date Signed:	Position With Company (Title):	

CERTIFICATE OF ACCEPTANCE		OLTG-2A
NA7.7 Outdoor Lighting Acceptance Tests		**(Page 2 of 3)**
Project Name/Address:		
System Name or Identification/Tag:	System Location or Area Served:	

NA7.7.1 Outdoor Motion Sensor Acceptance		
Intent:	Lights are turned off when not needed per Section 119(d) & 132.	
Construction Inspection		
1.	Motion Sensor Construction Inspection	
	☐	Motion sensor has been located to minimize false signals
	☐	Sensor is not triggered by motion outside of adjacent area
	☐	Desired motion sensor coverage is not blocked by obstruction that could adversely affect performance
Functional testing		
1.	Simulate motion in area under lights controlled by the motion sensor. Verify and document the following:	
	☐	Status indicator operates correctly.
	☐	Lights controlled by motion sensors turn on immediately upon entry into the area lit by the controlled lights near the motion sensor
	☐	Signal sensitivity is adequate to achieve desired control
2.	Simulate no motion in area with lighting controlled by the sensor but with motion adjacent to this area. Verify and document the following:	
	☐	Lights controlled by motion sensors turn off within a maximum of 30 minutes from the start of an unoccupied condition per Standard Section 119(d).
	☐	The occupant sensor does not trigger a false "on" from movement outside of the controlled area
	☐	Signal sensitivity is adequate to achieve desired control.

NA7.7.2 Outdoor Lighting Shut-off Controls		
Construction Inspection		
1.	Outdoor Lighting Shut-off Controls Construction Inspection	
	☐	Astronomical time switch controls and automatic time switch controls have been certified to the Energy Commission in accordance with the applicable provision in Standards Section 119. Verify that model numbers of all such controls are listed on the Energy Commission database as "Certified Appliances & Control Devices."
	☐	Controls to turn off lights during daytime hours are installed
	☐	Astronomical and standard time switch control is programmed with acceptable weekday, weekend, and holiday (if applicable) schedules
	☐	Demonstrate and document for the owner time switch programming including weekday, weekend, holiday schedules as well as all set-up and preference program settings
2.	Lighting systems that meet the criteria of Section 132(c)2 of the Standards shall have a scheduling control (time switch) installed which is able to schedule separately:	
	☐	A reduction in outdoor lighting power by 50 to 80%
	☐	Turning off all outdoor lighting covered by Section 132(c)2 of the Standards
	☐	Verify that the correct time and date is properly set in the standard and astronomical time switch.
	☐	Verify that the correct latitude, longitude and time zone are set in the astronomical time switch.
	☐	Verify the battery back-up (if applicable) is installed and energized in the standard and astronomical time switch.

CERTIFICATE OF ACCEPTANCE	OLTG-2A
NA7.7 Outdoor Lighting Acceptance Tests	**(Page 3 of 3)**
Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

NA7.7.2.2 Outdoor Photocontrol Functional testing		
Note photocontrol must be used in conjunction with time switch or motion sensor to meet the requirements of Section 132(c)2 of the Standards.		
1.	Nighttime test. Simulate or provide conditions without daylight. Verify and document:	
	□	Controlled lights turn on
2.	Sunrise test: Provide between 10 and 30 horizontal footcandles (fc) to photosensor. Verify and document the following	
	□	Controlled lights turn off

NA7.7.2.3 Astronomical Time Switch Functional testing		
1.	Power off test. Program control with location information, local date and time, and schedules. Disconnect control from power source for at least 1 hour. Verify and document:	
	□	Control retains all programmed settings and local date and time
2.	Night schedule ON test. Simulate or provide times when the sun has set and lights are scheduled to be ON. Verify and document:	
	□	Controlled lights turn on
3.	Night schedule OFF test. Simulate or provide times when the sun has set and lights are scheduled to be OFF. Verify and document:	
	□	Controlled lights turn off
4.	Sunrise test: Simulate or provide the programmed offset time after the time of local sunrise	
	□	Controlled lights turn off

NA7.7.2.4 Standard (non-astronomical) Time Switch Functional Testing		
Note: this control must be used in conjunction with a photocontrol to meet requirements of Section 132(c) of the Standards.		
1.	Power off test. Program control with local date and time and schedules. Disconnect control from power source for at least 1 hour. Verify and document:	
	□	Control retains all programmed schedules and local date and time
2.	On schedule test. Simulate or provide times when lights are scheduled to be ON. Verify and document:	
	□	Controlled lights turn on
3.	Schedule test. Simulate or provide times when the sun has set and lights are scheduled to be OFF. Verify and document:	
	□	Controlled lights turn off

SECTION 31 00 00
EARTHWORK

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Excavation and scarification.

B. Rough grading, cutting, and filling.

C. Compaction of subgrade.

1.02 RELATED WORK DESCRIBED ELSEWHERE

A. Section 02 41 00 - Demolition

B. Section 32 10 13 - Asphaltic Concrete Paving

C. Section 32 10 15 - Concrete Paving and Sitework

D. Section 03 30 00 - Cast-in-Place Concrete

E. Section 22 00 00 - General Plumbing Requirements

1.03 REFERENCES

A. California Department of Transportation "Standard Specifications," referenced sections, State of California.

1.04 PROJECT/SITE CONDITIONS

A. Use all means necessary to control dust on or near the site resulting from the performance of the work. Thoroughly moisten all surfaces to prevent dust being a nuisance to the public, adjacent uses, and concurrent work on site.

B. Verify existing grades and dimensions before starting any grading operations. If any discrepancy exists with information shown on the drawings, notify the Architect immediately.

C. Use all means necessary to protect items designated to remain and all work of this Section.

D. All existing benchmarks shall be protected and maintained throughout the course of the work. Monuments or stakes disturbed or destroyed during the course of the work shall be re-established.

E. Earthwork shall be conducted as to avoid injury to persons and damage to adjacent property. Provide appropriate shoring, bracing and barriers, including light when necessary.

F. Earthwork operations shall comply with all safety requirements of the California Industrial Accident Commission and Division of Industrial Safety and the Federal Occupational Safety and Health Act (OSHA).

1.05 QUALITY ASSURANCE

A. The Owner may retain and pay a qualified Soils Engineer to take all field samples and do all laboratory testing necessary to insure compliance of the work to these Specifications. Results of any testing done during the course of the work shall be submitted to the Owner'

Representative and Architect. If testing is performed the Contractor shall provide 48 hours notice prior to commencing the following operations to permit the Owner's Soils Engineer to observe the work:

1. Over excavation for subgrade preparation.
2. Recompaction of scarified soils.
3. Placement and compaction of fill.
4. Footing excavation.

B. Should testing indicate work that does not satisfy these Specifications, the Contractor shall pay, through the Owner, for all additional tests required to determine the extent of work that is not satisfactory and for all additional tests necessary to demonstrate compliance with these Specifications.

C. The Contractor shall be responsible for contacting Underground Service Alert (USA), at 1-(800)-227-2600, prior to excavation to confirm the location of existing underground utility installations.

PART 2 - PRODUCTS

2.01 FILL MATERIAL FOR SUB-GRADE PREPARATION

A. Site Materials: All on-site fill materials shall be non clay-bearing, free of organic or deleterious products and shall be a soil/soil-rock product containing lumps or rock no greater than 4 inches in the greatest dimension, with not more than 15% larger than 2-1/2 inches in greatest dimension.

B. Import Materials: All import material shall meet the content requirements of 2.01/A above, be granular in nature per ASTM D 2488-00, readily compacted without excessive voids, and have an plasticity index not greater than 10 per ASTM D 4829-95. Imported material shall have enough binder to allow foundation excavations and utility trenches to stand without caving.

2.02 PAVING BASE

A. Class II aggregate base conforming to, mixed, spread and compacted to the requirements of Section 26 of the Standard Specifications, placed over approved compacted fill material per the requirements of 3.06/B below.

PART 3 - EXECUTION

3.01 GENERAL

A. Soils in the area of concrete footings and slabs shall be over-excavated to a level plane, then filled with moisture conditioned compacted structural fill.

B. Soils in the area of paving and concrete flatwork shall be scarified, moisture conditioned and compacted.

3.02 SITE PREPARATION

A. Clear the area of new construction of all large roots, abandoned pipes, undocumented fills, debris, and other deleterious materials and dispose of off site.

B. Strip surface vegetation and organic topsoil to a depth of at least 4 inches. Organic topsoil may be stockpiled for use in landscaping and non-structural fill areas if acceptable to the Landscape Architect.

C. Immediately upon discovery of any subsurface structures or utilities in areas subject to earthwork operations, contact the Architect to observe the void resulting from removal and the underlying surface. Proceed with fill and compaction as directed by the Architect or the Owner's Soils Engineer.

3.03 EXCAVATION, BACKFILLING AND COMPACTION

A. During cutting operations, stockpile removed soils for reuse as appropriate; stripped topsoil or clay bearing materials may only be used in landscape or non-structural fill.

B. During scarification operations, backfill and recompact all voids created by dislodging cobbles, roots, or debris and remove the dislodged cobbles, roots, or debris from the subgrade.

C. During compaction operations, moisten or dry all on-site or imported structural fill material to a level that is within + or - 2% of optimum moisture.

D. During fill operations, allow material containing excess moisture to dry to acceptable moisture content per 3.03 C above prior to compacting, spreading fill for air drying as required. Do not compact fill by jetting under any circumstances. Fill layers shall not exceed 8 inches compacted thickness.

E. Grading tolerances:
1. Top Surface of Subgrade: Plus or minus 1/10 foot.
2. Top Surface of Backfilling: Plus or minus 1/10 foot.

F. Bring to the immediate attention of the Architect or the Owner's Soils Engineer all wet, pumping, contaminated, or unstable areas encountered during excavation for resolution prior to proceeding with earthwork operations.

3.04 COMPACTION TESTING

A. Relative density laboratory tests, if performed, shall comply with ASTM D1557-91, Method A, B, or C; field tests performed in accordance with ASTM D-2922-91, and ASTM D-3017-91, using the Modified AASHO Test for Compaction. Modifications to these methods shall only be made as directed by a Soils Engineer.

3.05 PREPARATION OF SUBGRADE

A. Adjust subgrade by cutting or filling as required to accommodate finish grades shown for footings, flatwork, and paving, including thickness of any base course. Where not specified otherwise in 3.07 below, allow for 4 inches of finish grade fill above compacted subgrade. Roll the surface to a smooth and uniform texture free from lumps, rock pockets, soft spots, and spongy areas.

3.06 FINISH SITE GRADING

A. Adjust finish grade to elevations shown on the Drawings. Firmly hand tamp or compact by vibra-plate.

B. Slope grade away from buildings and walls a minimum of 2% slope for 5 feet.

C. Remove surplus fill materials from site, unless the Owner specifically identifies or approves another means of disposal.

3.07 SCHEDULE OF LOCATIONS

A. Condition structural footing area soils as follows:
   1. In areas below and 5 feet beyond the perimeter of all building footings, remove soils to a level plane at a minimum depth of 24 inches below bottom of existing grade or 12 inches below bottom of footings, whichever is deeper.
   2. Scarify the resulting surface to a depth of 12 inches and recompact as required for structural fill.
   3. Structural fill shall be placed in level lifts not exceeding 8 inches, brought to within + or - 2% of optimum moisture content and compacted to a minimum of 90% of maximum dry density as determined by test method ASTM D 1557-91. Fill and compact to top of subgrade.

B. Condition paving area soils as follows:
   1. In areas below and 5 feet beyond the perimeter of all new or replaced asphaltic or cast-in-place concrete paving, scarify, moisture condition to + or - 2% of optimum and recompact the upper 12 inches below existing grade or finished subgrade to a minimum of 90% maximum dry density.
   2. Place 12 inches of approved subgrade material and compact to 95% of maximum dry density, in thickness indicated on drawings, or as established by San Luis Obispo Engineering Standards.

C. Condition concrete walk and flatwork soils as follows:
   1. In areas below and 12 inches beyond the perimeter of all walks and flatwork compact subgrade per paragraph 3.06 A. 3 above.

D. Condition landscape area soils as follows:
   1. Compact all fill material per paragraph 3.06 A. 3 above, to 12 inches below finish grade.
   2. Remove native soils as necessary to provide for 12 inches of top soil at finish grade. Compact the resulting surface by vibra-plate. Stockpile sufficient material for landscape contractor's use in finish grading at planted areas.

E. Condition utility trenches as follows:
   1. Trench bottoms shall receive bedding of free draining sand up to 12 inches above utility pipes compacted to 90%.
   2. Trench backfill above bedding shall be approved on-site inorganic material or non-expansive import per 2.01, placed in 8 inch lifts, conditioned to between +2% and -2% of optimum moisture and compacted to 90%. The top 12 inches below vehicle parking or walks/flatwork shall be compacted to 95%. Trench walls shall be kept moist during backfill placement.
   3. Trenches or excavations greater than 5 feet in depth shall be shored or sloped back in compliance with OSHA regulations prior to entry.

END OF SECTION

SECTION 32 10 13
ASPHALTIC CONCRETE PAVING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Asphaltic concrete paving at parking and driveway areas.

B. Paint striping and marking at parking spaces, aisles, and crosswalks.

1.02 RELATED WORK

A. Section 31 00 00 - Earthwork

B. Section 32 10 15 - Concrete Paving and Sitework

1.03 REFERENCES

A. Referenced portions of "Standard Specifications" of State of California Department of Transportation.

B. San Luis Obispo City Engineering Standards.

PART 2 - PRODUCTS

2.01 ASPHALTIC CONCRETE

A. Binder:
Paving asphalt (as described in Section 92 of referenced standards), with a viscosity grade of AR4000.

B. Asphaltic Concrete:
Type B asphaltic concrete (as described in Section 39 of referenced standards), with aggregate type B, 3/4" diameter maximum size, medium graded.

2.03 TACK COAT

A. For application to all vertical asphaltic concrete or cast-in-place concrete surfaces to be paved against: SS-1h emulsified asphalt (as described in Section 37 of referenced standards)

2.04 SEAL COAT

A. Fog type, SS-1h emulsified asphalt (as described in Section 37 of referenced standards).

2.05 STRIPING PAINT

A. White traffic paint complying with Federal Specification TT-P-115E; Dunn-Edwards W801 "Vin-L-Stripe" epoxy modified acrylic latex or equivalent.

PART 3 - EXECUTION

3.01 INSPECTION

A. Verify that compacted base is dry and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

C. Beginning of installation means acceptance of existing conditions.

3.02 PLACEMENT OF ASPHALTIC CONCRETE SURFACING

A. Repair any voids occurring after completion of grading operations.

B. Place asphaltic concrete in strict accordance with the provisions of Section 39 of the referenced standards.

C. Roll surface until smooth and dense texture is obtained, using equipment and placement methods allowed by referenced standards.

D. Asphaltic concrete thickness at on-site paving areas shall be no less than 4 full inches after compaction over 8 inches of compacted base (traffic index of 6), unless otherwise specified by a civil engineer.

E. Asphaltic concrete thickness at any repairs to the public street shall be as directed by the San Luis Obispo City Engineer.

3.03 PLACEMENT OF SEAL COAT

A. Apply seal coat a minimum of 7 days after placement of asphaltic concrete, in accordance with Section 37 of the referenced standards.

B. Apply seal coat at the rate of .07 gallons per square yard over the entire paved area.

C. Carefully remove all seal coat from concrete and other adjacent surfaces.

3.04 ADJUSTMENTS

A. Finish all asphaltic concrete surfaces to meet the tolerances described in Section 39, Article 39-6.03 of the referenced standards.

B. Upon direction of the Architect, cut out and/or rework all surfaces which pond or do not meet these tolerances.

3.05 PAINTING

A. Thoroughly clean areas to receive paint striping and marking.

B. Apply striping paint in strict accordance with the Drawings, San Luis Obispo City standards, and the manufacturer's recommendations, protecting painted surfaces until dry.

3.06 CLEANUP

A. Clean up and remove all debris related to paving operations from site.

B. Clean any asphalt products splattered on adjacent surfaces with an appropriate cleaner.

END OF SECTION

SECTION 32 10 15
CONCRETE PAVING AND SITEWORK

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Non-pigmented concrete walks, steps, sidewalks, curbs, gutters, drainage structures, driveway and parking lot paving, and related concrete site improvements as shown on drawings.

1.02 RELATED WORK

A. Section 31 00 00 - Earthwork

B. Section 32 10 13 - Asphaltic Concrete Paving

C. Section 03 30 00 - Cast-in-Place Concrete

1.03 REFERENCES

A. San Luis Obispo City Engineering Standards, current edition.

B. ACI 301 - Specifications for Structural Concrete for Buildings.

C. ANSI/ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.

D. ANSI/ASTM A497 - Welded Deformed Steel Wire Fabric for Concrete Reinforcement.

E. ANSI/ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction.

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

G. ASTM C33 - Concrete Aggregates.

H. ASTM C94 - Ready Mixed Concrete.

I. ASTM C150 - Portland Cement.

J. ASTM C979 - Concrete Color Additives.

K. Referenced portions of "Standard Specifications" of State of California Department of Transportation.

1.04 QUALITY ASSURANCE

A. Perform work in accordance with ACI 301.

B. Obtain materials for similar installations from same source throughout.

1.05 REGULATORY REQUIREMENTS

A. Conform to California Administrative Code Title 24 for slopes and surface treatments of public walk and ramp surfaces.

1.06 TESTS

A. Concrete slump and strength testing and analysis will be performed under provisions of Section 01 40 00.

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

A. Cement: ASTM C150 Normal-Type I or II.

B. Fine and Coarse Aggregates: ASTM C33.

C. Water: Clean and not detrimental to concrete.

2.02 FORM MATERIALS

A. Conform to ACI 301 and Section 03300 of these specifications.

B. Joint Filler: per ASTM D1751; Burke No. 236 or approved equivalent, 1/4 inch thick.

2.03 REINFORCEMENT

A. Reinforcing Steel: Conform to Section 03300.

B. Welded Steel Wire Fabric: Plain type, ASTM A185, uncoated finish.

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

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

2.04 ACCESSORIES

A. Curing Compound: Conform to ASTM C309; any Burke product compatible with concrete additives.

B. Form Release: Burke Release #1 form release agent or equivalent non-oil type form coating.

C. Preformed Joint: Burke No. 237 Plastic Zip Strip joint former or approved equivalent.

2.05 ADDITIVES

A. Chemical Admixtures: Admixtures for water reduction, acceleration, retardation, air entrainment, or high early strength shall conform to appropriate ASTM designations and shall be used only if approved in advance by Architect on the basis of submittals under provisions of Section 01300.

2.07 CONCRETE MIX

A. Mix concrete in accordance with ASTM C94.

B. Provide concrete mixes according to the following schedule:
   1. Walks: 2,000 psi 28-day compressive strength, Class B concrete.
   2. Curbs and Gutters: 2,500 psi 28-day compressive strength, Class B concrete.
   3. Vehicle Paving: 3,000 psi 28-day compressive strength, Class B concrete.

C. Use accelerating admixtures in cold weather, set-retarding admixtures during hot weather, or air entraining agent to concrete mix for concrete work subject to freeze/thaw cycling only when approved by Architect.

PART 3 - EXECUTION

3.01 INSPECTION

A. Verify compacted base is ready to support concrete paving, walks, flatwork and imposed loads.

B. Verify gradients and elevations of subgrade are correct.

C. Beginning of installation means acceptance of existing conditions.

3.02 PREPARATION

A. Moisten substrate to minimize absorption of water from fresh concrete.

3.03 FORMING

A. Place and secure forms to correct location, dimension, and profile, and in compliance with Section 03 30 00.

B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

C. Place joint fillers vertical in position, in straight lines. Secure to formwork during concrete placement.

D. Unless otherwise noted on drawings, form walks and plazas at 4 full inches thickness and vehicle paving at 6 full inches thickness.

3.04 REINFORCEMENT

A. Place reinforcement as indicated in details on drawings, and in compliance with Section 03 30 00.

B. Interrupt reinforcement at expansion joints.

C. Provide dowelled joints at interruptions of concrete with one end of dowel treated to allow longitudinal movement.

D. Concrete vehicle paving shall be reinforced with a minimum of #3 bars at 24" o.c. both directions; cold joints shall be reinforced with #4 smooth dowels at 36" o.c.

E. Unless noted otherwise, walks and miscellaneous flatwork shall be reinforced with 6” X 6” 10/10 expanded wire mesh.

3.05 FORMED JOINTS

A. Place joints at locations indicated on drawings or as directed by Architect, to correct elevation and profile. Align curb, gutter, and sidewalk joints.

B. Determine which joints shall be expansion joints and which joints shall be contraction crack control (weakened plane) joints based on referenced standards (Caltrans Standard Specifications, Chapter 40). In no case shall a concrete paving surface extend more than twelve (12) feet unbroken by a joint.

C. Tool joints with a metal joint tool. Sawcut joints may only be used if approved in advance by the Architect. Sawcut joints in exposed to view locations shall be cut against a straightedge guide to assure a straight line.

3.06 PLACING CONCRETE - GENERAL

A. Place concrete in accordance with ACI 301.

B. Ensure reinforcement, inserts, embedded parts and formed joints are not disturbed during concrete placement.

C. Place concrete continuously between predetermined construction joints. Do not break or interrupt successive pours such that unplanned cold joints occur.

3.07 FINISHING

A. Finish concrete paving and related flatwork according to the following schedule:
   1. Curbs and Gutters: Smooth Sacked.
   2. Sidewalks: Light Broom, conforming to San Luis Obispo City standards and meeting CBC Section 1133B.7 requirements for slip resistance.
   3. Internal Project Walks, Ramps, Steps and Plazas: Light Broom, perpendicular to length, meeting CBC Section 1133B.7 requirements for slip resistance. Provide static coefficient of friction, measured by a means acceptable to the Authority Having Jurisdiction, of 0.6 or better for accessible routes and 0.8 or better for ramps.
   4. Vehicle Surfaces: Medium Broom.

B. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

3.09 PROTECTION

A. Immediately after placement, protect concrete from premature drying, rain pitting, excessive hot or cold temperatures, and mechanical injury.

B. Do not allow spotting, ponding or uneven accumulation of moisture during cure period.

END OF SECTION

SECTION 32 20 00
SITEWORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Metal Fence and Gates.

B. Site Furnishings.

C. Playground Equipment.

D. Bicycle Racks.

E. Playground Surfacing.

1.02 RELATED SECTIONS

A. Section 32 10 15 – Concrete Paving and Sitework

B. Section 03 30 00 – Cast-in-Place Concrete

C. Section 09 9 000 – Painting

1.03 SUBMITTALS

A. Submit product data under provisions of Section 01 30 00.

B. Submit shop drawings, describing fence and gate layout, elevations, dimensions, details, and accessories, under provisions of Section 01 30 00.

C. Submit shop drawings for playground equipment, describing equipment location/orientation, locations of footings or mounting hardware, and dimensions of fall zones separating equipment from hard surfaces, under provisions of Section 01 30 00.

1.04 REFERENCES

A. ASTM F 668, Class 2b – PVC Coated Metal Fence Materials

B. ASTM A 526 – Hot Dip Galvanized Coating

C. ASTM F 1043 – Cold Formed Steel Fence Components

D. ASTM A 446 – Cold Rolled Steel Sheet

E. ASTM F1292 - Play Surface Impact Attenuation

1.05 QUALITY ASSURANCE

A. Qualification of fabricators: established manufacturer with a minimum of five years' experience in the fabrication of the specified product types.

B. Qualifications of fence installers: established fence installer approved by the manufacturer for installation of the specified products, with a minimum of three years' experience.

1.06 WARRANTIES

A. Fence and Gate Systems: 12 years limited for galvanized coatings, 15 years limited for powder coating and vinyl coating.

B. Athletic Equipment and Bicycle Racks: limited lifetime warranty.

PART 2 - PRODUCTS

2.01 FENCE AND GATES

A. Acceptable Manufacturers:

1. Master Halco, Ameristar.

2. Alternate products may be used if approved on the basis of submittals made under provisions of Section 01 30 00.

B. Product Characteristics:

1. Product: Classic Ornamental Premier commercial fencing.
2. Design: Universal 3-Rail.
3. Materials: hot dip galvanized and polyester powder coated steel 50 KSI yield strength.
4. Gate Hinges: True-Close self-closing 180º non-liftoff type hinges by D&D Technology, adjustable to 5 lbs. maximum operating pressure.
5. Gate Latch: Nationwide Industries OM ornamental, locking magnetic gate latch, accessible lever handle.
6. Color: black.
7. Mounting: posts set directly in concrete footings.

2.02 SITE FURNISHINGS

A. Acceptable Manufacturer:

1. Belson Outdoors Inc.

2. Alternate products may be used if approved on the basis of submittals made under provisions of Section 01 30 00.

B. Picnic Tables:

1. Standard Tables (3 total): Belson Model PMB-6P "Park Master" 72" long, black painted/coated steel frame, cedar color recycled plastic top and benches.
2. Universal Accessible Tables (2 total): Belson Model PMB-HP "Park Master" 72" long with accessible extension, one side, black painted/coated steel frame, cedar color recycled plastic top and benches.
3. Mounting: manufacturer's recommended steel strap and concrete footing.

C. Benches:

1. Fixed Park Benches (4 total): Belson Model PB6-CONING "Contour" 72" long, black painted/coated steel frame, cedar color recycled plastic back and seat.
2. Mounting: in-ground mount; posts into concrete footings.

D. Grills:

1. Fixed Grills (2 total): Belson Model FC-1193-BHC, with utility shelf US-100, black painted/coated steel frame with adjustable, non-removable rack.
2. Mounting: in-ground mount; post into concrete footing.

E. Trash Receptacles:

1. Fixed Receptacles (3 total): Belson Model PLS-32A, 25-1/4" dia. x 30-1/2" high, black painted/coated steel frame and top, cedar color recycled plastic sides.
2. Mounting: manufacturer's recommended steel strap and concrete footing.

2.03 PLAYGROUND EQUIPMENT

A. Acceptable Manufacturers:

1. As listed below.

2. Alternate products may be used if approved on the basis of submittals made under provisions of Section 01 30 00.

B. Swing Set:

1. Commercial Playground Swing: 3-seat fixed swing set, Playtime Playground Equipment Model No. 11560-COMM-OUT, strap seats, color as selected by Architect.
2. Mounting: posts mounted into concrete footing.

C. Spring Toys:

1. Tot Lot Riding Toys (3 total):
   a. Truck Spring Bouncer: AAA State of Play Item No. FB007 "Tommy Truck," manufactured by Quitele, plastic body on painted steel spring.
   b. Frog Spring Bouncer: AAA State of Plan Item No. SA-05 "Freddy Frog," manufactured by Childworks, plastic body on painted steel spring.
   c. 4-Seat Spring Bouncer: Playtime Playground Equipment Model No. 11579-COMM-OUT, 84" diameter, powder coated steel.
2. Mounting: per manufacturer's recommendations, into concrete anchors.

D. Tot Lot Activity Station:

1. Interactive Play Structure: Play and Park Model No. 66507 "Educational Activity Center" by Playcore, 6 powder coated steel posts, 5 polyethylene plastic panels, 54" x 101" total footprint dimension.
2. Mounting: per manufacturer's recommendations, into concrete anchors.

2.04 BICYCLE RACKS

A. Acceptable Manufacturer:

1. Peak Racks.

2. Alternate products may be used if approved on the basis of submittals made under provisions of Section 01 30 00.

B. Bicycle Racks (11 sets):

1. Peak Racks Single Sided 125" rack for 7 bikes, galvanized (3 total).
2. Peak Racks Double Sided 84" rack for 8 bikes, galvanized (9 total).
3. Mounting: per manufacturer's recommendations, into concrete surface.

2.05 PLAYGROUND SURFACING

A. Acceptable Manufacturer:

1. Playgrounds Unlimited.

2. Alternate products may be used if approved on the basis of submittals made under provisions of Section 01 30 00.

B. Playground Safety Surface: Rubber Bark by Playgrounds Unlimited, manufactured from metal-free recycled tire material, min. 4" thick, in color selected by Architect from standard range.

2.06 OTHER MATERIALS

A. All other materials, not specifically described but required for a complete and proper fence, gate, and gate operator installation, shall be new, of first quality, and subject to the architect’s approval.

PART 3 - EXECUTION

3.01 INSPECTION

A. Prior to installation of site improvements, carefully inspect the area of work, and related work of other trades to verify that such work is complete, accurate, and ready to receive the work of this Section.

B. Beginning of installation means acceptance of existing conditions.

3.02 FABRICATION AND DELIVERY

A. Fabricate fence and gate components in accordance with approved shop drawings.

B. Deliver products of this Section to the jobsite and protection from damage under provisions of Section 01 60 00 of these Specifications.

3.03 PREPARATION

A. Lay out site improvements for approval of Owner's representative prior to commencing with the work of this Section.

B. Lay out playground equipment in strict compliance with approved fall zone dimensions.

C. Compact subgrade below playground surfacing as recommended by surfacing manufacturer, sloping subgrade at 1% minimum to drain.

3.04 INSTALLATION

A. Permanently anchor site improvement items in compliance with manufacturers' recommendations.

B. Install fence posts, rails, and all fence frame components plumb, level, and accurately fitted.

C. Install site improvements as directed by manufacturers' published instructions, using the full number of recommended fasteners.

3.05 CLEAN-UP

A. Remove any debris related to the work of this Section from the project site.

B. Touch up any galvanized coating, paint, or vinyl coating damaged during installation with manufacturer's recommended touch-up material to the Architect's approval.

END OF SECTION

SECTION 32 80 00
IRRIGATION SYSTEM
(08202012)

PART 1 - GENERAL

1.01 DESCRIPTION

A. This section includes all furnishing, all labor, tools, machinery, materials, automatic control devices, and processes required to complete the irrigation system as indicated on the drawings; installed ready for use without further cost in labor or materials to the Owner.

B. It is the intent of the Drawings and these Specifications to indicate and specify a complete and efficient irrigation system retrofit providing total 100 percent coverage and proper precipitation for all the planting areas to comply with the City of San Luis Obispo requirements.

C. When not otherwise specified, workmanship and material shall conform to the local plumbing code having jurisdiction.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Planting, in Section 32 90 00

B. Grading.

C. Excavation and Backfill.

1.03 MATERIALS

All materials are listed, and installation details provided on the Planting & Irrigation Drawings, by either manufacturer and model, or equipment type.

1.04 GENERAL REQUIREMENTS

A. The Irrigation Plan(s) are diagrammatic. The intent is to provide a complete and efficient sprinkler irrigation system ready for use with 100 percent coverage and head-to-head spacing.

B. The Contractor shall apply for all necessary permits. Furnish acceptance certificate and receipts to the Owner Representative.

C. Prior to submission of his bid, the Contractor shall examine the site, the complete Drawings of the project, and the Specifications for same in addition to the Drawings and Specifications for the sprinkler irrigation portion of the work.

D. Verify the location, size, and detail of stubouts provided as the source of water supply to the irrigation system, as shown on the plans.

E. Any items shown or written on the Drawings or in these Specifications shall be considered to appear on both.

F. In the event of "conflict" between the Drawings and Specifications, the Landscape Designer shall be consulted.

G. Protect existing site improvements from damage, including existing trees, curbs, and walks. Notify the Owner Representative immediately in the event that piping, electrical conduits, or other underground utilities not shown on the Drawings are encountered in the excavation. All utilities, conduits, and piping, whether indicated on the Drawings or not, shall be protected to keep them safely in service.

H. The Contractor shall keep the premises clean and free of excess equipment, materials, and rubbish incidental to his work.

I. Rough final grades indicated on the Drawings shall be achieved prior to commencing the work under this Section. At completion of irrigation work, trenches shall be returned to finish grades indicated on Drawings.

J. Verify the correctness of all finish grades within the work area in order to insure proper soil coverage (as specified) of the irrigation system pipes.

K. Backfill material shall be of approved soil. Unsuitable material, including clods and rocks over 2-1/2” in size, shall be removed and disposed of legally at no extra cost to the Owner Representative. No large or sharp rocks shall bear directly on the pipe. Backfilling shall be done carefully and shall be properly tamped to 90 percent compaction and 95 percent for top 6” of backfill.

L. Upon completion of installation, the Contractor shall check and adjust each sprinkler head to meet the site requirements and the plan.

M. The Contractor shall furnish record drawings to the Owner Representative, showing all and any deviations from the original plan to achieve proper coverage.

1.05 REFERENCE SPECIFICATIONS AND STANDARDS

A. Architect and Owner's Representative shall decide all questions relative to the quality of workmanship and materials furnished.

B. The Architect shall decide all questions relating to the "interpretation" of the Drawings and Specifications and the acceptable fulfillment of the contract.

1.06 SUBSTITUTIONS

A. The Contractor shall furnish the articles, equipment materials or processes specified by name in the Drawings and Specifications. No substitutions will be allowed without prior written approval by the Architect.

B. Manufacturer's warranties shall not relieve the Contractor of his liability under the guarantee. Such warranty shall only supplement the guarantee.

1.07 IRRIGATION GUARANTEE

A. The entire sprinkler system shall be unconditionally guaranteed by the Contractor as to material and workmanship, including settling of backfilled areas below grade for a period of one (1) year following the date of Owner's final acceptance of work.

B. If, within one (1) year from the date of Owner's final acceptance, settlement occurs and adjustments in pipes, valves and sprinkler heads, sod or paving is necessary to bring the system, sod or paving to the proper level of the permanent grades, the Contractor, as part of the work under his contract, shall make all adjustments including restoration of damaged planting, paving, or other improvements.

1.08 RESPONSIBILITY

A. The Contractor shall locate lines, valves, and other underground utilities, etc., prior to excavating trenches. The Contractor shall be held responsible for any damage to existing utilities.

1.09 RECORD DRAWINGS

A. Location on drawing are diagrammatic only and shall be changed and adjusted as necessary or as directed, to meet existing conditions and to follow the intent of the drawings and specified in obtaining complete water coverage. It is, therefore, the Contractor's responsibility to record any changes as to location of equipment on "as-built" drawings.

B. Procedure for as-built preparation shall be:

1. Show dimensional locations and depths of the following:
   a. Point of connection.
   b. Routing of sprinkler pressure lines (dimension maximum 100 feet along routing and all directional changes).
   c. Gate valves.
   d. Sprinkler control valves.
   e. Quick coupling valves.
   f. Routing of control wires.
   g. Other related equipment (as may be directed by the Landscape Architect).
2. Maintain as-built drawings on site at all times. Post information on as-built drawings day-to-day as the project is installed.

1.10 OPERATING INSTRUCTIONS AND CONTROLLER CHART

A. An operation and instruction manual shall be furnished for each type of automatic controller and any other power equipment.

B. The Contractor shall fill in the sequence chart at each controller, or provide one if not normally part of the unit, and shall readily identify value locations without leaving controller location.

1.11 OPERATION AND MAINTENANCE MANUALS

A. Prepare and deliver the Owner within ten (1) calendar days prior to completion of construction, all required and necessary descriptive material and complete detail and sufficient quantity, properly prepared in four (4) individually bound copies. Describe the material installed in sufficient detail to permit operating personnel to understand, operate and maintain all equipment. Include spare parts list and related manufacturer information of each equipment item installed. Each manual shall include the following:

1. Duration of guarantee period.

2. Complete operating and maintenance instruction on all major equipment with parts numbers and exploded views.

B. In addition to the maintenance manuals, provide the maintenance personnel with instruction for major equipment and show written evidence to the Owner at the conclusion of the project that is service has been rendered.

1.12 MISCELLANEOUS EQUIPMENT TO BE FURNISHED

A. One extra sprinkler body/nozzle of each type specified.

B. Two keys for the irrigation controller.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Rain Bird Corporation
PO Box 1492
Redlands CA 92373
Anita Matlock, Specifications
951.314.1740
amatlock@rainbird.com

B. Hunter Industries
1940 Diamond St.
San Marcos CA 92078
760.744.5240

C. Netafim USA Corporate Office
5470 East Home Ave. Fresno,
CA 93727
559.453.6800 office

2.02 MATERIALS

A. Controller: The controller shall be of the type and model as required by the accompanying drawings and fitted with ET Manager Cartridges, Rmote optional.

1. www.rainbird.com/ESPLXseries/products/traditional/ESP-LXME
2. www.rainbird.com/landscape/products/controllers/ETmanagerCartridge
3. www.rainbird.com/landscape/products/controllers/LIMR

B. Service Assembly; Pressure Regulator WYE Filter, Master Valve & Flow Sensor: The service assembly pressure regulator WYE filter, master valve & flow sensor shall be of the type and model as required by the accompanying drawings and installed to meet the City of San Luis Obispo Engineering Standards.

1. www.watts.com
2. www.rainbird.com/landscape/products/valves/GB-Rseries
3. www.rainbird.com/landscape/products/central/flowsensors

C. Irrigation Valves: The drip and spray valves shall be of the type and model as required by the accompanying drawings.

1. www.rainbird.com/landscape/products/valves/PEB_PESBseries
2. www.rainbird.com/landscape/products/dripControl/XCZ-100-PRBR

D. Quick Coupler: The quick coupler shall be of the type and model as required by the accompanying drawings.

1. www.rainbird.com/landscape/products/valves/quickCouplingValves

E. Sprinkler Heads: All sprinkler heads and bubblers shall be of the type and model as required by the accompanying drawings.

1. Body: www.rainbird.com/golf/products/landscape/RD1800
2. Nozzel: www.rainbird.com/landscape/products/rotors/5000plus
3. www.rainbird.com/landscape/products/sprayNozzles/rotaryNozzles
4. Optional Nozzel: www.hunterindustries.com/product/nozzles/mp-rotator
5. Assembly: www.rainbird.com/landscape/products/rotors/TSJswingJoints

F. Dripline & Emitters: The dripline and emitters shall be of the type and model as required by the accompanying drawings.

1. www.rainbird.com/landscape/products/dripline/XFseriesDripline
2. www.netafimusa.com/landscape/products/pressure-compensating

G. Valve Box Covers: The valve box covers shall be of the type and model as required by the accompanying drawings.

1. www.rainbird.com/landscape/products/accessories/VBseriesValveBoxes

J. Automatic Controller Remote Control Valves and Valve Boxes: The automatic controller remote control valves and valve boxes shall be the model and type as required by the accompanying drawings.

K. Plastic pipe: all plastic pipe shall be PVC extruded from 100% virgin polyvinyl chloride class 1120-1220 permanently stamped with the manufacturers names, nominal pipe size, PVC 1120-1220 and the pressure rating in PSI. All pressure lines shall be schedule 40. All non-pressure lines shall be class 200, except pipe which is installed under paved areas which shall be schedule 40.

L. Plastic fittings: All plastic fittings shall be injection molded PVC schedule 40, NSF approved Marlex® as required by the accompanying drawings.

M. Control Wiring: All direct burial wire shall be 600V single conductor solid copper UF, UL approved. Minimum wire gauges shall be No. 14 AWG for control wire and No. 12 AWG for the common ground return wire. Common wire shall have a white insulating jacket, with control wires having any color jacket other than white. Splices shall be made with Pen-Tite® type connectors with resin.

N. Solvent-weld: All solvent-weld and primer for PVC pipe shall be of a make and type approved by the manufacturer(s) of the pipe and fittings for the intended use. Solvent-weld shall be maintained at the proper consistency throughout use.

O. Teflon Tape: All threaded connections shall be joined with the use of Teflon tape. Pipe dope or other pipe joint compounds are not approved for use on this job.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Site Conditions

1. The Contractor shall check and verify all dimensions on the site prior to proceeding with work under this contract.
2. Extreme care shall be exercised in excavating and working near existing utilities. Contractor shall be responsible for damage to any facilities.
3. Disruption of services: Permission to shut off any water lines must be obtained from the Construction Supervisor, who will make necessary arrangements. Disruption in existing systems shall be kept to a minimum.
4. Static pressure: The contractor shall verify the static pressure at the irrigation points of connection to the water supply prior to commencing work and shall notify the owner in writing of the pressure available at least forty-eight (48) hours prior to the commencement of work.

3.02 PREPARATION

A. Physical layout: Prior to commencing work on the project, the contractor shall have laid out the irrigation system as shown on the accompanying drawings for approval by the Landscape Architect or Owners representative. Trenching shall begin only after the layout is approved. The contractor shall be responsible to determine the actual existing pipe locations; locations shown are based upon the best information available but are not guaranteed. Actual layout shall conform with the actual site conditions and the intent shown on the accompanying drawings.

3.03 PVC PIPE AND CLEARANCES

A. All pipes shall have a minimum clearance of 4 inches from each other and a minimum clearance of 6 inches from pipes of other trades. Parallel lines shall not be installed directly over one another.

B. PVC pipe shall be installed to allow for expansion and contraction as recommended by the manufacturer.

C. Joints shall be allowed to set at least twenty-four (24) hours before pressure is applied to the system.

3.04 PVC SLEEVES AND CONDUIT

A. All PVC mainline sleeves shall be a minimum of twice (2x) the outside diameter of the pipe fitting to be sleeved.

B. All PVC non-pressure lateral lines shall be installed prior to paving.

C. All PVC control wire conduit shall be of sufficient size to hold the required quantity of control and common wires.

D. All sleeving and conduits to be of sufficient strength to withstand all possible traffic.

3.05 TRENCHES

A. Trenches shall be dug with vertical sides and a flattened bottom. Pressure lines and lateral lines under paved areas shall have a minimum depth of 24 inches below subgrade. All other lateral lines shall have a minimum depth of 18 inches below subgrade.

3.06 INSTALLATION

A. Water connection: The recycled water meter connection shall be made at the point indicated on the accompanying drawings. Actual point and type of connection shall be determined by site conditions.
B. Equipment Detalis: Refer to the Details provided on the Plans for additional installation requirements of the specificed irrigation equipment/

B. Pipe Installation:

1. All pipe shall be assembled free from dirt and other foreign matter. All field cuts shall have all rough edges and burrs removed.
2. Pipe shall be continuously supported as it is installed in the trench.
3. All PVC pipe shall be fabricated per the manufacturers instructions.
4. All threaded nipples shall be installed with Teflon tape. No field threading of plastic pipe shall be allowed.
5. Open ends of pipes or underground sleeves or fittings shall be capped or plugged as pipe is assembled to prevent the entrance of dirt and other foreign matter. Caps or plugs shall only be removed as necessary to continue installation.

C. Remote Control Valves

1. Valves shall be installed as required by the accompanying drawings with a maximum of two valves per box.
2. Each valve shall have attached to it a 2 inch diameter aluminum identification tag with a permanent valve/station number stamped on it.
3. Valves shall be installed not closer than 12 inches from paved areas, buildings, or walls.
4. Pressure lines shall be thoroughly flushed prior to installing the valves.
5. Remote control valves shall be adjusted so that the most remote sprinkler heads operate at the pressure recommended by the head manufacturer. A uniform distribution of water shall be applied by the sprinkler heads to the planting areas for each individual valve system.

D. Automatic Control Wire:

1. Wires shall be run under the pressure line. Wires shall be taped to the pressure line at 5 foot intervals, allowing slack for contraction. Where wires do not parallel pressure lines, they shall be buried a minimum of 24 inches, taped at 5 foot intervals, and run along walks or building walls wherever possible. Control lines under paving shall be in PVC conduit 24 inches deep.
2. A wire loop of a minimum of at least 12 inches shall be provided at each valve, change of direction, or splice.

3. Wire splices shall only be allowed at valve connections.
4. All connections shall be made per the manufacturers recommendation with Pen-Tite® type connectors with resin.

E. Automatic Controller:

1. The automatic controller shall be installed as required by the accompanying drawings, and per manufacturer's recommendations and specifications.
2. The controller is essentially diagrammatic and will be specifically located by the Owner or his authorized representative.
3. All local and other applicable codes shall take precedence in connecting the 110 volt electrical service to the controller.

F. Flushing the system: After the pipes are installed, and prior to the installation of the sprinkler heads and bubblers, the entire system shall be flushed using a full head of water used to remove dirt, scale, and any other foreign materials from the system.

3.07 PRESSURE TESTING

A. After the manufacturer's recommended curing time for the solvent-weld has elapsed, all pressure lines shall be tested under a minimum of 100 PSI for not less than 4 hours.

B. If leaks develop, system must be re-tested following repair until the entire system is proven watertight.

C. The pressure test shall be made in the presence of the Owner, or Owner's representative.

D. Backfilling:

1. As soon as the work has been installed, inspected and approved, all trenches shall be backfilled. The contractor shall not allow any of his work to be covered until it has been inspected and approved by the Owner. Should any of the work be covered before such approval, the contractor shall uncover the work at his own expense.
2. Initial backfill on all lines shall be of a fine granular earth material, free of clods, rocks, and plant debris.
3. Remaining backfill shall be earth excavated from the trenches placed in maximum 6 inch layers compacted to a dry density equal to that of the adjacent soil. Excepting that the trenches in areas of paving shall be backfilled entirely with sand and compacted by means of power compaction.
4. Backfill areas shall be dressed off to conform to the adjacent grades without dips, sunken areas, humps, or other irregularities.

E. Sprinkler Heads and Bubblers: After the lines have been backfilled and permanent grade established, the sprinkler heads and bubblers shall be installed as required by the accompanying drawings. All sprinklers heads shall be adjusted to provide full coverage and proper precipitation rates with minimum over spray under actual operating conditions.

3.08 COVERAGE TEST

A. Upon completion of all systems, the Contractor, in the presence of the Landscape Architect shall perform a coverage test to determine if the coverage of water afforded all areas is complete and adequate. The Contractor shall change any heads, nozzles, or orifices as may be required to provide coverage as indicated on the drawings and as specified.

1. Contractor shall inform the Landscape Architect of any deviation from the plan required due to wind, planting, soil or site conditions, that bear proper coverage.

3.09 WORKMANSHIP AND PROCEDURE

All assemblies specified herein shall be installed in accordance with the respective detail. In the absence of detail drawings or specifications pertaining to the specific items required to complete the work, the Contractor shall perform such work in accordance with the best standard practice and to the satisfaction of the Landscape Architect and Owner.

3.10 APPROVAL OF WORK

A. Installations and operations must be approved by the Owner and Landscape Architect.

B. Prior to commencing of work, the Contractor shall arrange a meeting with the Owner and/or Landscape Architect at which time the Contractor will be informed of specific inspections required and the method of calling for such inspections as the individual work is completed.

C. In no event shall the Contractor cover up or otherwise remove from view any work under this contract without prior approval of the Owner. Any work covered prior to inspection shall be opened to view by the Contractor at his expense.

3.11 COMPLETION CLEAN-UP

A. Upon completion of work, the Contractor shall remove excess materials, rubbish, debris, etc., and his construction and installation equipment from the premises. All exposed piping at vacuum breakers shall be painted green.

END OF SECTION
(08202012)

SECTION 32 90 00
PLANTING
(08202012)

PART 1 - GENERAL

1.01 DESCRIPTION

A. This section includes all labor, materials, and equipment required to complete work indicated on the drawings. The work shall be performed in accordance with the City of San Luis Obispo requirements and with the best standards of practice relating to the various trades. The principal items of work included in this section is as follows:

1. Finish Grading for Planting.
2. Soil Preparation.
3. Fertilization.
4. Planting, including Trees, Shrubs, Groundcover and Turf.
5. Inspection and Certifications.
6. Guarantees.
7. Clean-up.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Landscape Irrigation System: Section 32 80 00.

B. Planting Details this set.

C. Landscape Maintenance Specifications

1.03 GENERAL REQUIREMENTS

A. Bidders are expected to visit the site to familiarize themselves with existing conditions.

B. The Contractor shall adequately protect the work, adjacent property, the public, and shall be responsible for any damage, injury, or loss due to his acts or neglect.

1.04 INSPECTIONS AND APPROVALS

A. Inspections and approvals shall be given by the Landscape Architect. Contractor shall notify the Owner Representative in writing when ready for inspection and shall be on the site when inspections are made. If the work is not ready for inspection when the Owner Representative arrives, Contractor shall pay for such visit.

B. Inspection is required for the following:

1. Upon completion of finish grading and soil conditioning prior to planting.
2. Upon delivery of plant material to site.
3. When trees and shrubs are spotted for planting, but before planting holes are excavated.
4. When planting, and all other specified work, except the 90 day establishment period, has been completed.

5. When 90 day establishment period has been completed.

C. Upon completion of repairs and/or replacements that are found to be necessary at the time of inspection, the Owner Representative shall certify in writing final acceptance at the end of the 90 day establishment period.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Plant materials shall be delivered to the job site no sooner than 10 days prior to installation.

B. Protection: Plant materials that are not to be planted upon delivery shall be protected from drying winds, heat, cold, or sun; and shall be watered as necessary until planted. Antidesiccant is permitted if used according to manufacturer's directions. The use of such a products by itself does not constitute sufficient protection form heat, cold, or wind.

1.06 ESTABLISHMENT PERIOD

A. The contractor shall continuously maintain all areas of the contract during the progress of the work and during the establishment period which begins the day after all work is completed and continuing for a 90 day period after the final acceptance of the project as complete by the Owner Representative.

B. All areas shall be kept free of debris. Maintenance shall include watering, weeding, cultivating, removal of dead material, resetting plants to proper grades or upright position, and restoration of the planting saucer and other necessary operations. The contractor shall notify the owner 48 hours prior to each 14 day maintenance interval.

C. Upon the completion of the establishment period, the site shall be clean and free of debris, weeds, and equipment. Plant materials shall be established, healthy, weed free, and free of infestation.

1.07 GUARANTEES

A. All plants shall be fully guaranteed for the 90 day establishment period.

B. All plant material which fails to maintain a healthy, vigorous, and thriving condition shall be replaced. Replacement plants shall closely match adjacent specimens of the same species and shall conform to the standards for plant materials in these specifications. All replaced material shall immediately be removed from the site and all necessary repairs to plans, grades, lawn areas, paving, and other areas damaged during replacement shall be made at the Contractor's expense. Replaced plant materials will then be guaranteed for a full 90 day period from the date of replacement.

1.08 PROCEDURES

A. All irrigation work shall be inspected and approved prior to the start of any work in this section unless approved by the Owner Representative.

B. Prior to excavation for planting or placing of stakes, locate all utilities, electric cables, conduits, sprinkler lines, heads, valves and valve control wires, and all utility lines so that proper precautions may be taken not to damage such improvements. In the event of a conflict between utilities lines and plant locations,

promptly notify the Landscape Architect who shall arrange for relocation. Failure to follow this procedure places upon the Contractor the responsibility for, at his own expense, making any and all repairs for damages resulting from work hereunder.

1.09 CERTIFICATIONS & SUBMITTALS

A. Material receipts: The contractor shall submit material receipts to the Owner Representative for verification of quality and quantities of material used.

PART 2 - PRODUCTS

2.01 MATERIALS

A General

1. Quality: All plants shall be typical of their species or variety. All plants shall have normal, well developed branches and vigorous root systems. They shall be sound, healthy, vigorous, free from defects, disfiguring knots, abrasions of the bark, sun scald injuries, plant diseases, and insect infestations. They shall have healthy, normal root systems. All plants shall be nursery grown from stock that has proven hardy to the location of this project. Plants shall have been growing under similar climatic conditions as the location of this project, and shall have been properly acclimated to the site.
2. Size: Size and grading standards shall conform to those of the American Association of Nurserymen, Inc. in the American Standard of Nursery Stock.
3. Identification: Each plant delivered to the site shall have an identification tag from the supplying nursery showing botanical and common names.
4. Acceptance: No plants shall be considered accepted until they have been inspected and approved by the Owner Representative. The Owner Representative shall be the sole judge of the quality and acceptability of the materials. All rejected material shall be immediately removed from the site and replaced with acceptable material at the contractor's expense.

B. Trees and shrubs: Trees shall have sufficiently sturdy vertical leaders allowing no more than a 10 degree list without external support.

C. Sod: Sod shall be "Bonsai"™ Double Dwarf Fescue (or equal). Sod shall be delivered to the job site no sooner than 18 hours prior to installation.

D. Groundcover: Groundcovers shall be grown in flats or 4” liners and remain in those flats until planting. Tops shall be proportionate to the roots, which shall not have grown outside the flats.

E. Imported Topsoil: Imported topsoil shall be of fertile friable soil of loamy character having a normal amount of natural humus with PH range of 6.0 to 7.0. It shall be reasonably free of subsoil, refuse, roots, rocks, weeds, noxious seeds, or other deleterious matter. Its source shall be approved by the Owner Representative prior to delivery to the site.

F. Soil Amendments: Soil Amendments, specified herein, are for bidding purposes only and are subject to change upon receipt of soil test. The Contractor shall

obtain a test from a laboratory approved for "Soil Fertility"/"Agricultural Suitability". A minimum of two (2) test locations shall be taken for this site.

1. Fertilizers: Fertilizer shall be delivered to the site in the original unopened container each bearing the manufacturer's guaranteed analysis.

   Gro-Power® Slow Release 12-8-8 fertilizer (or equal) at 10lbs/1000 sq. ft. for groundcover areas planted from flats; and turf areas at 15 lbs./1000 sq. ft..

   Agri-Form® Slow Release 20-10-5 tablets in 21 gram sizes (or equal).

   Agricultural Gypsum at 100 lbs./1000 sq. ft. to a 6" depth for groundcover and turf areas.
2. Nitrogen Stabilized Sawdust or Mushroom Compost (or equal)
3. Shredded Bark Mulch: Shredded bark mulch shall be reasonably free from subsoil, refuse, roots, rocks, weeds, noxious seeds, or other deleterious matter. Its source shall be approved by the Owner prior to delivery to the site.

PART 3 - EXECUTION

3.01 PREPARATION

A. Soil preparation and finish grading of planting areas:

1. All planting areas shall be graded to finish grade under this section. Finish grade in the turf areas shall be 1 inch below adjoining pavement or headers.
2. The contractor shall adjust the soil surface as required to achieve positive drainage.
3. Excess soils from finish grading shall be removed or redistributed before application of soil conditioners or fertilizers.
4. Weeds and grasses shall be removed with their roots and shall be disposed of off the site before and during rough and finish grading.
5. The soil conditioning spread as specified and thoroughly tilled, a minimum of two directions, into the soil to a minimum depth of 6 inches. All debris, foreign matter, and stones over one inch in diameter shall be removed prior to the application of soil amendments and fertilizers.
6. Planting areas shall be kept clean and free from all concrete, asphaltic waste, lumber, or other construction debris.
7. After soil preparation has been completed, but prior to planting, planting areas shall be watered so that a minimum of 6 to 8 inches of good quality water passes through the soil profile.
8. Upon completion of finish grading, inspection and approval of the owner shall be obtained before the commencement of planting.

B. Sodding:

1. After soil preparation and grading, the area which is to be sodden shall be raked smooth, free of depressions or undulation.
2. The soil surface shall be moistened to a depth of 6 inches prior to sodding.

3. Soil conditioning for the turf and groundcover areas shall consist of the following volumes of material applied per 1,000 square feet and thoroughly rototilled into the soil to a minimum depth of 6 inches:

Nitrogen Stabilized Sawdust (or) Mushroom compost (or equal)	3 cubic yards
Gro-Power® (or equal)	10 pounds for Groundcover Areas

3.02 IMPLEMENTATION

A. Groundcover Planting: Plant per Detail provided – Refer to Plans.

1. All areas receiving groundcover plants shall be moist to a depth of six inches at planting time.
2. Plants from flats shall be planted, evenly spaced as indicated on the drawings, with rows staggered to form an equilateral triangle between any three adjacent plants. First row from walks. Headerboards or buildings shall be placed at one-half the indicated spacing.
3. Rooted cuttings shall remain in flats until transplanting. The soil shall contain sufficient moisture so it will not fall apart when transferring plants.
4. Each plant shall be planted in a manner which will insure a minimum disturbance to the root system. The cuttings shall be planted sufficiently deep to cover all roots.
5. To avoid drying out, planting shall be watered immediately after planting until the entire area is watered to the full depth of each hole.
6. All groundcover planting areas shall be fertilized with a 12-8-8 commercial fertilizer at the manufacturer's recommended rate.
7. All groundcover planting areas shall be treated with a pre-emergent herbicide, according to the manufacturer's recommendations.

B. Tree and Shrub Planting: Plant per Detail provided – Refer to Plans.

1. After grading operations have been completed, container plants in quantities and sizes specified shall be staked or spotted onto the site as shown on the landscape plans for approval by the Owner Representative prior to being removed from their containers and prior to excavation of their planting pits. Shrubs shall not be planted closer than two feet min. from the edge of the shrubs beds, walk, or buildings.
2. All planting pits shall have vertical sides, dug to twice the diameter of the plant container, and the same depth as the root ball.
3. Containers shall be opened and removed in such a manner that the root ball remains unbroken. No plants shall be planted if the root ball is broken before or during the process of installation.
4. Plants shall be set in the center of the planting pit plumb and straight. Plants faced for best appearance or relationship to adjacent structures. All plants shall be planted at a depth which shall assure that they are at their natural growing depth.
5. All plants shall be planted with 21 gram 20-10-5 fertilizer tablets. Two tablets per 5 gallon plant and three tablets per 15 gallon plant. Tablets shall be separated from the root ball by a minimum of 2 inches of soil.
6. Planting pits shall be backfilled carefully to fill all voids and to avoid breaking or damaging roots. Backfill shall be tamped to prevent settling. When pit is nearly filled, water thoroughly and allow water to soak away.

If settling of the backfill to achieve finished grade, allow for 1 1/2 inches of shredded bark mulch.

7. A watering basin shall be formed with a diameter of at least 2 inches to finish grade.
8. Trees shall be mulched within 2 days after planting by covering the entire beds or pits with a layer of 1 1/2 inches deep shredded bark mulch, which shall be thoroughly saturated with water after placement to prevent displacement by wind or water.
9. All trees, unless otherwise indicated, shall be held vertical with two treated lodge pole pine poles set a minimum of two times the root ball diameter apart. In a manner to avoid injury to the root ball, stakes shall be braced at their bottom with a 1 inch by 4 inch redwood crosspiece, nailed horizontally. Trunks shall be secured with flexible reinforced rubber tree ties fastened securely to the stake in such a manner so no portion of the trunk or branches touches either stake and so that there shall be no abrasion of bark.
10. All broken or badly bruised branches shall be removed with a clean cut, and in a manner appropriate with the natural growth habits of the particular plan. No plants shall be pruned or clipped prior to delivery to the site without the written approval of the Owner Representative.
11. Street trees shall be planted, staked, and amended per City of San Luis Obispo "Street Tree Pruning and Planting Standards and Specifications".

C. Tree Staking Materials: Plant per Detail provided – Refer to Plans.

1. Stakes for trees shall be sound, free from warp, round lodge pole pine poles. They shall have minimum uniform cross-section of 3 inches nominal dimension, and shall be not less than 8 feet in length, pointed at one end and chamfered at the other end.
2. Tree ties shall be 1 inch wide plastic heavy duty tree ties attached by HDG nails as required.

D. Fertilizers: All shrubs shall be fertilized with 21 gram 20-10-5 commercial fertilizer tablets as specified under soil amendments. All groundcover areas shall be fertilized with a 12-8-8 commercial fertilizer as specified under soil amendments.

3.03 CLEAN UP

A. During construction, the contractor shall keep the site free of trash and debris, and keep the site in as neat a condition as it is practical. The contractor shall be responsible for the daily removal of trash and debris from the site.

B. Upon completion of the work, the entire site shall be cleared of equipment, unused material, and rubbish, so as to resemble a tidy appearance. All irrigation shall be ready for final inspection.

END OF SECTION
(08202012)

SECTION 33 10 00
SITE WATER DISTRIBUTION

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes: Completion of water piping and valves as indicated on the drawings and specified herein to completely interconnect all equipment with piping for complete and operable systems, including equipment drains.

1. Pipe materials
2. Trenching and backfilling - compaction
3. Laying pipe

B. Related sections:

1. Compaction for backfilling: Section 31 00 00 - Excavation and Backfill for Utilities.
2. Reinforcing Steel, Section 03 30 00

1.02 REFERENCE STANDARDS

A. The work specified in this section shall be performed in accordance with the City of San Luis Obispo Utility Department standards for the installation of potable and reclaimed water lines.
B. Construction shall be in conformance with the applicable sections of the Standard Specifications for Public Works Construction.
C. Open Trench Operations: Trench excavations and backfill necessary for the installation of the water piping and valves and appurtenances shall be done in accordance with Section 306 of the Standard Specifications and as noted in the Special Provisions.

1.03 SUBMITTALS

A. Submit the following under the product information category:

1. Pipe, fittings and accessories.
2. Valves and accessories

1.04 PERFORMANCE REQUIREMENTS

A. An encroachment permit will be required for the work in this section. All work onsite and offsite encompassed in the section must be in accordance with the requirements of the City of San Luis Obispo Engineering Standards and Specifications.

1.05 QUALITY ASSURANCE

A. General: Perform leakage testing on all pipe installed on this project. Furnish all equipment, material, personnel and supplies to perform all tests and make all taps and other necessary temporary connections. Test pressure shall be measured at the highest point on the line unless specifically noted otherwise. Leakage tests shall be performed after all connections to the existing piping, and at a time agreed upon and in the presence of the engineer. The test pressure, allowable leakage shall be as herein specified.

1. Buried Piping: The leakage test for buried piping shall be made after all pipe is installed and backfilled. However, the contractor may elect to conduct preliminary tests prior to backfill. Final test shall be after trenches have been backfilled and compacted.
2. Exposed Piping: All supports, anchors and blocks shall be installed prior to leakage testing. No temporary supports or blocking shall be installed for final test.
3. Encased Piping: The leakage tests for encased piping shall be made after all pipe is installed and encased, and before any structures are installed above it.
4. Testing Apparatus: Contractor shall provide all equipment and appurtenances as required to complete pressure testing.
5. Reports: The contractor shall keep records of each piping test, including:
    a. description and identification of piping tested
    b. test pressure
    c. date of test
    d. witnessing by contractor and engineer
    e. test evaluation
    f. remarks, to include such items as leaks (type, location), and repairs made on leaks

Allowable leakage is “none”.

B. DISINFECTION OF POTABLE WATER SYSTEMS

1. Contractor shall clean and disinfect potable water system in accordance with the procedures utilized by the City of San Luis Obispo Utility Department and the County of San Luis Obispo Health Department.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Solvent Welded Polyvinyl Chloride (PVC) Water Pipe
1. PVC water pipe, 2 inch diameter and smaller shall be Schedule 40 PVC.
2. Solvent Weld Joints: Make pipe joints in accordance with ASTM D2855. Handle solvent cements and primers in accordance with ASTM F402.
3. Threaded joints: Short nipple, threaded at one end, socket at the other; thread sealant in accordance with pipe manufacturer’s recommendations.

B. PVC Valves
1. Valves 2 inches and smaller shall be Schedule 40 PVC Ball Valves installed in a pre-cast concrete valve box with cast iron cover flush with finish grade.
2. Install a union at each threaded connection of valves to facilitate removal.
3. Connections between ferrous and non-ferrous, piping, valves accessories or supports shall be made using a dielectric coupling, union, or flange.

C. Copper Pipe
1. Copper pipe shall be Type K, soft.

D. Polyethylene Pipe
1. Polyethylene pipe shall be 200 psi per AWWA C901; Gold Label 3408 Driscopipe or equivalent approved based on submittals under Section 01 30 00.

E. Recycled Water Piping
1. Service tubing for recycled water shall be purple or have a purple stripe wrapped in purple polyethylene sleeve conforming to AWWA A21.5 and shall be clearly labeled as non-potable.
2. Meter box and lid for recycled water shall be integrally cast with the words "Recycled Water" or "Reclaimed Water."

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 EXCAVATING, TRENCHING, AND BEDDING

A. Excavate, trench, and bed for site drains in accordance with pertinent provisions of Section 31 00 00, and the following.

B. Movement of construction machinery:
1. Use means necessary to avoid displacement of, and injury to, pipe while compacting by rolling or operating equipment next to the pipe.
2. Movement of construction machinery over a storm drain at any stage of construction is solely at the Contractor's risk.

C. Bedding:
1. Provide a bedding surface for the pipe with a firm foundation of uniform density throughout the entire length of the pipe.
2. Bed the pipe carefully in a soil foundation accurately shaped and rounded to conform to the lower 1/4 of the outside perimeter of circular pipe, or set the pipe in a bed of sand.
3. Tamp bedding where necessary.
4. Provide bell holes and depressions for pipe joints of only the length, depth, and width required for making the particular pipe joint properly.
5. Where plastic pipe is used, provide a minimum of 4" of sand bedding over the top and under the pipe.

3.3 INSTALLING PIPE

A. General:
1. Carefully examine each pipe prior to placing.
a. Promptly set aside defective pipe and damaged pipe.
b. Clearly identify defects.
c. Do not install defective pipe or damaged pipe.
2. Place pipe to the grades and alignment indicated, with a tolerance of one in 1000 vertical and one in 500 horizontal, unless otherwise directed by the Civil Engineer.
3. Provide adequate facilities for lowering pipe safely into the trenches.
4. Do not place pipe in water, nor place pipe when trench or weather is unsuitable for such work.

B. Polyvinyl chloride pipe joints: Install with the specified materials and in accordance with the manufacturers' recommendations as approved by the Civil Engineer.

C. Joining pipe of different materials: Provide fittings or couplings made for the pipe material jointing, or provide a concrete collar as approved by the Civil Engineer.

D. Joining pipe of different sizes:
1. Provide reducer fittings to the larger pipe.
2. Where pipes are different materials as well as different sizes, use the same material for reducer fitting as in the larger pipe.
3. Use saddle connection when branch lines join a main or collector main.
4. Use eccentric collar joint when the slope of the pipe is less than 1%.

3.5 BACKFILLING

A. Backfill and compact in accordance with pertinent provisions of Section 31 00 00.

3.6 TESTING AND INSPECTING

A. Provide personnel and equipment necessary, and perform tests required to demonstrate that the work of this Section has been completed in accordance with the specified requirements.

B. Hydrostatic test on watertight joints:
1. Make a hydrostatic test on each watertight joint. Test one sample of each type watertight joint used. If one sample fails because of faulty workmanship, test an additional joint.
2. Only joints within the building area and outside the building area but within ten feet of exterior walls or faces of the buildings need be tested.
3. Replace or repair joints found to be faulty. Repeat the test and repair cycle until joints are demonstrated to meet the specified requirements.

END OF SECTION

SECTION 33 40 00
SITE DRAINAGE

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Provide rainwater drainage system as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:
1. Section 31 00 00 - Earthwork
2. Section 33 10 00 - Water Distribution System

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 SUBMITTALS

A. Comply with pertinent provisions of Section 01 30 00.

B. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
1. Materials list of items proposed to be provided under this Section;

1.4 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01 60 00.

PART 2 - PRODUCTS

2.1 PIPE MATERIALS

A. Provide pipe and associated materials of the size indicated on the Drawings and meeting the following requirements.
1. Polyvinyl chloride pipe (PVC):
a. Acceptable products: "PWPipe Series 46" plastic solid wall storm drain pipe and fittings, SDR 35, manufactured by PWPipe Company, Eugene, Oregon, or equal.
2. Polyethylene material in plastic couplings: Comply with ASTM D1784 and ASTM D 2412. Elastomeric seal or gasket conforming to ASTM F 477 and ASTM D 3212.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 EXCAVATING, TRENCHING, AND BEDDING

A. Excavate, trench, and bed for site drains in accordance with pertinent provisions of Section 31 00 00, and the following.

B. Movement of construction machinery:
1. Use means necessary to avoid displacement of, and injury to, pipe while compacting by rolling or operating equipment next to the pipe.
2. Movement of construction machinery over a storm drain at any stage of construction is solely at the Contractor's risk.

C. Bedding:
1. Provide a bedding surface for the pipe with a firm foundation of uniform density throughout the entire length of the pipe.
2. Bed the pipe carefully in a soil foundation accurately shaped and rounded to conform to the lower 1/4 of the outside perimeter of circular pipe, or set the pipe in a bed of sand.
3. Tamp bedding where necessary.
4. Provide bell holes and depressions for pipe joints of only the length, depth, and width required for making the particular pipe joint properly.
5. Where plastic pipe is used, provide a minimum of 4" of sand bedding over the top and under the pipe.

3.3 INSTALLING PIPE

A. General:
1. Carefully examine each pipe prior to placing.
   a. Promptly set aside defective pipe and damaged pipe.
   b. Clearly identify defects.
   c. Do not install defective pipe or damaged pipe.
2. Place pipe to the grades and alignment indicated, with a tolerance of one in 1000 vertical and one in 500 horizontal, unless otherwise directed by the Engineer.
3. Provide adequate facilities for lowering pipe safely into the trenches.
4. Do not place pipe in water, nor place pipe when trench or weather is unsuitable for such work.

B. Polyvinyl chloride pipe joints: Install with the specified materials and in accordance with the manufacturers' recommendations as approved by the Engineer.

C. Joining pipe of different materials: Provide fittings or couplings made for the pipe material jointing, or provide a concrete collar as approved by the Engineer.

D. Joining pipe of different sizes:
   1. Provide reducer fittings to the larger pipe.
   2. Where pipes are different materials as well as different sizes, use the same material for reducer fitting as in the larger pipe.
   3. Use saddle connection when branch lines join a main or collector main.
   4. Use eccentric collar joint when the slope of the pipe is less than 1%.

3.5 DRAINAGE STRUCTURES

A. Install drainage structures in accordance with the Drawings and with the manufacturers' recommendations as approved by the Civil Engineer.

3.6 BACKFILLING

A. Backfill and compact in accordance with pertinent provisions of Section 31 00 00.

3.7 TESTING AND INSPECTING

A. Provide personnel and equipment necessary, and perform tests required to demonstrate that the work of this Section has been completed in accordance with the specified requirements.

B. Hydrostatic test on watertight joints:
   1. Make a hydrostatic test on each watertight joint. Test one sample of each type watertight joint used. If one sample fails because of faulty workmanship, test an additional joint.
   2. Only joints within the building area and outside the building area but within ten feet of exterior walls or faces of the buildings need be tested.
   3. Replace or repair joints found to be faulty. Repeat the test and repair cycle until joints are demonstrated to meet the specified requirements.

END OF SECTION