

Rosemead Unified School District
Rosemead District Office
3907 Rosemead Blvd Suite #220, Rosemead, CA 91770

TECHNICAL SPECIFICATIONS

New Electronic Marquee

NAC | Architecture

Architect's Job No.
161-23036

September 11, 2023

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SECTION 01000
ABBREVIATIONS, SYMBOLS AND ACRONYMS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. List of abbreviations, symbols, and acronyms of societies, institutes, and associations generally appearing in the Contract Documents.

1.02.1 RELATED SECTIONS

- A. Division 01: General Requirements

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.01 ABBREVIATIONS

ac	Alternating current
amp	ampere
BTU	British thermal unit
cfh	Cubic feet per hour
cfm	Cubic feet per minute
cm	Centimeter
Co.	Company
COP	Coefficient of performance
Corp.	Corporation
d	Penny
db.	Decibel
DB	Dry bulb
dc	Direct current
EER	Energy efficiency ratio
F	Degrees Fahrenheit
fpm	Feet per minute
ft	Foot or feet
gph	Gallons per hour
gpm	Gallons per minute
HP	Horsepower
HVAC	Heating, ventilating and air conditioning
Hz	Hertz
Inc.	Incorporated
KHz	Kilohertz
Kip	thousand pounds
Ksf	Thousand pounds per square foot
Ksi	Thousand pounds per square inch
Kv	Kilovolt

KVA	Kilovolt amperes
KW	Kilowatt
KWH	Kilowatt hour
LF	Linear foot
lb	Pound
LED	Light emitting diode
MBH	1000 BTUs per hour
MHz	Mega hertz
mil	Thousandth of an inch
mm	Millimeter
mph	Miles per hour
oz.	Ounce
PCF	Pounds per cubic foot
pH	Acidity-alkalinity balance
psf	Pounds per square foot
psi	Pounds per square inch
psig	Pounds per square inch, gage
RF	Radio frequency
rpm	Revolutions per minute
SF	Square foot
SY	Square yard
V	Volt
WB	Wet bulb

3.02 SYMBOLS

#	Number or pound
'	Foot or feet
"	Inch(es)
%	Percent

3.03 ACRONYMS

AA	The Aluminum Association, Inc
AABC	Associated Air Balance Council
AAMA	American Architectural Manufacturers Association
AASHTO	American Association of State Highway and Transportation Officials
AATCC	American Association of Textile Chemists and Colorists
ABMA	American Boiler Manufacturers Association
ACI	American Concrete Institute
ADA	Americans with Disabilities Act
ADAAG	Americans with Disabilities Act Accessibility Guidelines
AGA	American Gas Association
AGCIH	American Conference of Governmental Industrial Hygienists
AI	Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction

AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Movement and Control Association, Inc.
ANSI	American National Standards Institute
APA	APA – The Engineered Wood Association
ARI	Air-Conditioning and Refrigeration Institute
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATBCB	Architectural & Transportation Barriers Compliance Board
AWI	Architectural Woodwork Institute
AWPA	American Wood Preservers Association
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
BIA	Brick Institute of America
CAL/OSHA	California Occupational Safety and Health Administration
CBC	California Building Code
CCR	California Code of Regulations
CEC	California Electrical Code
CFR	Code of Federal Regulations
CISPI	Cast Iron Soil Pipe Institute
CLFMI	Chain Link Fence Manufacturers Institute
CMC	California Mechanical Code
CQC	California Quality Control (CMA Standards)
CPC	California Plumbing Code
CRA	California Redwood Association
CRI	Carpet and Rug Institute
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standards, U.S. Department of Commerce
CSFM	California State Fire Marshal
CSI	Construction Specifications Institute
CTIOA	Ceramic Tile Institute of America
CTI	Cooling Tower Institute
DHI	Door and Hardware Institute
DSA	Division of the State Architect
EPA	Environmental Protection Agency
ETL	ETL Testing Laboratories
FCC	Federal Communication Commission
FM	Factory Mutual
FS	Federal Specifications

GA	Gypsum Association
GANA	Glass Association of North America
HMMA	Hollow Metal Manufacturer's Association
HPVA	Hardwood Plywood & Veneer Association
IACS	International Annealed Copper Standards
IAMPO	International Association of Plumbing and Mechanical Officials
ICBO	International Conference of Building Officials
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical & Electronic Engineers, Inc.
IES	Illuminating Engineering Society
IMI	International Masonry Institute
IRI	Industrial Risk Insurers
ISO	International Organization for Standardization
MLSFA	Metal Lath/Steel Framing Association
MSS	Manufacturers Standardization Society of the Valve & Fittings Industry.
NAAMM	National Association of Architectural Metal Manufacturers
NBFU	National Board of Fire Underwriters
NBS	National Bureau of Standards
NCMA	National Concrete Masonry Association
NEBB	National Environmental Balancing Bureau
NEMA	National Electrical Manufacturers Association
NEC	National Electrical Code
NFPA	National Fire Protection Association
NFPA	National Forest Products Association
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology
NOFMA	National Oak Flooring Manufacturers Association
NPCA	National Paint and Coatings Association
NPDES	National Pollutant Discharge Elimination System
NRCA	National Roofing Contractors Association
NSF	National Sanitation Foundation
NTMA	National Terrazzo & Mosaic Association
NUSIG	National Uniform Seismic Installation Guidelines
NWMA	National Woodwork Manufacturers Association
PCA	Portland Cement Association
PCI	Precast/Prestressed Concrete Institute
PDI	Plumbing and Drainage Institute
PEI	Porcelain Enamel Institute
PS	Product Standard, U.S. Department of Commerce
RIS	Redwood Inspection Service
RFCI	Resilient Floor Covering Institute

SCAQMD	South Coast Air Quality Management District
SDEI	Steel Deck Institute
SDI	Steel Door Institute
SFM	State Fire Marshal
SFPA	Southern Forest Products Association
SIGMA	Sealed Insulating Glass Manufacturers Association
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SSPC	Steel Structures Painting Council
SWI	Steel Window Institute
TCA	Tile Council of America
UBPPA	Uni-Bell PVC Pipe Association
UCI	Uniform Construction Index
UFAS	Uniform Federal Accessibility Standards
UL	Underwriters' Laboratories, Inc.
WCLIB	West Coast Lumber Inspection Bureau
WDMA	Window and Door Manufacturers Association
WIC	Woodwork Institute of California
WWPA	Western Wood Products Association

END OF SECTION

SECTION 01005
SUMMARY OF THE WORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. The furnishing of all labor, materials, equipment, services, and incidentals necessary for Work to be performed. Work includes but is not limited to the removal of the existing marquee and its concrete footings, and replacement with new electronic marquee with new concrete footings. New electrical/low voltage conduits/wiring for new marquee.

1.02 RELATED SECTIONS

- A. Section 01010: Phasing of the Work
- B. Section 01100: Coordination
- C. Section 01500: Construction Facilities and Temporary Controls

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.01 USE OF PREMISES

- A. CONTRACTOR shall coordinate the Work of all trades, with OWNER and/or Separate Work Contract. CONTRACTOR shall sequence, coordinate, and perform the Work to impose minimum hardship on the operation and use of the existing facilities and/or Project site. CONTRACTOR shall install all necessary protection for existing improvements, Project site, property, and new Work against dust, dirt, weather, damage, vandalism, and maintain and relocate all protection to accommodate progression of the Work.
- B. CONTRACTOR shall confine entrance and exiting to the Project site and/or facilities to routes designated by the OAR
- C. Within existing facilities, OWNER will remove specific items from Work areas prior to the start of Work. CONTRACTOR shall remove remaining items in areas of the Work
- D. CONTRACTOR shall utilize all available means to prevent generation of unnecessary noise and maintain noise levels to a minimum. When required by the OAR,, CONTRACTOR shall immediately discontinue noise-generating activities and/or provide alternative methods to minimize noise generation. CONTRACTOR shall install and maintain air compressors, vehicles, and other internal combustion engine equipment with mufflers, including unloading cycle of compressors. CONTRACTOR shall discontinue operation of equipment producing objectionable noise as required by the OAR.

- E. CONTRACTOR shall furnish, install, and maintain adequate supports, shoring, and bracing to preserve structural integrity and prevent collapse of existing improvements and/or Work modified and/or altered as part of the Work.
- F. CONTRACTOR shall secure building entrances, exits, and Work areas with locking devices as required by the OAR.
- G. CONTRACTOR assumes custody and control of OWNER property, both fixed and portable, remaining in existing facilities vacated during the Work.
- H. CONTRACTOR shall cover and protect surfaces of spaces in existing facilities turned over for the Work, including OWNER property remaining within as required to prevent soiling or damage from dust, dirt, water, and/or fumes. CONTRACTOR shall protect areas adjacent to the Work in a similar manner. Prior to OWNER occupancy, CONTRACTOR shall clean all surfaces including OWNER property.
- I. CONTRACTOR shall not use or allow anyone other than OWNER employees to use facility telephones and/or other equipment, except in an emergency. CONTRACTOR shall reimburse OWNER for telephone toll charges originating from the facility except those arising from emergencies or use by OWNER employees.
- J. CONTRACTOR shall protect all surfaces, coverings, materials, and finished Work from damage. Mobile equipment shall be provided with pneumatic tires.
- K. CONTRACTOR is advised OWNER will award Separate Work Contracts at this Project site.
- L. CONTRACTOR shall not permit the use of portable and/or fixed radio's or other types of sound producing devices including other similar devices.

3.02 PROPERTY INVENTORY

- A. Property, OWNER intends to remove, will be removed by OWNER before a space is vacated for the Work. Before performing Work in each space, OAR and CONTRACTOR shall prepare a detailed initial written inventory of OWNER property remaining within, including equipment and the condition thereof. OAR and CONTRACTOR shall retain a signed copy of the inventory dated and signed by both parties. Prior to subsequent OWNER occupancy of each such room or space, OAR and CONTRACTOR shall perform a final inventory of OWNER property and all discrepancies between the initial inventory and final inventory shall be the responsibility of CONTRACTOR.

3.03 FURNITURE, FIXTURES, AND EQUIPMENT

- A. If designated in the Contract Documents to be OWNER furnished CONTRACTOR installed (OFCD), CONTRACTOR shall unload, store, uncrate, assemble, install, and connect OWNER supplied furniture, fixtures, and equipment.

- B. CONTRACTOR shall, within ten (10) days after delivery, uncrate and/or unpack equipment in presence of IOR who shall inspect the delivered items. IOR shall prepare an inspection report listing damaged or missing parts and accessories. IOR shall transmit one copy of the report to OAR and CONTRACTOR. OWNER will procure and/or replace missing and or damaged furniture, fixtures, and equipment.
- C. CONTRACTOR shall install equipment in the locations and orientation. CONTRACTOR shall verify exact locations with OAR prior to final installation of equipment.
- D. If required, OAR will furnish setting and or placement drawings for equipment.
- E. CONTRACTOR shall install equipment by proper means and methods to ensure an installation as recommended by the manufacturer. CONTRACTOR shall furnish and install all necessary fasteners and required blocking to properly install equipment.
- F. CONTRACTOR shall install furniture, fixtures, and equipment with manufacturer recommended fasteners for the type of construction the furniture, fixtures, and equipment is being fastened and/or anchored to.
- G. CONTRACTOR shall provide final connections of any electrical to the equipment. CONTRACTOR shall, prior to final connection, verify the operating characteristics of equipment are consistent with the designated supply.

END OF SECTION

SECTION 01050
SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Procedure for submission of a certified Schedule of Values for review and approval by the OAR.

1.02 RELATED SECTIONS

- A. Section 01080: Application for Payment
- B. Section 01300: Submittals
- C. Section 01365: Construction Schedule

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.01 PREPARATION

- A. Upon receipt of the Notice of Intent to Award, CONTRACTOR shall commence preparation of a certified Schedule of Values.
- B. CONTRACTOR shall coordinate the preparation of a certified Schedule of Values with preparation of the Construction Schedule as set forth in Section 01365.
- C. CONTRACTOR shall follow the table of contents as a Project specific guide to establish the format for a certified Schedule of Values. Provide at least one (1) line item for each Division and/or Specification Section item. Provide separate line items for labor and material when required by the OAR.
- D. Include the following Project school(s) identification on each certified Schedule of Values:
 - 1. Project name and location
 - 2. Project Number
 - 3. ARCHITECT name
 - 4. CONTRACTOR name
 - 5. Date of Submittal
- E. Round amounts to the nearest whole dollar; the total shall equal the Contract Amount.
- F. An approved certified Schedule of Values shall serve as the basis for the monthly certified Application for Payment.

3.02 90 DAY INTERIM SCHEDULE OF VALUES

- A. CONTRACTOR may prepare and submit, in accordance with sub-section 3.03, a 90 day interim Schedule of Values denoting Work to be completed during the first 90 days following the date established in the Notice to Proceed.
- B. CONTRACTOR shall coordinate the preparation of the 90 day interim Schedule of Values with preparation of the Construction Schedule as set forth in Section 01360.
- C. The 90 day interim Schedule of Values is subject to the same terms and conditions as set forth in sub-section 3.03.
- D. The 90 day interim Schedule of Values shall be incorporated into a final Schedule of Values.
- E. The OAR has the right to require subsequent revisions to an approved 90 day interim and/or a final Schedule of Values.

3.03 SUBMITTAL

- A. Within ten (10) days after the date established in the Notice to Proceed, CONTRACTOR shall submit five (5) certified copies of an interim and/or final Schedule of Values for review and approval by the OAR.
- B. OAR will review and if necessary, return the submitted Schedule of Values with summary comments noting items not in compliance with the requirements of the Contract Documents. CONTRACTOR shall revise the submitted Schedule of Values and return five (5) copies within three (3) days of receipt of summary comments.
- C. Signature by OAR shall constitute acceptance of the submitted Schedule of Values.
- D. A copy of the approved Schedule of Values will be transmitted to CONTRACTOR, IOR, and ARCHITECT.
- E. CONTRACTOR shall obtain OAR approval of a 90 day interim Schedule of Values prior to submittal of the first certified Application for Payment.
- F. CONTRACTOR shall obtain OAR approval of the final Schedule of Values prior to submittal of the fourth certified Application for Payment.

END OF SECTION

SECTION 01080
APPLICATION FOR PAYMENT

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. This Section specifies administrative and procedural requirements relative to a certified Application for Payment.
 - 1. Coordinate the certified Schedule of Values and certified Application for Payment with, but not limited to, the Construction Schedule, submittal log, and list of Subcontractors.

1.02 RELATED SECTIONS:

- 1. Section 01050: Schedule of Values
- 2. Section 01365: Construction Schedule
- 3. Section 01700: Contract Closeout

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.01 APPLICATION FOR PAYMENT

- A. Each certified Application for Payment shall be consistent with previous applications and payments as reviewed by ARCHITECT and/or OAR, paid for by OWNER, and:
 - 1. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional requirements.
- B. Payment Application Times: The period of Work covered by each Application for Payment is the payment date for each progress payment as specified in the General Conditions. The period covered by each Application for Payment is the previous month.
- C. Payment Application Forms: Use OWNER provided forms for the Application for Payment.

- D. Application Preparation: Complete every entry on the form. Include execution by a person authorized to sign legal documents on behalf of CONTRACTOR. ARCHITECT will return incomplete applications without action.
- E. Transmittal: Submit a minimum of four (4) signed and original copies of each certified Application for Payment to the ARCHITECT. All copies shall be complete, including releases and similar attachments.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information related to the application, in a manner acceptable to ARCHITECT.
- F. Initial Application for Payment: Administrative actions and submittals, that must precede or coincide with submittal for the first certified Application for Payment include, but are not limited to, the following:
1. Certified Schedule of Values
 2. Performance and payment bonds. List of principal suppliers and fabricators.
 3. Worker Compensation certificates, if applicable.
 4. Auto Insurance, if applicable.
 5. Hazardous Material Insurance Certificates, if applicable.
 6. Construction Schedule
 7. Submittal Schedule
 8. Emergency Contact List
 9. Copies of authorizations and licenses from governing authorities for performance of the Work
- G. Application for Payment at Substantial Completion: Following OAR issuance of the certificate of Substantial Completion, submit an Application for Payment:
1. Administrative actions, submittals and/or Work that shall precede or coincide with this application include:
 - a. Occupancy permits and similar approvals by authorities having legal jurisdiction over the Work.
 - b. Removal of temporary facilities and services.
 - c. Removal of surplus materials, rubbish, and similar elements.
 - d. OWNER training and orientations.
 - e. Change over information related to OWNER occupancy, use, operation, and maintenance.
 - f. Final cleaning.
 - g. Ensure that incomplete Work is not accepted and will be completed without undue delay.
 - h. Advice on shifting insurance coverage.

- i. List of defective Work, recognized as exceptions to certificate of Substantial Completion.
 - j. Change of door locks to OWNER system.
- H. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of the final Application for Payment include, but are not limited to, the following:
 - 1. Completion of Contract Closeout requirements.
 - 2. Project record documents.
 - 3. Completion of final punch list items.
 - 4. Delivery of extra materials, products and or stock.
 - 5. Identification of unsettled claims.
 - 6. Proof that taxes, fees, and similar obligations are paid.
 - 7. Operating and maintenance instruction manuals.
 - 8. Consent of surety to final payment.
 - 9. Waivers and releases.
 - 10. Warranties, guarantees and maintenance agreements.

END OF SECTION

SECTION 01100
COORDINATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. This Section specifies administrative and procedural requirements necessary for coordinating Work operations including, but not limited to, the following:
1. General coordination procedures.
 2. Coordination drawings.

PART 2 – PRODUCTS (NONE)

PART 3 - EXECUTION

3.01 COORDINATION

- A. CONTRACTOR shall coordinate operations included in various sections of the Contract Documents to assure efficient and orderly installation of each part of the Work. Coordinate Work operations included under related sections of the Contract Documents that depend on each other for proper installation, connection, and operation of the Work, including but not limited to:
1. Schedule construction operations in the sequence required where installation of one part of the Work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
 3. Provide provisions to accommodate items scheduled for later installation.
 4. Prepare and administer provisions for coordination drawings.
- B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required in notices, reports, attendance at meetings, and:
1. Prepare similar memoranda for OAR and Separate Work Contract where coordination of their Work is required.

- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of schedules.
 - 2. Installation, relocation, and removal of temporary facilities.
 - 3. Delivery and processing of submittals.
 - 4. Progress meetings.
 - 5. Project closeout activities.

- D. Conservation: Coordinate Work operations to assure operations are carried out with consideration given to conservation of energy, water, materials, and:
 - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into the Work.

3.02 SUBMITTALS

- A. Coordination Drawings: CONTRACTOR shall prepare coordination drawings for coordination of installation of landscape scope. Prepare coordination drawings for those areas where limited space availability necessitates maximum utilization of space for efficient installation of different components.
 - 1. All coordination meetings will be held in the Project field office of CONTRACTOR. CONTRACTOR is required to distribute Shop Drawings, cut sheets and submittals to Subcontractors where appropriate. Reviewed coordination drawings will be maintained in the Project field office of CONTRACTOR.

END OF SECTION

SECTION 01120
CUTTING AND PATCHING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section specifies administrative and procedural requirements for cutting and patching.

1.02 RELATED SECTIONS

- A. Section 01050: Schedule of Values
- B. Section 01100: Coordination
- C. Section 01300: Submittals
- D. Section 01740: Warranties

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.01 SUBMITTALS

- A. The word “cutting” as used in the Contract Documents includes, but is not limited to, cutting, drilling, chopping, and other similar operations and the word “patching” includes, but is not limited to, patching, rebuilding, reinforcing, repairing, refurbishing, restoring, replacing, or other similar operations.
- B. Cutting and Patching Proposal: CONTRACTOR shall submit a proposal describing procedures well in advance of the time cutting and patching will be performed if the Contract Documents requires approval of these procedures before proceeding. Include the following information, as applicable, in the proposal:
 - 1. Describe the extent of cutting and patching required. Denote how it will be performed and indicate why it cannot be avoided.
 - 2. Describe anticipated results in terms of changes to existing construction. Include changes to the building’s appearance or other significant visual elements.
 - 3. List products to be used and firms or entities that will perform this Work.
 - 4. Indicate dates when cutting and patching will be performed.

5. Utilities: List utilities that cutting and patching operations will disturb or affect. List utilities to be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
6. Where cutting and patching involves adding reinforcement to structural elements, submit an RFI for resolution by the AOR.
7. Review by ARCHITECT prior to proceeding with cutting and patching does not waive ARCHITECT right to later require complete removal and replacement of defective Work.

3.02 QUALITY ASSURANCE

- A. Operational Limitations: Do not cut and patch operating elements or related components in a manner that would result in reducing their capacity to perform as intended. Do not cut and patch operating elements or related components in a manner that would result in increased maintenance or decreased operational life or safety.
 1. Obtain review of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:
 - a. Primary operational systems and equipment
 - b. Water, moisture, or vapor barriers
 - c. Membranes and flashings
 - d. Fire protection systems
 - e. Noise and vibration control elements and systems
 - f. Control systems
 - g. Communication and/or data systems
 - h. Electrical wiring systems
- B. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the opinion of ARCHITECT, reduce the building's aesthetic qualities. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching. Remove and replace Work cut and patched in a visually unsatisfactory manner.
 1. If possible, retain the original installer or fabricator to cut and patch the exposed Work listed below. If it is impossible to engage the original installer or fabricator, engage another recognized experienced and specialized firm.
 - a. Firestopping
 - b. Masonry (exterior and interior where exposed)

3.03 WARRANTY

- A. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

3.04 INSPECTION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed before cutting. If unsafe or unsatisfactory conditions are encountered, take corrective action before proceeding.
 - 1. Before proceeding, meet at the Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

3.05 PREPARATION

- A. Temporary support: Provide adequate temporary support of existing improvements or Work to be cut.
- B. Protection: Protect existing improvements and Work during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of existing improvements or Work that might be exposed during cutting and patching operations.
- C. Avoid interference with operation of adjoining areas or interruption of free passage to adjoining areas.

3.06 PERFORMANCE

- A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay. Verify compatibility and suitability of existing substrates before starting the Work.
- B. Cutting: Cut existing construction using methods least likely to damage elements retained or adjoining Work.
 - 1. In general, where cutting, provide hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
 3. Cut through concrete and masonry using a cutting machine, such as a carborundum saw or a diamond-core drill. Saw cut reinforcing bars and paint ends with bituminous paint except where bonded into new concrete or masonry.
 4. Comply with requirements of applicable Division 2 Sections where cutting and patching requires excavating, backfill, or re-compaction.
- C. Patching: Patch with durable seams that are as invisible as possible. Comply with required tolerances.
1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation. Verify conditions of existing substrates prior to executing Work.
 2. Restore exposed finishes of patched areas and extend finish restoration into retaining adjoining construction in a manner that will eliminate all evidence of patching and refinishing.

3.07 CLEANING

- A. Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar items. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged coverings to their original condition.

END OF SECTION

SECTION 01160
REQUEST FOR CLARIFICATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Procedure for requesting clarification of the intent of the Contract Documents.

1.02 RELATED SECTIONS

- A. Section 01005: Summary of the Work
- B. Section 01100: Coordination
- C. Section 01365: Construction Schedule
- D. Section 01700: Contract Closeout

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.01 PROCEDURE

- A. ARCHITECT response is a clarification of the intent of the Contract Documents and does not authorize changes in the Contract Amount, Milestones and/or Contract Time.
- B. A Request for Clarification may be returned with a stamp or notation "Not Reviewed," if:
 - 1. The requested clarification is ambiguous or unclear;
 - 2. The requested clarification is equally available to the requesting party by researching and/or examining the Contract Documents;
 - 3. CONTRACTOR has not reviewed the Request for Clarification prior to submittal.
- C. Allow a minimum of nine (8) days for review and response time, after receipt by ARCHITECT and OAR. CONTRACTOR shall verify and is responsible in verifying ARCHITECT and OAR receipt of a Request for Clarification.
- D. Changes or alterations to the approved drawings or specifications shall be made by means of addenda or change orders as per section 4-338 of the California Building Standards Administrative Code and approved by DSA.

END OF SECTION

SECTION 01200
PROJECT MEETINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section specifies administrative and procedural requirements for Project meetings, including but not limited to, the following:
 - 1. Job start meeting.
 - 2. Pre-installation conferences.
 - 3. Progress meetings.
 - 4. Meetings as required by the OAR.

1.02 RELATED SECTIONS

- A. Section 01010: Phasing of the Work
- B. Section 01100: Coordination
- C. Section 01300: Submittals
- D. Section 01365: Construction Schedule

PART 2 – PRODUCTS

PART 3 - EXECUTION

3.01 JOB START MEETING

- A. In accordance with General Condition Article 2.6, OAR will schedule a job start meeting before starting the Work, at a time and date determined by OAR. Meeting shall be held at the Project site or another location as determined by OAR. Meeting will be held in order to review responsibilities, procedures, and other administrative requirements contained within the Contract Documents.
- B. Authorized representatives of OWNER, IOR, ARCHITECT, CONTRACTOR and other parties shall attend the meeting. All participants at the meeting shall be familiar with the Project and authorized to conclude matters relating to the Work.
- C. Agenda items shall include significant items which could affect progress of the Work, including, but not limited to the following:
 - 1. Preliminary Construction Schedule
 - 2. Critical work sequencing

3. Designation of responsible personnel
 4. Identification of OAR
 5. Procedures for processing field decisions
 6. Request for Proposal
 7. Construction Directive and Change Order
 8. Procedures for processing Applications for Payment
 9. Prevailing wages
 10. Submittal of Shop Drawings, Product Data, material lists, and Samples
 11. Preparation of project record documents
 12. Use of the Project site and/or premises
 13. Parking availability
 14. Office, work, and storage areas
 15. Equipment deliveries and priorities
 16. Safety procedures
 17. First Aid
 18. Security
 19. Housekeeping
 20. Working hours
 21. Insurance Services including OCIP
 22. Environmental Health & Safety
- D. OAR shall prepare and issue meeting minutes to attendees and interested parties no later than five (5) calendar days after the meeting date.

3.02 PRE-INSTALLATION CONFERENCES

- A. CONTRACTOR shall coordinate and conduct pre-installation conferences at the Project site as required by related Sections of the Contract Documents.
- B. CONTRACTOR, manufacturers, and fabricators involved in or affected by the installation and its coordination or integration with other pre-ceding and/or subsequent installations of Work shall attend the meeting. CONTRACTOR shall advise OAR, IOR, and ARCHITECT of scheduled meeting dates in order to secure their attendance.
1. CONTRACTOR shall review the progress of construction activities and preparations for the particular activity under consideration at each pre-installation conference, including requirements for the following:
 - a. Contract Documents
 - b. Options
 - c. Related Construction Directives and Change Orders
 - d. Purchases
 - e. Deliveries
 - f. Shop Drawings, Product Data, and quality-control samples

- g. Review of mockups
- h. Possible conflicts
- i. Compatibility problems
- j. Time schedules
- k. Weather limitations
- l. Manufacturer's recommendations
- m. Warranty requirements
- n. Compatibility of materials
- o. Acceptability of substrates
- p. Temporary facilities
- q. Space and access limitations
- r. Governing regulations
- s. Safety
- t. Inspecting and testing requirements
- u. Required performance results
- v. Recording requirements
- w. Protection

- 2. CONTRACTOR shall record significant discussions and directives received from each conference. CONTRACTOR shall, within three (3) calendar days after the meeting date, distribute the minutes of the meeting to all concerned parties, including but not limited to, OAR, IOR, and ARCHITECT.

3.03 PROGRESS MEETINGS

- A. Progress meetings will be held at the Project site on a weekly basis.
- B. In addition to representatives of CONTRACTOR, OWNER, and ARCHITECT, each Subcontractor, supplier, or other entity concerned with current progress or involved in planning, coordination, or performance of the Work shall, if requested by OAR, be represented at these meetings. All participants at the conference shall be familiar with the Project and authorized to conclude all matters relating to the Work.
- C. Failure of the CONTRACTOR to be so represented at any progress meeting which is held at a mutually agreed time or for which a written notice is given, shall not relieve CONTRACTOR from abiding by any and all OAR or ARCHITECT determinations or directives issued at such meeting.
- D. OAR will review and correct or approve minutes of the previous progress meeting and will review other significant items affecting progress. Topics for discussion as appropriate to the status of the Project include but are not limited to:
 - 1. Interface requirements

2. Construction Schedule
3. Sequence and coordination
4. Status of submittals / RFC's
5. Deliveries
6. Off-site fabrication
7. Access
8. Site utilization
9. Temporary Construction Facilities and Controls
10. Hours of work
11. Hazards and risks
12. Housekeeping
13. Quality and workmanship
14. Unforeseen conditions
15. Testing and Inspection
16. Defective Work
17. Construction Directive
18. Request for Proposal
19. Change Order Proposals and Change Orders
20. Documentation of information for payment requests
21. Application for Payment
22. Other items as required or as brought forth.

E. No later than three (3) calendar days after each progress meeting, OAR will prepare and distribute minutes of the meeting to each present and absent party. Include a brief summary, in narrative form, of progress, decisions, directives, actions taken, and all other issues since the previous meeting and report.

1. Schedule Updating: If required, CONTRACTOR shall revise the Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the next scheduled progress meeting.

3.04 ADDITIONAL MEETINGS

A. OAR, upon giving notice to the intended parties and without further obligation, may require additional meetings to discuss Work and/or Project related activities.

END OF SECTION

SECTION 01300
SUBMITTALS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Administrative and procedural requirements for submittals required for the Work, including but not limited to; Shop Drawings, Product Data, Samples, material lists, and quality control items as required by the Contract Documents.
- B. Wherever possible, throughout the Contract Documents, the minimum acceptable quality of workmanship and products has been defined by the name and catalog number of a manufacturer and by reference of recognized industry standards.
- C. To ensure that specified products are furnished and installed in accordance with the design intent, procedures have been established for submittal of design data and for its review by ARCHITECT, OAR and/or others.

1.02 RELATED SECTIONS

- A. Section 01100: Coordination
- B. Section 01120: Cutting and Patching
- C. Section 01365: Construction Schedule
- D. Section 01640: Substitutions
- E. Section 01700: Contract Closeout
- F. Section 01740: Warranties

PART 2 – PRODUCTS

PART 3 - EXECUTION

3.01 PROCEDURES

- A. CONTRACTOR shall package each submittal appropriately for transmittal and handling. CONTRACTOR shall transmit each submittal to ARCHITECT with concurrent copy of the transmittal to the OAR. ARCHITECT and/or OAR will not accept submittals received from sources other than from CONTRACTOR.
- B. After ARCHITECT review, ARCHITECT will transmit submittals to OAR and OAR shall further distribute to CONTRACTOR, IOR and/or others as required. Work shall not commence, unless otherwise approved by OAR, until approved submittals are transmitted to CONTRACTOR.

- C. CONTRACTOR shall clearly identify any deviations from the Contract Documents on each submittal. Any deviation not so noted even though stamped reviewed is not acceptable.
- D. CONTRACTOR shall coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities requiring sequential activity.
- E. Timing of Submittals:
1. In accordance with General Conditions, CONTRACTOR shall submit to ARCHITECT, with copy of transmittal to the OAR, those Shop Drawings, Product Data, diagrams, materials lists, Samples and other submittals required by the Contract Documents.
 2. The schedule of submittals shall provide adequate time between submittals in order to allow for proper review without negative impact to the Construction Schedule.
 3. Schedule of submittals shall be related to Work progress, and shall be so organized as to allow sufficient time for transmitting, reviewing, corrections, resubmission, and re-reviewing.
 4. CONTRACTOR shall coordinate submittal of related items and ARCHITECT reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received by ARCHITECT.
 5. CONTRACTOR shall revise, update and submit submittal schedule to ARCHITECT and OAR on the first of each month, or as required by OAR.
 6. CONTRACTOR shall allow in the Construction Schedule, at least sixteen (16) days for ARCHITECT review following ARCHITECT receipt of submittal. For plumbing, Landscape, and other submittals requiring joint review with OAR, CONTRACTOR shall allow a minimum of eighteen (18) days following ARCHITECT receipt of submittal.
 7. No adjustments to the Contract Time and/or Milestones will be authorized because of a failure to transmit submittals to ARCHITECT sufficiently in advance of the Work to permit review and processing.
 8. In case of product substitution, Shop Drawing preparation shall not commence until such time ARCHITECT and OAR reviews said submittal relative to the General Conditions.

- G. If required, resubmit submittals in a timely manner. Resubmit as specified for initial submittal but identify as such. Review times for re-submitted items shall be as per the time frames for initial submittal review.
- H. Shop Drawing preparation shall not commence until such time as CONTRACTOR receives Product Data approval.
- I. ARCHITECT, or authorized agent, will stamp each submittal with a uniform, action stamp. ARCHITECT, or authorized agent, will mark the stamp appropriately to indicate the action taken, as follows:
 - 1. Final Unrestricted Release: When ARCHITECT, or authorized agent, marks a submittal “ Reviewed, “ the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.
 - 2. Final-But-Restricted Release: When ARCHITECT, or authorized agent, marks a submittal “ Reviewed as Noted,“ the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents. Final payment depends on that compliance.
 - 3. Returned for Re-submittal: When ARCHITECT, or authorized agent, marks a submittal “ Rejected, Revise and Resubmit,“ do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat as necessary to obtain different action mark. In case of multiple submittals covering same items of Work, CONTRACTOR is responsible for any time delays, schedule disruptions, out of sequence Work, or additional costs due to multiple submissions of the same submittal item. Do not use, or allow others to use, submittals marked “Rejected, Revise and Resubmit” at the Project site or elsewhere where Work is in progress.
 - 4. Other Action: Where a submittal is for information or record purposes or special processing or other activity, the ARCHITECT, or authorized agent, will return the submittal marked “Action Not Required “.

3.02 SHOP DRAWINGS

- A. Shop Drawings are original drawings prepared by CONTRACTOR, Subcontractor, supplier, or distributor illustrating some portion of Work by showing fabrication, layout, setting, or erection details. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings.

- B. Produce Shop Drawings to an accurate scale that is large enough to indicate all pertinent features and methods. Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 x 11 inches but no larger than 24 x 36 inches.
- C. Shop Drawings shall include fabrication and installation drawings, setting diagrams, schedules, patterns, templates, and similar drawings. Include the following information:
 - 1. Dimensions
 - 2. Identification of products and materials included by sheet and detail number.
 - 3. Compliance with specified standards.
 - 4. Notation of coordination requirements.
 - 5. Notation of dimensions established by field measurement.
- D. Provide a space of approximately 4 by 5 inches on the label or beside the title block on Shop Drawings to record CONTRACTOR and ARCHITECT review, and the action taken. Include the following information on the label for processing and recording action taken:
 - 1. Project name.
 - 2. Date.
 - 3. Name and address of ARCHITECT.
 - 4. Name and address of CONTRACTOR.
 - 5. Name and address of Subcontractor.
 - 6. Name and address of supplier.
 - 7. Name and address of manufacturer.
 - 8. Name and title of appropriate Specification section.
 - 9. Drawing number and detail references, as appropriate.
- E. Unless otherwise agreed to or indicated in individual Specification sections, submit a sufficient number to allow for adequate CONTRACTOR, Subcontractor, supplier, manufacturer and fabricators distribution plus two sets to be retained by ARCHITECT, one set to IOR and one set to OAR. .

3.03 PRODUCT DATA

- A. Collect Product Data into a single submittal for each element of Work or system. Product Data includes printed information, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, wiring diagrams, schedules, illustrations, or performance curves.
 - 1. Mark each copy to show or delineate pertinent materials, products, models, applicable choices, or options. Where Product Data includes information on

several products that are not required, clearly mark copies to indicate the applicable information. Include the following information:

- a. Manufacturer's printed recommendations.
- b. Compliance with trade association standards.
- c. Compliance with recognized testing agency standards.
- d. Application of testing agency labels and seals.
- e. Notation of dimensions verified by field measurement.
- f. Notation of coordination requirements.
- g. Notation of dimensions and required clearances.
- h. Indicate performance characteristics and capacities.
- i. Indicate wiring diagrams and controls.

2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.

C. Required Copies and Distribution: Same as denoted in sub - section 3.02, E.

3.04 SAMPLES

A. Procedure:

1. Submit Samples of sufficient size, quantity, cured and finished and physically identical to the proposed product or material. Samples include partial or full sections or range of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches denoting color, texture, and/or pattern.
 - a. Mount or display Samples in the manner to facilitate review of qualities indicated. Include the following:
 1. Specification section number and reference.
 2. Generic description of the Sample.
 3. Sampling source.
 4. Product name or name of manufacturer.
 5. Compliance with recognized standards.
 6. Availability and delivery time.
2. Submit Samples for review of size, kind, color, pattern, and texture. Submit Samples for a final check of these characteristics with other elements and a comparison of these characteristics between the final submittal and the actual component as delivered and installed.

- a. Where variations in color, pattern, texture, or other characteristic is inherent in the material or product represented, submit at least three (3) multiple units that show the approximate limits of the variations.
 - b. Refer to other Specification sections for requirements for Samples that illustrate workmanship, fabrication techniques, assembly details, connections, operation, and similar construction characteristics.
 - c. Refer to other sections for Samples to be returned to CONTRACTOR for incorporation into the Work. Such Samples must be undamaged at time of installation. On the transmittal indicate special requests regarding disposition of Sample submittals.
 - d. Samples not incorporated into the Work, or otherwise not designated as OWNER property, remain the property of CONTRACTOR and shall be removed from the Project site prior to Substantial Completion.
- 3. Color and Pattern: Whenever a choice of color or pattern is available in a specified product, submit accurate color chips and pattern charts to OAR for review and selection.
 - 4. Number Required: Submit 5 of each. Two will be returned to CONTRACTOR with one to ARCHITECT, OAR, and IOR.
- B. When specified, erect field Samples and mock-ups at the Project site to illustrate products, materials, or workmanship and to establish standards by which completed Work shall be judged.
 - C. Maintain sets of Samples, as returned, at the Project site, for quality comparisons throughout the course of the Work. Sample sets may be used to obtain final acceptance of the Work associated with each set.

3.05 QUALITY CONTROL SUBMITTALS

- A. Submit quality control submittals, including design data, certifications, manufacturer's field reports, and other quality control submittals as required under other sections of the Contract Documents.
- B. When other sections of the Contract Documents require manufacturer's certification of a product, material, and/or installation complies with specified requirements, submit a notarized certification from the manufacturer certifying compliance with specified requirements.

- C. Certification shall be signed by an officer of the manufacturer or other individual authorized to sign documents on behalf of the represented company.
- D. Requirements for submittal of inspection and test reports are specified in other sections of the Contract Documents.

END OF SECTION

SECTION 01340
CONSTRUCTION & DEMOLITION WASTE MANAGEMENT

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Preparation and implementation, including reporting and documentation, of a Waste Management Plan for reusing, recycling, salvage or disposal of non-hazardous waste materials generated during demolition and/or new construction (Construction & Demolition (C&D) Waste), to foster material recovery and re-use and to minimize disposal in land fills.

B. Related Sections

1. Section 01300: Submittals
2. Section 01700: Contract Closeout

1.02 REFERENCES

- A. California Integrated Waste Management Act of 1989 (AB 939)
- B. California Code of Regulations Title 14, Section 18700 et seq.

1.03 SYSTEM DESCRIPTION

- A. Collection and separation of all C&D waste materials generated on-site, reuse or recycling on-site, transportation to approved recyclers or reuse organizations, or transportation to legally designated landfills, for the purpose of recycling salvaging and/or reusing a minimum of 75% of the C&D waste generated.

1.04 SUBMITTALS

- A. C&D Waste Management Plan (Exhibit 1): Within 10 calendar days after the Notice to Proceed and prior to any waste removal, submit the following to the OAR for review and approval. Update quarterly. Include:
 1. Materials to be recycled, reused, or salvaged, either onsite or offsite.
 2. Estimates of C&D waste quantity (in tons) by type of material. (If waste is measured by volume, give factors for conversion to weight in tons.)
 3. Procedures for recycling/ reuse program.
 4. Permit or license and location of Project waste-disposal areas.D
 5. Site plan for placement of waste containers.

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ROSEMEAD SCHOOL DISTRICT

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01340-1

- B. C&D Waste Management Monthly Progress Report (Exhibit 2): Summary of waste generated by Project, monthly with Application for Payment. Include:
 - 1. Firms accepting the recovered or waste materials.
 - 2. Type and location of accepting facilities (landfill, recovery facility, used materials yard, etc.). If materials are reused or recycled on the Project site, location should be designated as “on-site reuse / recycling”.
 - 3. Type of materials and net weight (tons) of each.
 - 4. Value of the materials or disposal fee paid.
 - 5. Attach weigh bills and other documentation confirming amount and disposal location of waste materials.
- C. C&D Waste Management Final Compliance Report: Final update of Waste Management Plan to provide summary of total waste generated by Project.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION

3.01 IMPLEMENTATION

- A. Implement approved Waste Management Plan including collecting, segregating, storing, transporting and documenting each type of waste material generated, recycled or reused, or disposed in landfills.
- B. Designate an on-site person to be responsible for instructing workers and overseeing the sorting and recording of waste/ recyclable materials.
- C. Include waste management and recycling in worker orientation and as an agenda item for regular Project meetings.
- D. Recyclable and waste bin areas shall be limited to areas approved on the Waste Management Plan. Keep recycling and waste bins neat and clearly marked to avoid contamination of materials.

3.02 ATTACHMENTS

- A. Exhibit 1: Waste Management Plan
- B. Exhibit 2: Waste Management Monthly Progress Report.

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01340-2

EXHIBIT 2

**WASTE MANAGEMENT PROGRESS REPORT
CONSTRUCTION/ MAINTENANCE/ALTERATION & DEMOLITION PROJECTS**

PROJECT NAME: «PROJECTTITLE» «CONTRACTTITLE»
 PROJECT NO: «Project Number»
 NAME OF COMPANY: _____
 CONTACT PERSON: _____
 TELEPHONE: _____
 PROJECT SITE LOCATION: _____
 PROJECT TYPE: NEW CONSTRUCTION DEMOLITION
 MAINTENANCE/ALTERATION PROJECTS
 PROJECT SIZE (SQ. FT.): _____
 PERIOD _____ to _____

(1) Material Type	(2) Tons Actual Recycle	(3) Tons Actual Reuse	(4) Tons Actual Salvage	(5) Tons Actual Landfill	(6) Disposal or Recycling Facility (e.g., Onsite, Name of Facility)
Total					
Diversion Rate: Columns [(2)+(3)+(4)] / [(2)+(3)+(4)+(5)]					=

Signature	Title	Date
-----------	-------	------

- Column 1 "Material Types" – Enter type of materials targeted for recycling, reuse, and/or salvage, either on- or off-site, and include a category for waste materials requiring disposal.
- Columns 2 thru 4 "Estimated Generation" - Enter estimated quantities (tons) of recyclable, reusable, or salvageable waste materials anticipated to be generated and state number of salvageable items.
- Column 5 "Estimated Landfill" - Enter quantities (tons) of materials disposed.
- Column 4 "Disposal Location" - Enter end-destination of recycled, salvaged, and disposed materials.
- General : (1) Attach proposed Recycling & Waste Bin Location Plan.
 (2) Attach name and contact data for each recycling or disposal destination to be used.

END OF SECTION

DISTRICT OFFICE

NEW ELECTRONIC MARQUEE
ROSEMEAD SCHOOL DISTRICT

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT
01340-4

SECTION 01365

CONSTRUCTION SCHEDULE

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Construction Schedule procedures, preparation, submittal, updates, and revisions.

1.02 RELATED SECTIONS

- A. Section 01005: Summary of the Work
- B. Section 01300: Submittals.
- C. Section 01700: Contract Closeout.

1.03 PROCEDURES

- A. Within 7 calendar days after date of Notice to Proceed, CONTRACTOR shall submit to OWNER for review, a detailed Construction Schedule setting forth all requirements for complete execution of the Work.
- B. Seven (7) calendar days after receipt of the OWNER'S review comments, submit a final Construction Schedule acceptable to OWNER.
- C. If a Construction Schedule is considered by OWNER to not be in compliance with any requirement of the Contract, CONTRACTOR will be notified to review and revise the Construction Schedule and bring it into compliance. Failure of CONTRACTOR to submit a Construction Schedule in full compliance with the Contract Documents will result in a delay in progress payment processing. The Construction Schedule is to be used in evaluating progress for payment approval.
- D. Subsequently with each Progress Payment Request, CONTRACTOR shall deliver to OWNER an updated Construction Schedule reflecting Work progress to the end of the Progress Payment Request period. Each such Construction Schedule shall indicate actual progress to date in execution of the Work, together with a projected schedule for completion of all the Work.
- E. All schedule submittals are subject to review and acceptance by OWNER. OWNER retains the right to withhold progress payments until CONTRACTOR submits a Construction Schedule acceptable to OWNER.
- F. Concurrent with OWNER'S acceptance of CONTRACTOR'S submitted Construction Schedule, shall be CONTRACTOR'S signature of acceptance.

1.04

SCHEDULE SUBMITTAL PREPARATION GUIDELINES

- A. The Contract Work shall be scheduled and progress monitored using a Critical Path Method (CPM) network type scheduling system. Schedule shall be broken into sub-activities which shall, as a minimum, include major suppliers, all submittal approvals, all major trades, plumbing, mechanical, electrical, security, fire, and elevators/escalators. Scheduling system shall indicate all inter-relationships between trades and suppliers.
- B. Construction Schedule shall represent a practical plan to complete the Work within the Contract time requirement.
 - 1. A schedule extending beyond Contract time or less than Contract time will not be acceptable.
 - 2. A schedule found unacceptable by OWNER shall be revised by CONTRACTOR and resubmitted.
- C. Construction schedule shall clearly indicate sequence of construction activities, grouped by applicable phase and sorted by areas, buildings, or facilities within phase, and shall specifically indicate:
 - 1. Start and completion of all Work items, their major components, and interim milestone completion dates, as determined by CONTRACTOR and OWNER.
 - 2. Activities for procurement, delivery, installation of equipment, materials, and other supplies, including:
 - a. Time for submittals, resubmittals, and reviews. Include decision dates for selection of finishes.
 - b. Time for manufactured products for the Work fabrication and delivery.
 - c. Interdependence of procurement and construction activities.
 - d. As applicable, dates for testing, balancing equipment, and final inspection.
- D. Schedule shall be in sufficient detail to assure adequate planning and execution of the Work.
 - 1. Each task activity shall range in duration from a 1 workday minimum to a 15 workday maximum and shall be total of actual days required for completion. The activity duration shall not include consideration of weather impact on completion of that activity.

2. Schedule shall be suitable, in judgment of OWNER, to allow monitoring and evaluation of progress in performance of the Work; it shall be calendar time-scaled.
 3. Activities shall include:
 - a. Description; what is to be accomplished and where.
 - b. Workday duration.
 - c. Scheduled activities shall indicate continuous flow, from left to right.
 4. CONTRACTOR shall setup up the schedule calendar to identify workdays per week and shifts per day worked, non-work days, weekends and holidays.
- E. Failure to include any element of Work required for performance of this Contract shall not excuse CONTRACTOR from completing Work required to comply with the Contract Documents, notwithstanding acceptance of Construction Schedule.
- F. Submittal of Construction Schedule shall be understood to be CONTRACTOR'S confirmation that the schedule meets requirements of the Contract Documents, and that the Work will be executed in sequence indicated in schedule.

1.05 REVIEWS, UPDATES, AND REVISIONS

- A. OWNER will review and return the initial submittal of CONTRACTOR'S Construction Schedule, with summary comments, within 7 calendar days. If revisions are required, CONTRACTOR shall resubmit Schedule within 7 calendar days following receipt of OWNER'S comments.
- B. CONTRACTOR shall analyze and update the Project Construction Schedule:
1. As part of monthly payment application, CONTRACTOR shall submit to and participate with OWNER in a schedule review to include:
 - a. Actual start dates for Work items started during report period.
 - b. The percent (%) complete on activities that have actual start dates.
 - c. Actual completion dates for Work items completed during report period.
 - d. Estimated remaining duration for Work items in progress, which will not exceed original duration for activity.

- e. Estimated start dates for Work items scheduled to start during month following report period, if applicable.
 - f. Changes in duration of Work items.
- 2. In case of a change to CONTRACTOR'S planned sequence of Work, CONTRACTOR shall include a narrative report with updated progress schedule which shall include, but not be limited to, a description of problem areas, current and anticipated delaying factors, and any proposed revisions for a recovery plan.
 - 3. All Change Orders affecting the schedule shall be clearly identified as separate and new activities integrated into the schedule at the appropriate time and in the appropriate sequence as reviewed and approved by OWNER.
 - 4. The Project Construction Schedule Review will not relieve CONTRACTOR of responsibility for accomplishing all Work in accordance with the Contract Documents.
- D. Updates: CONTRACTOR shall submit to OWNER, with each payment application, an up-to-date Project Construction Schedule to include following:
- 1. Work Item Report: Detailing Work items and dependencies as indicated on the Schedule.
 - 2. Separate listing of activities completed during reporting period.
 - 3. Separate listing of activities which are currently in progress, indicating their remaining duration and percentages completed.
 - 4. Separate listing of activities which are causing delay in Work progress.
- E. Scheduling of change or extra Work orders is responsibility of CONTRACTOR.
- 1. CONTRACTOR shall revise the Project Construction Schedule to incorporate all activities involved in completing change orders or extra Work orders and submit it to OWNER for review.
- F. If OWNER finds CONTRACTOR is entitled to extension of any completion date, under provisions of the Contract, OWNER'S determination of total number of days of extension will be based upon an analysis of the current Project Construction Schedule, and upon data relevant to the extension.
- G. CONTRACTOR acknowledges and agrees that delays to non-critical activities will not be considered a basis for a time extension unless activities become

critical. Non-critical activities are those activities which, when delayed, do not affect an interim or Substantial Completion date.

- H. Any claim for extension of time shall be made in writing to OWNER not more than 7 days after commencement of delay; otherwise, it shall be deemed waived for all purposes. CONTRACTOR shall provide an estimate of the probable effect of such a delay on progress of Work as part of claim.

1.06 CONTRACTOR'S RESPONSIBILITY

- A. Nothing in these requirements shall be deemed to be an usurpation of CONTRACTOR'S authority and responsibility to plan and schedule Work as CONTRACTOR sees fit, subject to all other requirements of Contract Documents.
- B. CONTRACTOR shall provide at all times sufficient competent labor, materials, and equipment to properly carry on Work and to insure completion of each part in accordance with Construction Schedule and within time agreed.
- C. CONTRACTOR shall be responsible for ensuring that all submittals to the OWNER are accurate and consistent. Damage, including extra time and cost, caused by inaccuracies from CONTRACTOR will be compensated by CONTRACTOR.

1.07 SUSPENSION OF PAYMENTS

- A. Initial Submittal: If CONTRACTOR fails to comply with the specified requirements, OWNER reserves the right to engage an independent scheduling consultant to fulfill these requirements. Upon additional notice to CONTRACTOR, OWNER shall retain against CONTRACTOR all incurred costs for additional services.
- B. Update Submittals: OWNER has the right to withhold progress payments if CONTRACTOR fails to update and submit the Project Construction Schedule and reports as required by OWNER.

1.08 RECORD COPY

- A. Prior to the Contract Completion, CONTRACTOR shall submit the Project Construction Schedule showing the as-built sequence. The as-built schedule shall have all activities with actual start and end dates.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

SECTION 01420
TESTING AND INSPECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Testing and inspection services to meet requirements of the California Building Code (CBC), Title 24, Parts 1 and 2, as indicated on the Drawings.
- B. One or more DSA certified inspectors employed by the OWNER in accordance with the requirements of California Building Standards Administrative Code will be assigned to the Work with their duties as specifically defined in Section 4-333(b).
- C. Tests of materials are required by a DSA certified testing agency as set forth in Section 4-335 of the California Building Standards Administrative Code.

1.02 RELATED SECTIONS

- A. Section 01120: Cutting and Patching
- B. Section 01300: Submittals
- C. Section 01365: Construction Schedule
- D. Section 01450: Test and Balance
- E. Section 01600: Materials and Equipment
- F. Section 01700: Contract Closeout
- G. Section 01740: Warranties

PART 2 – PRODUCTS (Not applicable)

PART 3 – EXECUTION

3.01 TESTS

- A. OWNER will select an independent testing agency to conduct tests, sampling, and testing of materials. Selection of material to be tested shall be by the agency and not by CONTRACTOR.
- B. Any material shipped from the source of supply prior to having satisfactorily passed such testing and inspection or prior to the receipt of notice from IOR such testing and inspection is not required shall not be incorporated into the Work.
- C. OWNER will select and directly reimburse testing agency the costs for all DSA and/or DSA required tests and inspections, but may be reimbursed by

CONTRACTOR for such costs as noted in related sections of the Contract Documents.

- D. The independent testing agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the Work. The agency shall not perform any duties of CONTRACTOR.

3.02 TEST REPORTS

- A. Test reports shall include all tests performed, regardless of whether such tests indicate the material is satisfactory or unsatisfactory. Samples taken but not tested shall also be reported. Records of special sampling operations as required shall also be reported. Reports shall indicate the material or materials were sampled and tested in accordance with requirements of CBC, Title 24, Parts 1 and 2, as indicated on the Drawings. Test reports shall indicate specified design strength. They shall also definitely state whether or not material or materials tested comply with the specified requirements.

3.03 VERIFICATION OF TEST REPORTS

- A. Each testing agency shall submit to the Division of the State Architect a verified report in duplicate covering tests which are required to be performed by that agency during progress of the Work. Such report shall be furnished each time construction on the Work is suspended, covering tests up to that time, and prior to Final Completion of the Work, covering all tests.

3.04 INSPECTION BY OWNER

- A. OWNER and its representatives shall at all times have access, for purpose of inspection, to all parts of the Work and to shops wherein the Work is in preparation, and CONTRACTOR shall at all times maintain proper facilities and provide safe access for such inspection.
- B. OAR shall have the right to reject materials and/or workmanship deemed defective Work, and to require correction. Defective workmanship shall be corrected in a satisfactory manner and defective materials shall be removed from the premises and legally disposed of, all without charge to OWNER. If CONTRACTOR does not correct such defective Work within a reasonable time, fixed by written notice and in accordance with the terms and conditions of the Contract Documents, OWNER may correct such defective Work and proceed in accordance with related Articles of the Contract Documents.
- C. CONTRACTOR is responsible for compliance to all applicable local, state, and federal regulations regarding codes, regulations, ordinances, restrictions, and requirements.

3.05 INSPECTOR OF RECORD

- A. Inspector of Record is employed by OWNER in accordance with requirements of Title 24 of the California Code of Regulations with their duties specifically defined therein.
- B. Inspection of Work shall not relieve CONTRACTOR from any obligation to fulfill all of the terms and conditions of the Contract Documents.
- C. CONTRACTOR shall be responsible for scheduling times of inspection, tests, sample taking, and similar activities of the Work.

3.06 TESTS AND INSPECTIONS

The following tests and inspections do not limit inspection of the Work but are required by DSA, other agencies, or are required in related Sections of the Contract Documents.

See DSA Testing and Inspection form DSA 103 for all required testing for this project.

END OF SECTION

SECTION 01600
MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. This Section includes administrative and procedural requirements governing selection of products for incorporation into the Work.

1.2 RELATED SECTIONS

- A. Section 01100: Coordination
- B. Section 01300: Submittals
- C. Section 01640: Substitutions
- D. Section 01740: Warranties

1.3 DEFINITIONS

- A. Definitions used in this Section are not intended to change the meaning of other terms used in the Contract Documents, such as “specialties,” “systems,” “structure,” “finishes,” “accessories,” and other similar terms. Such terms are self-explanatory and have well-recognized meanings in the construction industry.

- 1. “Products” are items purchased for incorporation into the Work, whether purchased for the Work or taken from previously purchased stock. The term “product” includes the terms “material” and “equipment” and terms of similar intent.
 - a. “Named Products,” are items identified by the manufacturer’s product name, including make, model number or other designation, shown or listed in the manufacturer’s published product literature, current as of the date of the Contract.
 - b. “Foreign Products,” as distinguished from “domestic products,” are items substantially manufactured (50 percent or more of value) outside the United States and its possessions. Products produced or supplied by entities substantially owned (more than 50 percent) by persons who are not citizens of, nor living within, the United States and its possessions are also considered to be foreign products.

2. “Materials,” are products substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
3. “Equipment,” is a product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.

1.4 SUBMITTALS

- A. Material list: Prepare a list in tabular form acceptable to ARCHITECT and/or OAR showing proposed products. Include generic names. Include the manufacturer’s name and proprietary names for each item listed.
 1. Coordinate material list with the Construction Schedule and the submittal schedule.
 2. Form: Prepare material list with information on each item tabulated under the following column headings.
 - a. Related Specification Section number
 - b. Generic name used in Contract Documents
 - c. Proprietary name, model number, and similar designations
 - d. Manufacturer’s name and address
 - e. Supplier’s name and address
 - f. Installer’s name and address
 - g. Projected delivery date or time span of delivery period
 3. Initial Submittal: Within ten (10) days after execution of each subcontract agreement, as set forth in General Condition Article 6.25, submit three (3) copies of an initial material list to the ARCHITECT with a copy to the OAR. Provide a written explanation for omissions of data and for known variations from the Contract Documents.
 4. ARCHITECT Action: ARCHITECT will respond in writing to OAR within fourteen (14) days and OAR will forward response to CONTRACTOR within sixteen (16) days of receipt of the completed material list. No response outside this period constitutes no objection to listed items but does not constitute a waiver of the requirement that selected items comply with the Contract Documents. ARCHITECT response will include a list of unacceptable item selections, containing a brief explanation of reasons for this action.

1.5 QUALITY ASSURANCE

- A. Source Limitations: To the fullest extent possible, provide products of the same kind from a single source.
 - 1. CONTRACTOR is to verify necessary lead times for all materials; however, when specified products are available only from sources that do not, or cannot, produce a quality adequate to complete Work in a timely manner, consult with the ARCHITECT to determine the most important product qualities before proceeding. Qualities may include attributes, such as visual appearance, strength, durability, or compatibility. When a determination has been made, select products from sources producing these qualities, to the fullest extent possible.
- B. Compatibility of Options: When the CONTRACTOR is given the option of selecting between two or more products for use in the Work, the product selected shall be compatible with products previously selected, even if previously selected products were also options.
- C. Foreign Product Limitations: Except under one or more of the following conditions, provide domestic products, not foreign products, for inclusion into the Work:
 - 1. No available domestic product complies with the Contract Documents.
 - 2. Domestic products that comply with the Contract Documents are available only at prices or terms substantially higher than foreign products that comply with the Contract Documents.
- D. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products that will be exposed in view in occupied spaces or on the exterior.
 - 1. Labels: Locate required product labels and stamps on concealed surfaces or, where required for observation after installation, on accessible surfaces that are not conspicuous.
 - 2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface that is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:
 - a. Name of product and manufacturer
 - b. Model and serial number
 - c. Capacity

- d. Speed
- e. Ratings

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
 - 1. Schedule delivery to minimize long-term storage at the Project site and to prevent overcrowding of Work spaces.
 - 2. Coordinate delivery with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to the Project site in an undamaged condition in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - 4. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
 - 5. Store products at the Project site in a manner that will facilitate inspection and measurement of quantity or counting of units.
 - 6. Store heavy materials away from structures in a manner that will not endanger the structure's supporting construction.
 - 7. Store products subject to damage by the elements above ground, under cover in a weather-tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

PART 2 - PRODUCTS

2.1 MATERIAL SELECTION

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, new at the time of installation.

1. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.
 2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other Projects.
- B. Product Selection Procedures: The Contract Documents and governing regulations govern product selection. Procedures governing product selection include the following:
1. Proprietary Specification Requirements: Where Specifications name only a single material or manufacturer, provide the product indicated. No substitutions will be permitted.
 2. Semi-proprietary Specification Requirements: Where Specifications name two or more products or manufacturers, provide one of the products indicated. No substitutions will be permitted.
 - a. Where Specifications specify products or manufacturers by name, accompanied by the term “or equal” comply with General Condition Article 6.14 to obtain approval for use of an unnamed product.
 3. Descriptive Specification Requirements: Where Specifications describe a product or assembly, list exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with the Contract Documents.
 4. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by the manufacturer for the application indicated.
 - a. Manufacturer’s recommendations may be contained in published material literature or by the manufacturer’s certification of performance.
 5. Compliance with Standards, Codes, and Regulations: Where Specifications only require compliance with an imposed code, standard or regulation, select a product that complies with the standards, codes, or regulations specified.

6. Visual Matching: Where Specifications require matching an established Sample, decision of the ARCHITECT will be final on whether a proposed product matches satisfactorily.
7. Visual Selection: Where specified product requirements include the phrase "... as selected from manufacturer's standard or premium colors, patterns, textures..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The ARCHITECT will select the color, pattern, and texture from the product line selected.

PART 3 - EXECUTION

3.1 INSTALLATION OF PRODUCTS

- A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located, and aligned with other Work.
 1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration until Substantial Completion.

END OF SECTION

SECTION 01640
SUBSTITUTIONS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. This Section includes administrative and procedural requirements for handling requests for substitutions submitted eleven (11) days or more after the date established in the Notice to Proceed.

1.2 RELATED SECTIONS

- A. Section 01300: Submittals
- B. Section 01600: Materials and Equipment

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1 APPLICATION

- A. CONTRACTOR proposed changes in products or materials required by the Contract Documents eleven (11) days or more after the date established in the Notice to Proceed, are considered to be requests for substitutions. OAR will consider requests for substitution if a product is no longer manufactured and/or cannot be acquired from existing inventories. The following are not considered to be valid requests for substitutions:
 - 1. Revisions to the Contract Documents requested by OAR or ARCHITECT.
 - 2. Specified options of products included in the Contract Documents.
 - 3. Substitutions requested on a “or equal” basis.

3.2 SUBMITTALS

- A. Transmit submittals as described in related Sections for each request for substitution.
 - 1. Identify the product to be replaced in each request. Include related Specification Section and Drawing number.

2. Provide complete documentation denoting compliance with the requirements for substitutions, and the following information, as appropriate.
 - a. A detailed comparison of significant qualities of the proposed substitution with those specified in the Contract Documents. Significant qualities may include elements, such as performance, weight, size, durability, and visual effect.
 - b. Product Data, including Drawings, descriptions of products, fabrication, and installation procedures.
 - c. Samples, where applicable or requested.
 - d. CONTRACTOR certification the proposed substitution conforms to requirements of the Contract Documents in every respect and is appropriate for the applications indicated.
 - e. CONTRACTOR waiver of rights to an increase in the Contract Amount, Milestones and/or Contract Time that may subsequently become necessary because of the failure of the substitution to adequately perform.
3. If required, ARCHITECT will request additional information or documentation for evaluation. OAR will notify CONTRACTOR of acceptance or rejection of the substitution.
4. ARCHITECT will review and consider request for substitution and provide a recommendation to OAR
5. Where a proposed substitution involves and/or effects more than one Subcontractor, CONTRACTOR shall ensure each Subcontractor cooperates with the other Subcontractor involved to coordinate the Work, provide uniformity and consistency, and assure compatibility of all products.
6. CONTRACTOR submittal and ARCHITECT review of Shop Drawings, Product Data, material lists or Samples do not constitute an acceptable or valid request for substitution.

END OF SECTION

SECTION 01700
CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section includes administrative and procedural requirements for Contract Closeout, including but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Project record documents submittal.
 - 3. Operation and maintenance manual submittal.
 - 4. OWNER orientation and instruction.
 - 5. Final cleaning.
- B. Closeout requirements for specific Work activities are included in the appropriate Sections in Divisions 01 through 16.

1.02 RELATED SECTIONS

- A. Section 01080: Application for Payment
- B. Section 01300: Submittals
- C. Section 01365: Construction Schedule
- D. Section 01740: Warranties

PART 2 – PRODUCTS

PART 3 - EXECUTION

3.01 SUBSTANTIAL COMPLETION

- A. Inspection Procedures: On receipt of a request for a certificate of Substantial Completion, OAR will either authorize commencement of inspection or advise CONTRACTOR of unfilled requirements. IOR, OAR, CONTRACTOR and ARCHITECT will inspect the Work and IOR shall prepare a comprehensive punch list of items to be completed.
 - 1. IOR will repeat inspection when requested and assure the Work is complete.
 - 2. Results of the completed inspection will form a partial basis of the requirements for Final Completion.

- B. Re-inspection Procedures: IOR, OAR, CONTRACTOR and ARCHITECT will inspect the Work upon notice the Work, including final inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to OAR.
 - 1. Upon completion of inspection, OAR will recommend Final Completion. If the Work is incomplete, OAR will advise CONTRACTOR of Work that is incomplete or of obligations that have not been fulfilled but are required for Final Completion.
 - 2. If necessary, re-inspection will be repeated, but may be assessed against CONTRACTOR if OWNER is subject to additional professional service and or additional costs of inspection.

3.02 PROJECT RECORD DOCUMENT SUBMITTAL

- A. General: Do not use project record documents for construction purposes. Protect record documents from deterioration and loss. Provide access to record documents for ARCHITECT, IOR and OAR reference during normal working hours. Project record document shall be updated on a weekly basis. Prior to submitting each application for payment, secure IOR and ARCHITECT approval of project record documents.
- B. Record Drawings: Maintain a clean, undamaged set of blue or black line white prints of Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark which Drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Drawings. Provide detailed and accurate field dimensions for concealed elements that would be difficult to measure and record at a later date.
 - 1. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work. Date and number entries in the same format as submitted. Call attention to entry by a “cloud” around the affected areas.
 - 2. Mark new information important to OWNER but was not shown on Drawings or Shop Drawings.
 - 3. Utility location and depth below finished grade and/or above ceilings and attic spaces shall be fully dimensioned and indicated on record drawings. Dimensions shall be measured from building lines or permanent landmarks and shall be triangulated to those features.

4. Note related Change Order or Construction Directive numbers where applicable. RFC submissions shall be referenced on each affected sheet, Drawing and/or Shop Drawing.
 5. Organize record drawing sheets into manageable sets. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.
 6. Prior to Final Completion of the Work, and review of the project record drawings by ARCHITECT, prepare a final set of project record drawings incorporating all mark ups and information noted. Provide a hardline drawing set of record drawings printed on reproducible white bond paper. Submit final set of Record Drawings to ARCHITECT.
- C. Record Specifications: Maintain two complete copies of the Specifications, including Addenda. Include with the Specifications two copies of other written Contract Documents, such as Change Orders and/or Construction Directives issued during construction.
1. Mark these record documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.
 2. Give particular attention to substitutions and selection of options and information on concealed Work that cannot otherwise be readily discerned later by direct observation.
 3. Note related record document information with Product Data.
 4. Prior to Final Completion of the Work, submit record Specifications to ARCHITECT for OWNER records.
- D. Record Product Data: Maintain two copies of each Product Data submittal. Note related Change Orders and Construction Directives and mark-up of record drawings and Specifications.
1. Mark these documents to illustrate significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the Project site and from the manufacturer's installation instructions and recommendations.
 2. Provide detailed and accurate information regarding concealed products and portions of Work that cannot otherwise be readily discerned later by direct observation.

3. Prior to Final Completion of the Work, submit complete set of record Product Data to the ARCHITECT for OWNER records.
- E. Record Samples: Immediately prior to Substantial Completion, CONTRACTOR shall meet with ARCHITECT and OAR at the Project site to determine which Samples are to be transmitted to OWNER for record purposes. Comply with OAR instructions regarding delivery to OWNER storage area.
- F. Miscellaneous Records: Refer to other Specification sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Immediately prior to the date of Final Completion, complete and compile miscellaneous records and place in good order. Identify miscellaneous records properly and bind or file, ready for continued use and reference. Submit to ARCHITECT for OWNER records.
- G. Maintenance Manuals: Prior to Substantial Completion, organize operation and maintenance data into suitable two sets of manageable size. Bind properly indexed data in individual, heavy-duty, 2-3", 3-ring, vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Submit to OAR for ARCHITECT and for OWNER records. Include the following types of information.
 1. Emergency instructions
 2. Spare parts list
 3. Copies of warranties
 4. Wiring diagrams
 5. Recommended "turn-around" cycles
 6. Inspection procedures
 7. Shop Drawings and Product Data
 8. Fixture lamping schedule
- H. Verified Reports: Construction progress of the Work shall be reported to DSA via a duly verified report as per Sections 4-336 and 4-343 of the California Building Standards Administrative Code.

3.03 CLOSEOUT PROCEDURES:

- A. Operation and Maintenance Instructions: Prior to Substantial Completion, arrange for each installer of equipment that requires regular operation and maintenance to meet with designated OWNER personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer's representatives if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items:
 1. Maintenance manuals

2. Record documents
3. Spare parts and materials
4. Tools
5. Lubricants
6. Fuels
7. Identification systems
8. Hazards
9. Cleaning
10. Warranties and bonds
11. Maintenance agreements and similar continuing commitments

3.04 FINAL CLEANING

- A. General: Related sections of the Contract Documents specify general cleaning during performance of the Work. General cleaning is included in Division 01 Section "Construction Facilities and Temporary Controls".
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial cleaning and maintenance program. Comply with manufacturer's instructions.
 1. Complete the following cleaning operations before requesting inspection for a certificate of Substantial Completion.
 - a. Clean exposed exterior hard-surfaced finished to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition. Leave concrete floors broom clean.
 - b. Clean the Project site, including landscape development areas, of rubbish, litter, and other foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted to a smooth, even-textured surface.

END OF SECTION

SECTION 01740
WARRANTIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. This Section includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturers and/or installer's standard warranties on products and special product warranties.
 - 1. Refer to the General Conditions for terms of the guarantee period for the Work.

1.2 RELATED SECTIONS

- A. Section 01600: Materials and Equipment
- B. Section 01700: Contract Closeout
- C. All Necessary work related sections division 2-16

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1 WARRANTY REQUIREMENTS

- A. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties shall not relieve CONTRACTOR of the warranty of the Work incorporating such materials, products, and/or equipment. Manufacturer's disclaimers and limitations on warranties do not relieve suppliers, manufacturers, installers, and Subcontractors of the requirement to countersign special warranties with CONTRACTOR.
- B. Standard warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to OWNER.
- C. Special warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for OWNER.
- D. Related Damages and Losses: When correcting failed or defective warranted Work, remove and replace Work that has been damaged as a result of such failure

or which must be removed and replaced to provide access for correction of warranted Work.

- E. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement with the reinstated warranty equal to the original warranty.
- F. Replacement Cost: Upon determination the Work covered by a warranty has failed and/or is defective, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. CONTRACTOR is responsible for the cost of replacing or rebuilding defective Work regardless of whether OWNER has benefited from use of the Work through a portion of its anticipated useful service life.
- G. OWNER Recourse: Expressed warranties made to OWNER are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which OWNER can enforce such other duties, obligations, rights, or remedies.
- H. Rejection of Warranties: OAR reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
- I. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, OAR reserves the right to refuse to accept the Work until CONTRACTOR presents evidence the entities required to countersign such commitments have done so.

3.2 SUBMITTALS

- A. Submit written warranties to ARCHITECT prior to Final Completion of the Work. If the certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, submit written warranties as set forth in the certificate of Substantial Completion.
 - 1. When a designated portion of the Work is partially used and/or occupied by OWNER, submit properly executed warranties to ARCHITECT within fifteen (15) days of the Partial Use or Occupancy of the designated portion of the Work.
- B. When the Contract Documents require CONTRACTOR, or CONTRACTOR and a Subcontractor, installer, supplier or manufacturer to execute a special warranty, prepare a written document containing appropriate terms and identification, ready

for execution by the required parties. Submit a draft to OAR, through the ARCHITECT, for approval prior to final execution.

1. Refer to Divisions 02 through 16 for specific content requirements and particular requirements for submitting special warranties.
- C. Form of Submittal: Prior to Final Completion of the Work, compile two copies of each required warranty properly executed by CONTRACTOR, or by CONTRACTOR and Subcontractor, installer, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the Specifications.
- D. Bind warranties and bonds in heavy-duty, commercial-quality, durable 3-ring, vinyl-covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8½ by 11” (115 by 280 mm) paper.
1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the item or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address, and telephone number of the installer.
 2. Identify each binder on the front and spine with the typed or printed title “WARRANTIES,” Project title and/or name, and name of CONTRACTOR.
 3. When warranted Work requires operation and maintenance manuals, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

END OF SECTION

SECTION 024113

SITE DEMOLITION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes the following

- 1. Demolition and removal of site improvements and all other related contiguous improvements as required. Refer to Contract Drawings for items and location.
- 2. Demolition, dismantling, cutting and alterations as indicated, specified, and required for completion of the Contract; for new construction, modernization and rehabilitation projects, as applicable. Includes items such as the following:
 - 1. Protecting existing work to remain.
 - 2. Salvageable items to be retained.
 - 3. Cleaning soiled materials that are to remain.
 - 4. Disconnecting and capping utilities.
 - 5. Removing debris and equipment.
 - 6. Removal of items indicated on drawings.

- B. Demolition of Existing Building Foundations

- 1. Demolition and removal of all existing building foundations, footings, slabs, retaining walls, etc. shall be carried in a careful and orderly manner, and according to all applicable codes and regulations for demolition of structures, safety of adjacent structures, dust control and disposal of materials.
- 2. Sprinkle Work with water to minimize dust. Provide hoses and water connections for that purpose.

- D. Demolition and Removal of Pavements

- 1. Markup all existing utilities on site.
- 2. Sawcut all Concrete Pavements, as indicated on Drawings.
- 3. Remove all indicated pavements, walkways, curb and gutter, concrete ditches, landscape areas, etc.
- 4. Protect all manhole and valve covers, lids, vaults and other site fixtures, marked to remain.

- E. Related Sections: The following Sections contain requirements that relate to this Section:

- 1. Sections for "Photographic Documentation", "Special Environmental Procedures", "Temporary Facilities", "Tree and Plant Protection", "Cutting and Patching" as applicable.

2. Division 31 for "Site Clearing" and "Earthwork" as applicable.
3. Asbestos-Containing Materials (ACMs) and/or other Hazardous Materials Report.

1.03 DEFINITIONS

- A. Remove: Remove and legally dispose of items except those indicated to be reinstalled, salvaged, or to remain the owners' property.
- B. Asbestos-Containing Materials (ACMs) and other hazardous materials: As identified in the Report, remove asbestos-containing materials (ASMs) and other identified hazardous materials.
- C. Remove and Salvage: Items indicated to be removed and salvaged remain the Owner's property. Remove, clean, and pack or crate items to protect against damage. Identify contents of containers and deliver to Owner's designated storage area.
- D. Remove and Reinstall: Remove items indicated; clean, service, and otherwise prepare them for reuse; store and protect against damage. Reinstall items in locations indicated or as directed by Owner.
- E. Existing to Remain: Protect construction indicated to remain against damage and soiling during demolition. When permitted by the Architect and Owner, items may be removed to a suitable, protected storage location during demolition and then cleaned and reinstalled in their original locations.

1.04 MATERIALS OWNERSHIP

- A. Except for items or materials indicated to be reused, salvaged, or otherwise indicated to remain the Owner's property, demolished materials shall become the Contractor's property and shall be removed from the site with further disposition at the Contractor's option.
- B. Historical items indicated remain the Owner's property. Carefully remove and salvage each item in a manner to prevent damage and deliver promptly to the Owner.
- C. Historical items, archeological or paleontological findings, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, commemorative benches, antiques, and other items of interest or value to the Owner, which may be encountered during demolition, remain the Owner's property. If such items are encountered, all project operations shall cease in the area of discovery immediately. The Owner shall secure the services of an archeological consultant to assess the resources and determine a course of action.
 1. Cooperate with Owner's archaeological consultant or historical adviser. Mitigated Negative Declaration (MND) for related requirements.
- D. Human Remains: In the event that human remains are discovered, there shall be no disposition of such human remains, other than in accordance with the procedures and requirements set forth in the California Health and Safety Code and Public Resources Code. All project operations shall cease in the area of discovery immediately. In conjunction with the Owner, the Code provisions require immediate notification of the County Coroner and the Native American Heritage Commission.

1. Cooperate with the County Coroner, the Native American Heritage Commission representative and other related officials. Refer to the Mitigated Negative Declaration (MND) for related requirements.

1.05 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 01 Specification Sections, for information only, unless otherwise indicated.
- B. Proposed dust-control measures.
- C. Proposed noise-control measures.
- D. Proposed signage.
- E. Schedule of demolition activities indicating the following:
 1. Detailed sequence of demolition and removal work, with starting and ending dates for each activity.
 2. Dates for shutoff, capping, and continuation of utility services.
- F. Inventory of items to be removed and salvaged.
- G. Inventory of items to be removed by Owner, if any.
- H. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by demolition operations.
- I. Record drawings at Project closeout according to Section "Project Record Documents".
 1. Identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions.
- J. Landfill records for record purposes indicating receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.06 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: Engage an experienced firm that has successfully completed demolition Work similar to that indicated for this Project.
- B. Regulatory Requirements: Comply with governing EPA & SCAQMD notification regulations before starting demolition. Observe applicable Best Practices and implementation of the Storm Water Pollution Prevention Plan (SWPPP). Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Pre-demolition Conference: Conduct conference at Project site to comply with pre-installation conference requirements of Division 01 Section "Project Meetings."

1.07 PROJECT CONDITIONS

- A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical. Bidders shall make themselves fully aware of the existing conditions within the site. Scope limits scheduled for demolition and items/areas to remain protected in supplement to the Bid Drawings and Documents.

- B. If conditions are encountered that vary from those indicated on plan, notify the Architect for instructions prior to proceeding.
- C. Buildings immediately adjacent to demolition area will be occupied. Conduct building demolition so operations of occupied buildings will not be disrupted.
 - 1. Provide not less than 72 hours' notice of activities that will affect operations of adjacent occupied buildings.
 - 2. Maintain access to existing walkways, exits, and other facilities used by occupants of adjacent buildings. Do not close or obstruct walkways, exits, or other facilities used by occupants of adjacent buildings without written permission from owner.
- D. Contractor to obtain all necessary encroachment and excavation permits from the local jurisdiction of authority for demolition of existing improvements in public right-of-way.

1.08 SCHEDULING

- A. Arrange demolition schedule so as not to violate city construction ordinances.
- B. Arrange demolition schedule with Owner.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

- A. Requirements for satisfactory soil materials are specified in Division 31 Section "Earthwork". Refer to the Geotechnical Investigation Report, dated [June 29, 2022](#) prepared by [Associated Soils Engineering Inc.](#), for site soil requirements
 - 1. Obtain approved borrow soil materials off-site when sufficient satisfactory soil materials are not available on-site.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that utilities have been disconnected and capped. Test lines as required.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of demolition required.
- C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- D. Survey existing conditions of the improvements such as light standards and trees to determine the best method(s) for removal so as not to cause potential damage to persons and property during the course of removal.
- E. Perform surveys as the Work progresses to detect hazards resulting from demolition activities.

3.02 UTILITY SERVICES

- A. Maintain existing utilities indicated to remain in service and protect them against damage during demolition operations.
 - 1. Do not interrupt existing utilities serving occupied or operating facilities on or off the property, except when authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to governing authorities.
 - a. Provide not less than 72 hours' notice to Owner if shutdown of service is required during changeover.
- B. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services serving structures to be demolished.
 - 1. Arrange to shut off indicated utilities with utility companies.
- C. Utility Requirements: Refer to Division 33 Sections and Contract Drawings, for shutting off, disconnecting, removing, and sealing or capping utility services. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.03 PREPARATION

- A. Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with demolition operations.
- B. Conduct demolition operations and remove debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- C. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around demolition area.
- D. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
- E. Protect existing site improvements, appurtenances, and landscaping to remain.
 - 1. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.

3.04 CUTTING EXISTING CONCRETE

- A. Cutting of existing concrete shall be done by experienced workers familiar with the requirements and space necessary for placing concrete. Perform concrete cutting with concrete cutting wheels and hand chisels. Take care not to damage concrete that is intended to remain.

- B. Extent of cutting of concrete shall be as indicated on drawings and in accordance with standard plans for public works construction plan no. 132-3. Replace concrete that is removed in excess of amount indicated or required.
- C. Prior to cutting or coring concrete, determine locations of hidden utilities and take necessary measures to protect them from damage.
- D. If an existing pavement joint or cracked area is within two feet outside of a designated sawcut line shown on the Drawings, removal and resurfacing shall be to that joint, and/or shall include the crack or cracked area, unless otherwise approved by Architect.

3.05 EXPLOSIVES

- A. Explosives: Use of explosives will not be permitted.

3.06 POLLUTION CONTROLS

- A. Use water mist, temporary enclosures, and other suitable methods to limit the spread of dust and dirt. Comply with governing environmental protection regulations.
 - 1. Do not create hazardous or objectionable conditions, such as ice, flooding, and pollution, when using water.
- B. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level.
- C. Clean adjacent buildings and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing before start of demolition.

3.07 DEMOLITION

- A. Demolition: Demolish improvements completely and remove from the site. Use methods required to complete Work within limitations of governing regulations and as follows:
- B. Below-Grade Construction: Demolish foundation walls and other below-grade construction, as follows:
 - 1. Completely remove below-grade construction, including foundation walls and footings unless noted otherwise on the drawings.
 - 2. Break up and remove below-grade concrete slabs, unless indicated to remain.
- C. Filling Below-Grade Areas: Completely fill below-grade areas and voids resulting from demolition of buildings and pavements with soil materials according to requirements specified in Division 31 Section "Earthwork."
- D. Damages: Promptly repair damages to adjacent facilities caused by demolition operations.

3.08 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose them.

END OF SECTION

SECTION 031000

CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Formwork for cast-in-place concrete as indicated.
2. Installation of items to be embedded in concrete, such as anchor bolts, inserts, embeds, and sleeves.

B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 03 2000: Concrete Reinforcing.
3. Section 03 3000: Cast-In-Place Concrete.

1.02 REFERENCES

A. American Concrete Institute (ACI) Publication:

1. ACI 318 – Building Code Requirements for Structural Concrete, Chapter 6, Formwork, Embedded Pipes, and Construction Joints.
2. ACI 347 – Guide to Formwork for Concrete.

B. American Plywood Association (APA):

1. Form No. V345 - Concrete Forming Design/Construction Guide.

C. National Institute of Standards and Technology (NIST):

1. NIST Voluntary Product Standard PS 1.

1.03 SUBMITTALS

A. Shop Drawings: Submit Shop Drawings indicating locations of forms, construction and expansion joints, embedded items, and accessories.

B. Product Data: Submit manufacturer's Product Data for form materials and accessories.

1.04 REGULATORY REQUIREMENTS

- A. California Building Code (CBC), Chapter 19A.
- B. California Code of Regulations, Title 8, Division 1, Chapter 4, Subchapter 4, Construction Safety Orders, Article 6, Excavations, Sections 1713 and 1717.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Storage shall prevent damage and permit access to materials for inspection and identification.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Form materials may be reused during progress of the Work provided they are completely cleaned and reconditioned, recoated for each use, capable of producing formwork of required quality, and are structurally sound.
- B. Form Lumber: WCLIB Construction Grade or Better, WWPA No. 1 or Better.
- C. Plywood: NIST Voluntary Product Standard PS 1, Group 1, Exterior Grade B-B Plyform or better, minimum 5-ply and 3/4 inch thick for exposed locations and at least 5/8 inch thick for unexposed locations, grade marked, not mill oiled. Furnished plywood with medium or high density overlay is permitted.
- D. Coated Form Plywood: For exposed painted concrete, plastic overlaid plywood of grade specified above, factory coated with a form coating and release agent Nox-crete", or equal.
- E. Tube Forms: Sonoco "Seamless Sonotubes," Ceme-Tube, Quik-Tube, or equal, of the type leaving no marks in concrete, one-piece lengths for required heights.
- F. Special Forms: For exposed integrally-colored concrete, plywood as above with high density overlay, plywood with integral structural hardboard facing or fibrous glass reinforced plastic facing, providing specified finish.
- G. For Exposed Concrete Finish:
 - 1. Plywood: New, waterproof, synthetic resin bonded, exterior type Douglas fir or Southern pine plywood manufactured especially for concrete formwork and conforming to NIST Voluntary Product Standard PS 1, Grade B-B grade, Class I.
 - 2. Glass-Fiber-Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to structural tolerances and appearance of finished concrete surfaces.

3. Steel: Minimum 16 gage sheet, well matched, tight fitting, stiffened to support weight of concrete, without deflection detrimental to tolerances and appearances of finished concrete surfaces.
 4. Plywood: "Finland Form,," "Combi Form" by North American Plywood Corporation, "Plyform" by Roy O. Martin, "ProForm" by Pacific Wood Laminates, or equal. The material shall be furnished with hard smooth birch face veneers with phenolic resin thermally fused onto panel sides. Edges shall be factory sealed.
- H. Form Ties: Prefabricated rod, flat band, wire, internally threaded disconnecting type, not leaving metal within 1 1/2-inch of concrete surface.
- I. Form Coating: Non-staining clear coating free from oil, silicone, wax, not grain-raising, "Formshield" by A.C. Horn, Inc., "Release" by Edoco/Dayton Superior, "Cast-Off" by Sonneborn/BASF Building Systems or equal. Where form liners are furnished, provide form coatings recommended by form liner manufacturer.
- J. Form Liner: Rigid or resilient type by L.M. Scofield, Symons, Greenstreak, or equal.

PART 3 - EXECUTION

3.01 GENERAL

- A. Forms shall be constructed so as to shape final concrete structure conforming to shape, lines and dimensions of members required by Drawings and Specifications, and shall be sufficiently tight to prevent leakage of mortar. They shall be properly braced or tied together to maintain position and shape. Forms and their supports shall be designed so that previously placed structures will not be damaged.
- B. Use form coating at all surfaces in contact with concrete.

3.02 TOLERANCES

- A. Permitted abrupt or gradual irregularities in formed surfaces as measured within a 5 feet length with a straightedge shall per ACI 347, Table 3.1:

Class of Surface			
A	B	C	D
1/8 inch	1/4 inch	1/2 inch	1 inch

1. Class A: Use for concrete surfaces prominently exposed to public view.

2. Class B: Use for coarse-textured concrete-formed surfaces intended to receive plaster, stucco or wainscoting.
3. Class C: Use as a general standard for permanently exposed surfaces where other finishes are not specified.
4. Class D: Use for surfaces where roughness is not objectionable and will be permanently concealed.

3.03 ERECTION

- A. Plywood shall be installed with horizontal joints level, vertical joints plumb and with joints tight. Back joints by studs or solid blocking, and fill where necessary for smoothness. Reused plywood shall be thoroughly cleaned, damaged edges or surfaces repaired and both sides and edges oiled with colorless form oil. Nail plywood along edges, and to intermediate supports, with common wire nails spaced as necessary to maintain alignment and prevent warping.
- B. Openings for Cleaning: Provide temporary openings at points in formwork to facilitate cleaning and inspection. At base of walls and wide piers, bottom form board on one face for entire length shall be omitted until form has been cleaned and inspected.
- C. Chamfers: Provide radius edge with ½” corner radius tool for all exposed concrete corners and edges unless otherwise indicated.
- D. Reglets and Rebates: As specified in Section 03 3000: Cast-In-Place Concrete.

3.04 REMOVAL OF FORMS

- A. Forms shall not be removed until concrete has sufficiently hydrated to maintain its integrity and not be damaged by form removal operations. Unless noted otherwise and/or permitted by the Architect, columns and wall forms shall not be removed in less than five days, floor slabs in less than seven days, beams and girders in less than 15 days, pan forms for joists may be removed after three days, but joist centering shall not be removed until after 15 days, and ramp, landing, steps and floor slabs shall not be removed in less than seven days. Shoring shall not be removed until member has acquired sufficient strength to support its weight, load upon it, and added load of construction.
- B. Compressive strength of in-place concrete shall be determined by testing field-cured specimens representative of concrete location or members, as specified in Section 03 3000: Cast-In-Place Concrete.

3.05 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

3.06

CLEAN UP

- A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 032000
CONCRETE REINFORCING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Concrete steel reinforcement.
- B. Related Requirements:
 - 1. Division 01 - General Requirements.
 - 2. Section 01420: Testing and Inspection.
 - 3. Section 031000: Concrete Forming.
 - 4. Section 033000: Cast-In-Place Concrete.

1.02 REGULATORY REQUIREMENTS

- A. Fabrication and placement of reinforcing shall be in accordance with requirements of CBC, Chapter 19A.

1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM A82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
 - 2. ASTM A184 - Standard Specification for Fabricated Deformed Steel Bar Mats for Concrete Reinforcement.
 - 3. ASTM A185 - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
 - 4. ASTM A496 - Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
 - 5. ASTM A497 - Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete.

6. ASTM A615 - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
 7. ASTM A706 - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
- B. American Concrete Institute (ACI) Publication:
1. ACI SP-66 – ACI Detailing Manual.
 2. ACI 318 – Building Code Requirements for Structural Concrete, as modified by CBC.
- C. American Welding Society (AWS):
1. AWS D1.4 – Structural Welding Code – Reinforcing Steel.

1.04 SUBMITTALS

- A. Shop Drawings: Submit steel reinforcement Shop Drawings in accordance with ACI 315. Include assembly diagrams, bending charts and slab plans. Indicate lengths and location of splices, size and lengths of reinforcing steel.
- B. Closeout Submittals: Record exact locations of reinforcing that vary from Contract Documents.

1.05 QUALITY ASSURANCE

- A. Comply with the following as a minimum requirement:
1. Concrete Reinforcing Steel Institute (CRSI) Manual of Standard Practice.
 2. American Welding Society (AWS).
 3. American Concrete Institute (ACI).
 4. CBC, Chapter 19A, Concrete.
- B. Source Quality Control: Refer to Division 01 Sections for general requirements and to the following paragraphs for specific procedures. Testing laboratory retained by the OWNER shall select test Samples of bars, ties, and stirrups from the material at the Project Site or from the place of distribution, with each Sample consisting of not less than two 18 inch long pieces, and perform the following tests according to ASTM A615, or ASTM A706, as applicable:

1. Identified Bars: If Samples are obtained from bundles as delivered from the mill, identified as to heat number, accompanied by mill analyses and mill test reports, and properly tagged with the identification certificate so as to be readily identified, perform one tensile and one bend test for each 10 tons or fraction thereof of each size of bars. Submit mill reports when Samples are selected.
 2. Unidentified Bars: When positive identification of reinforcing bars cannot be performed and when random Samples are obtained; perform tests for each 2.5 tons or fraction thereof, one tensile and one bend test from each size of bars.
- C. Certification of Welders: Shop and Project site welding shall be performed by welding operators certified by AWS.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Avoid exposure to dirt, moisture or conditions harmful to reinforcing.
- B. Reinforcing steel bars, wire, and wire fabric shall be stored on the Project site to permit easy access for examination and identification of each shipment. Material of each shipment shall be separated for size and shape.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Provide reinforcing of sizes, gages and lengths indicated, bent to indicated shapes.

2.02 MATERIALS

- A. Steel Reinforcing Bars: ASTM A615, or ASTM A706 deformed grade 60 billet steel unless otherwise specified or indicated.
- B. Bars or Rod Mats: ASTM A184.
- C. Welded Wire Fabric for Reinforcement: ASTM A185.
- D. Tie Wire: ASTM A82, fully annealed, copper-bearing steel wire, 16 gage minimum.
- E. Chairs, Spacers, Supports, and Other Accessories: Standard manufacture conforming to ACI 315 fabricated from steel wire of required types and sizes. For reinforcement supported from grade, provide properly sized dense precast blocks of concrete.

2.03 FABRICATION OF REINFORCING BARS

- A. Comply with CRSI Manual of Standard Practice for Reinforced Concrete Construction for fabrication of reinforcing steel.
- B. Bending and Forming: Fabricate bars of the indicated sizes and bend and form to required shapes and lengths by methods not injurious to materials. Do not heat reinforcement for bending. Bend bars No. 6 size and larger in the shop only. Bars with unscheduled kinks or bends are not permitted. Provide only tested and permitted bar materials.
- C. Welding: Provide only ASTM A706 steel where welding is indicated. Perform welding by the direct electric arc process in accordance with AWS D1.4 and specified low-hydrogen electrodes. Preheat 6 inches each side of joint. Protect joints from drafts during the cooling process; accelerated cooling is not permitted. Do not tack weld bars. Clean metal surfaces to be welded of loose scale and foreign material. Clean welds each time electrode is changed and chip burned edges before placing welds. When wire brushed, the completed welds must exhibit uniform section, smooth welded metal, feather edges without undercuts or overlays, freedom from porosity and clinkers, and good fusion and penetration into the base metal. Cut out welds or parts of welds deemed defective, using chisel, and replace with proper welding. Prequalification of welds shall be in accordance with CBC requirements.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Bars shall be bent cold. Bars partially embedded in concrete shall not be field bent except as indicated on reviewed Shop Drawings.
- B. Before installation and just prior to placing concrete, clean reinforcing of loose scale, rust, oil, dirt and any coating that could reduce bond.
- C. Accurately position, install, and secure reinforcing to prevent displacement during the placement of concrete.
- D. Provide metal chairs to hold reinforcement the required distance above form bottoms. In beams and slab construction, provide chairs under top slab reinforcement as well as under bottom reinforcement. Space chairs so that reinforcement will not be displaced during installation. Provide metal spacers to secure proper spacing. Stirrups shall be accurately and securely wired to bars at both top and bottom. At slabs, footings, and beams in contact with earth, provide concrete blocks to support reinforcement at required distance above grade.

- E. Install and secure reinforcement to maintain required clearance between parallel bars and between bars and forms. Lapped splices shall be installed wherever possible in a manner to provide required clearance between sets of bars. Stagger lapped splices. Dowels and bars extending through construction joints shall be secured in position against displacement before concrete is installed and subsequently cleaned of concrete encrustations while they are still soft.
- F. Do not install reinforcing in supported slabs and beams until walls and columns have been installed to underside of slabs and beams or until construction joints have been thoroughly cleaned. Reinforcing shall be inspected before placement of concrete and cleaned as required.
- G. Use deformed bars unless otherwise indicated, except for spiral reinforcement.

3.02 CLEAN UP

- A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

3.03 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 033000

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Cast-in-place normal weight and lightweight concrete, placement and finishing.

B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 031000: Concrete Forming and Accessories.
3. Section 032000: Concrete Reinforcing.

1.02 REFERENCES

A. American Concrete Institute (ACI) Publication:

1. ACI 117 – Specifications for Tolerances for Concrete Construction and Materials.
2. ACI 301 – Specifications for Structural Concrete.
3. ACI 302.1R – Guide for Concrete Floor and Slab Construction.
4. ACI 305R - Specification for Hot Weather Concreting.
5. ACI 306.1 – Standard Specification for Cold Weather Concreting.
6. ACI 308R – Guide to External Curing of Concrete.
7. ACI 318 - Building Code Requirements for Structural Concrete, as modified by CBC Sections 1903A and 1905A.

B. American Society for Testing and Materials (ASTM) Standards:

1. ASTM C31 – Standard Specification for Making and Curing Concrete Test Specimens in the Field.

2. ASTM C33 - Standard Specification for Concrete Aggregates.
3. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
4. ASTM C42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
5. ASTM C88 - Standard Test Method for Soundness of Aggregates by use of Sodium Sulphate or Magnesium Sulphate.
6. ASTM C94 - Standard Specification for Ready-Mixed Concrete.
7. ASTM C143 - Standard Test Method for Slump of Hydraulic Cement Concrete.
8. ASTM C150 - Standard Specification for Portland Cement.
9. ASTM C156 – Standard Test Method for Water Loss (from a Mortar Specimen) Through Liquid membrane-Forming Curing Compounds for Concrete.
10. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.
11. ASTM C172 – Standard Practice for Sampling Freshly Mixed Concrete.
12. ASTM C173 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
13. ASTM C260 – Standard Specification for Air-Entraining Admixtures for Concrete.
14. ASTM C289 - Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method).
15. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
16. ASTM C330 - Standard Specification for Lightweight Aggregates for Structural Concrete.
17. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.
18. ASTM C567 - Standard Test Method for Determining Density of Structural Lightweight Concrete.

19. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
20. ASTM C845 - Standard Specification for Expansive Hydraulic Cement
21. ASTM C989 - Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
22. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
23. ASTM C1064 - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
24. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.
25. ASTM C1315 – Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
26. ASTM D1308 – Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes.
27. ASTM C1567 - Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method).
28. ASTM D1751 - Standard Test Method for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
29. ASTM D7234 – Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers.
30. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
31. ASTM E1155 - Standard Test Method for Determining F_F Floor Flatness and F_L Floor Levelness Numbers.
32. ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs.
33. ASTM E1745 - Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

34. ASTM F710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
35. ASTM F1869 – Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
36. ASTM F2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In Situ Probes.
37. ASTM F3010 – Standard Practice for Two-Component Resin Based Membrane-Forming Moisture Mitigation Systems for Use under Resilient Floor Coverings.

1.03 SUBMITTALS

- A. Shop Drawings: Submit Shop Drawings indicating locations of cast-in-place concrete Work and accessory items such as vapor barriers. Include details and locations of reinforcing, embedded items, and interfacing with other Work.
- B. Mix Design Data: Submit concrete mix designs as specified herein and in Article 2.02.
 1. Submit name, address and telephone number of the concrete production facility which the contractor intends to engage to design the concrete mixes. Submit name and qualifications of the proposed concrete technologist.
 2. Mix Design: Submit a concrete mix design for each strength and type of concrete indicated in the drawings or specified. Include water/cement ratio, source, size and amount of coarse aggregate and admixtures. Predict minimum compressive strength, maximum slump and air content percentage. Clearly indicate locations where each mix design will be used.
 - a. Water/cement ration for concrete slabs on grade shall be 0.50 maximum.
 3. Test Reports: Submit copies of test reports showing that the proposed mixes produce concrete with the strengths and properties specified. Include tests for cement, aggregates and admixtures. Provide gradation analysis.
- C. Material Samples: Submit Samples illustrating concrete finishes and hardeners, minimum 12-inch by 12-inch.
- D. Certificates: Submit certification that each of the following conforms to the standards indicated:
 1. Portland cement: ASTM C150, Type V.

2. Normal weight concrete aggregates: ASTM C33.
 3. Lightweight concrete aggregates: ASTM C330.
 4. Aggregates: Submit evidence that the aggregate is not reactive in the presence of cement alkalis. In the absence of evidence, aggregate shall be tested by one of the methods in ASTM C33 Appendix XI, Methods for Evaluating Potential for Deleterious Expansion Due to Alkali Reactivity of an Aggregate. Aggregates deemed to be deleterious or potentially deleterious may be used with the addition of a material that has been shown to prevent harmful expansion in accordance with Appendix XI of ASTM C33, when approved by the building official, in accordance to CBC Section 1903A5A.
 5. Curing materials: ASTM C171.
- E. Admixtures: Submit product data for proposed concrete admixtures.

1.04 QUALITY ASSURANCE

- A. Continuous inspection shall be provided at the batch plant and for transit-mixed concrete to run check sieve analysis of aggregate, check moisture content of fine aggregate, check design of mix, check cement being used with test reports, check loading of mixer trucks, and certify to quantities of materials placed in each mixer truck.
- B. Inspection shall be performed by a representative of a testing laboratory selected by the OWNER. OWNER will pay for inspection costs. Notify the laboratory 24 hours in advance of time concrete is to be mixed. Notify the laboratory of postponement or cancellation of mixing within at least 24 hours of scheduling time.
- C. CONTRACTOR shall assist the testing laboratory in obtaining and handling samples at the project site and at the source of materials.
- D. Continuous batch plant inspection requirement may be waived in accordance with CBC Section 1705A.3.3.1. Waiver shall be in writing, including DSA approval. When batch plant inspection is waived by DSA, the following requirements shall be met:
 1. Approved inspector of the testing laboratory shall check the first batching at the start of work and furnish mix proportions to the licensed weightmaster.
 2. Licensed weightmaster shall positively identify materials as to quantity and certify to each load by a ticket.
 3. Tickets shall be transmitted to the Inspector by a truck driver with load identified thereon. The Inspector will not accept the load without a load

ticket identifying the mix and will keep a daily record of placements, identifying each truck, its load and time of receipt and approximate location of deposit in the structure and will transmit a copy of the daily record to DSA.

4. At the end of the project, the weightmaster shall furnish an affidavit to DSA certifying that all concrete furnished conforms in every particular to proportions established by mix designs.
- E. Special Inspections and Tests shall be in accordance with CBC Chapter 17A, Reinforcement and Anchor testing per CBC Section 1910A and Specification Section 01 4523.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Store cement and aggregate materials so as to prevent their deterioration or intrusion by foreign matter. Deteriorated or contaminated materials shall not be furnished.
- B. Packaged materials shall bear the manufacturers and brand name label, and shall be stored in their original unbroken package in a weather tight place until ready for use in the work.

1.06 PROJECT CONDITIONS

- A. Cold Weather Requirements: Batching, mixing, delivering and placing of concrete in cold weather shall comply with the applicable requirements of ACI 306.1.
- B. Hot Weather Requirements: Batching, mixing, delivering and placing of concrete in hot weather shall comply with the applicable requirements of ACI 305R.
- C. Concrete temperature of freshly mixed concrete shall be determined per ASTM C1064.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Cement: ASTM C150, Type V. Portland Cement.
- B. Aggregates: Conform to the following standards:
 1. Normal weight concrete: ASTM C33.
 2. Lightweight concrete: ASTM C330, with fine aggregates per ASTM C33.

3. Aggregate shall be tested for Potential Alkali Reactivity of Cement-Aggregate Combinations per ASTM C289.
 4. Nominal maximum size of coarse aggregate shall be no larger than:
 - a. 1/5 the narrowest dimension between sides of forms, nor
 - b. 1/3 the depth of slabs, nor
 - c. 3/4 the clear spacing between individual reinforcing bars or wires, bundles of bars, individual tendons, or ducts.
- C. Water: Water for concrete mixes, curing and cleaning shall be potable and free from deleterious matter.
- D. Admixtures: Shall be shown capable of maintaining essentially the same composition and performance throughout the work as the product used in establishing concrete proportions in accordance with ACI 318, Section 26.4.1.4.
1. Admixtures containing chlorides or sulfides are not permitted.
 2. Air-entraining admixtures shall comply with ASTM C260. Air-entrained admixtures shall not be used for floor slabs to receive steel trowel finish.
 3. Admixtures for water reduction and setting time modification shall conform to ASTM C494.
 4. Admixtures for producing flowing concrete shall conform to ASTM C1017.
 5. Fly ash, pozzolan and ground granulated blast-furnace slag: Modify ACI 318 Sections 26.4.2.2 and 26.4.2.3as follows:
 - a. Fly ash or other pozzolan used as a partial substitution for ASTM C150 Portland cement shall meet the following requirements:
 - 1) Shall conform to ASTM C618 for Class N or F materials (Class C is not permitted).
 - 2) For slab-on-grade applications, 15 percent maximum, by weight of fly ash or other pozzolans for slab-on-grade application or shall substitute for ASTM C150 Portland cement provided the mix design is proportioned per ACI 318, Section 26.4.3.
 - 3) For any other applications, 25 percent maximum, by weight of fly ash or other pozzolans for slab-on-grade application or shall substitute for ASTM C150 Portland cement

provided the mix design is proportioned per ACI 318, Section 26.4.3

6. Admixtures containing ASTM C845 expansive cements shall be compatible with the cement and produce no deleterious effects.
 7. Silica fumes used as an admixture shall conform to ASTM C1240.
- E. Expansion Joint Fillers: Preformed strips, non-extruding and resilient bituminous type, of thickness indicated, conforming to ASTM D1751.
- F. Curing:
1. Curing Paper: Shall conform to ASTM C171 and consist of two sheets of kraft paper cemented together with a bituminous material in which are embedded cords or strands of fiber running in both directions. The paper shall be light in color, shall be free of visible defects, with uniform appearance.
 2. Elevated slabs and slabs on grade may be cured at CONTRACTOR's option with curing and proactive water vapor emission and alkalinity control system. Products shall be approved by OWNER's Office of Environmental Health and Safety.
 - a. VaporSeal 309, by Floor Seal Technology, Inc., or equal.
 - 1) ASTM C156: 0.39 kg/m².
 - 2) ASTM C309: Exceeds requirements.
 - 3) ASTM C1315: Exceeds requirements.
 - 4) ACI 308R-01 Compliant.
 - b. Remedial Treatment: Water vapor emission and alkalinity control treatment, MES 100 by Floor Seal Technology, Inc. or equal.
 - 1) ASTM E96: <0.1 Perms.
 - 2) ASTM D1308: 14pH Resistant.
 - 3) ASTM D7234: 500+psi 100% concrete failure.
 - 4) ASTM F2170: 100%RH resistant.
 - 5) VOC Content: <100 g/L, meets SCAQMD Rule #1113.

- 6) ASTM F3010: Meets Requirements.
- c. Self-leveling Compounds: Ardex Engineered Cements, K15, or V1200, Schonox ZM Rapid, US Self Leveler Armstrong, S-194, or equal.
- G. Underlayment: Two component latex underlayment for filling low spots in concrete for both interior and exterior applications, from featheredge to a maximum of 3/8 inch in thickness. Underlayment shall be non-shrink and suitable for repairing exposed concrete surfaces and for underlayment of carpet, resilient, tile and quarry floor coverings. La-O-Tex by TexRite, Underlay C, RS by Mer-Krete Systems, Underlayment 962 by C-Cure, or equal.
- H. Vapor Barrier: Refer to Section 07 2600, Vapor Barriers.
- I. Stair Treads and Nosings: Two part stair tread and nosing with ribbed abrasive bars. Fabricated from 6063-T5 or 6063-T6 extruded aluminum, mill finish. Anti-slip abrasive filler consisting of aluminum oxide, silicon carbide, or a combination of both, in an epoxy-resin binder. Color shall extend uniformly throughout filler.
 - 1. American Safety Tread: TP-311R.
 - 2. Balco Inc.: DST-330.
 - 3. Nystrom: STTB-P3.375E.
 - 4. Wooster Products Inc.: WP-RN3SG.
 - 5. Equal.
- J. Grout: ASTM C1107, non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 7,000 psi at 7 days; of consistency suitable for application and a 30 minute working time.

2.02 CONCRETE MIX

- A. Mix shall be signed and sealed by a Civil or Structural Engineer currently registered in the State of California.
- B. Strength of Concrete: Strengths and types of concretes shall be as indicated in the Drawings. Unless otherwise indicated or specified, concrete shall be provided with minimum 28-day strength of 3000 psi (f'c).
- C. Concrete mix shall meet the durability requirements of ACI 318, Chapter 19 per table Tables 19.3.1.1 and 19.3.2.1

- D. Concrete proportioning shall be determined in accordance with ACI 318, Section 26.4.3.1(b) Proportions of materials shall provide workability and consistency to permit concrete to be placed readily into forms and around reinforcement under conditions of placement to be employed, without segregation or excessive bleeding.
- E. Ready-Mixed Concrete: Mix and deliver in accordance with requirements of ASTM C94.

PART 3 - EXECUTION

3.01 GENERAL

- A. Surfaces to receive concrete shall be free of debris, standing water, and any other deleterious substances before start of concrete placing.
- B. Time of Placing: Do not place concrete until reinforcement, conduits, outlet boxes, anchors, hangers, sleeves, bolts, and other embedded materials are securely fastened in place. Contact the Inspector at least 24 hours before placing concrete; do not place concrete until inspected by the Project Inspector.
- C. Pouring Record: A record shall be kept on the Project site of time and date of placing concrete in each portion of structure. Such record shall be maintained on the Project site until Substantial Completion and shall be available for examination by the ARCHITECT and DSA.

3.02 TOLERANCES

- A. Concrete construction tolerances shall be as specified in ACI 117 and as modified herein.
- B. Floor Flatness (F_F) and Floor Levelness (F_L) shall be as indicated below:

	Specified Overall Value		Minimum Local Value	
	F_F	F_L	F_F	F_L
Slabs on ground: mechanical and electrical rooms, parking structures and mortar bed set tile and quarry flooring.	20	15	15	10
Slab on ground: carpet.	25	20	17	15

Slab on ground: thinset tile and resilient flooring.	35	25	24	17
Suspended slabs: mechanical and electrical rooms, parking structures and mortar bed set tile and quarry flooring.	20	15	N/A	N/A
Suspended slabs: carpet.	25	20	N/A	N/A
Suspended slabs: thinset tile and resilient flooring.	35	20	N/A	N/A

- C. Refer to ACI 302.1R, Tables 8.1 and 8.2 Slab on Ground and Suspended Flatness/Levelness Construction Guide, for recommended concrete placing and finishing methods.
- D. Floor Flatness and Floor Levelness shall be tested in accordance to ASTM E1155. Floor measurements shall be made within 48 hours after slab installation, and shall precede removal of shores and forms.

3.03 PREPARATION

- A. For installation of vapor barrier refer to Section 07 2600, Vapor Barriers.
- B. Reglets and Rebates:
 - 1. Form reglets and rebates in concrete to receive flashing, frames and other equipment as detailed and required. Coordinate dimensions and locations required with other related Work.
 - 2. If concrete slabs on grade adjoin a wall or other perpendicular concrete surface, form a reglet in wall to receive and carry horizontal concrete Work. Reglet shall be full thickness of the slab and shall be 3/4 inch wide, unless otherwise indicated. Requirement does not apply to exterior walks, unless specifically indicated.
- C. Screeds: Install screeds accurately and maintain at required grade or slab elevations after steel reinforcement has been installed, but before starting to place concrete. Install screeds adjacent to walls and in parallel rows not to exceed 8 feet on centers.

3.04 INSTALLATION

- A. Conveying and Placing:
 - 1. Concrete shall be placed only under direct observation of the Project Inspector. Do not place concrete outside of regular working hours, unless the Inspector has been notified at least 48 hours in advance.

2. Concrete shall be conveyed from mixer to location of final placement by methods that will prevent separation or loss of materials.
3. Concrete shall be placed as nearly as practicable to its final position to avoid segregation due to re-handling or flowing. No concrete that has partially hydrated or has been contaminated by foreign materials shall be placed, nor shall re-tempered concrete or concrete which has been remixed after initial set be placed.
4. In placing concrete in columns, walls or thin sections, provide openings in forms, elephant trunks, tremies or other recognized devices, to prevent segregation and accumulation of partially hydrated concrete on forms or metal reinforcement above level of concrete being placed. Such devices shall be installed so that concrete will be dropped vertically. Unconfined vertical drop of concrete from end of such devices to final placement surface shall not exceed 6 feet.
5. Concrete shall be placed as a continuous operation until placing of panel or section is completed. Top surfaces of vertically formed lifts shall be level.
6. Concrete shall be thoroughly consolidated by suitable means during placement, and shall be thoroughly worked around reinforcement and embedded fixtures and into corners of forms.
7. Where conditions make consolidation difficult or where reinforcement is congested, batches of mortar containing same proportions of cement, sand, and water as provided in the concrete, shall first be deposited in the forms to a depth of at least one inch.

B. Cold Weather:

1. Provide adequate equipment for heating concrete materials and protecting concrete during freezing or near-freezing weather. All ground with which concrete is to come in contact shall be free from frost. No frozen materials or materials containing ice shall be used.
2. The temperature of concrete at the time of placement shall not be below the minimum temperatures given in Table 3.1 of ACI 306.1.
3. Concrete shall be maintained at a temperature of at least 50° F. for not less than 72 hours after placing or until it has thoroughly hardened. Cover concrete and provide sufficient heat as required. When necessary, aggregates shall be heated before mixing. Special precautions shall be taken for protection of transit-mixed concrete.

C. Hot Weather:

1. Concrete to be placed during hot weather shall comply with the requirements of ACI 318, Section 5.13.
2. Maintain concrete temperatures indicated in Table 2.1.5 of ACI 305R to prevent the evaporation rate from exceeding 0.2 pound of water per square feet of exposed concrete per hour.
3. Cool concrete using methods indicated in ACI 305R Appendix B.
4. Place and cure concrete as specified in ACI 305R Chapter 4.

D. Compaction and Screeding:

1. Tamp freshly placed concrete with a heavy tamper until at least 3/8 inch of mortar is brought to surface. Concrete shall then be tamped with a light tamper and screeded with a heavy straightedge until depressions and irregularities are eliminated, and surface is true to finish grades or elevations. Remove excess water and debris.
2. Where slabs are to receive separate cement finish or mortar setting bed, continued tamping to raise mortar to surface is not performed. Laitance shall be removed by brushing with a stiff brush or by light sandblasting to expose clean top surface of coarse aggregate.

E. Floating and Troweling:

1. When concrete has hydrated sufficiently, it shall be floated to a compact and smooth surface. After floating, wait until concrete has reached proper consistency before troweling. Top surfaces shall receive at least 2 troweling operations with steel hand trowel. Prior to and during final troweling, apply a fine mist of water frequently with an atomizing type fog sprayer. Omit troweling for slabs to receive a separate cement finish.
2. For interior finish slabs, final troweling shall provide a hard, impervious, and non-slip surfaces, free from defects and blemishes. Finished surface shall be within tolerances indicated in Article 3.02. Avoid burnishing. Do not add cement or sand to absorb excess moisture.
 - a. Floor of Walk-In Refrigerator: Finish as specified above, to a smooth finish.
 - b. Floor of Gymnasium Locker Rooms: After floating, and while the surface is still plastic, provide a fine textured finish by drawing a fine fiber bristle broom uniformly over the surface in one direction only. Floors sloped for drainage should be brushed in the direction of flow.

3. Vertical concrete surfaces shall be finished smooth and free from marks or other surface defects.

3.05 CURING

- A. Length of time, temperature and moisture conditions for curing concrete shall be in accordance with ACI 318, Section 5.11.
- B. Forms containing concrete, top of concrete between forms, and exposed concrete surfaces after removal of forms shall be maintained in a thoroughly wet condition for at least 7 consecutive days after placing.
- C. If weather is hot or surface has dried out, spray surface of concrete slabs and paving with fine mist of water, starting not later than 2 hours after final troweling and continuing until sunset. Surface of finish shall be kept continuously wet until curing medium has been installed.
- D. Immediately after finishing, monolithic floor slabs shall be covered with curing paper. Paper shall be lapped 4 inches at joints and sealed with waterproof sealer. Edges shall be cemented to finish. Repair or replace paper damaged during construction operations.
- E. When curing slabs with proactive water vapor emission and alkalinity control system:
 1. Coordinate and schedule application of curing compound with concrete pour schedule, while conforming to manufacturer's application instructions.
 2. When the surface of the concrete has hardened sufficiently to sustain foot traffic pre-cure slabs with liquefied product application following manufacturer's written instructions. Application shall be by trained applicators.
 3. Monitor Environmental Conditions: Set up weather station 20 to 30 inches above freshly placed concrete. Record temperature, humidity and wind velocity measurements at 15 minute maximum intervals.
 4. Calculate Evaporation Rate: Use recorded weather information in combination with nomograph per ACI 308R, Figure 4.1, Guide to Curing Concrete, to evaluate relevant evaporation rate.
 5. When the bleed water rate of the concrete is approximately equal to the surface water evaporation rate, spray curing compound material throughout surface of slabs and decks, following manufacturer's written instructions. Application shall be by trained applicators.

6. Perform the following tests at least 28 days after placement of concrete and prior to floor covering installation. Submit to OAR test results indicating locations that do not comply with scheduled flooring installation requirements.
 - a. Calcium chloride testing per ASTM F1869.
 - b. Relative humidity testing per ASTM F2170.
 - c. Alkalinity testing per ASTM F710.
 - d. Perform concrete bond layer humidity meter testing to determine substrate surface acceptability.

7. Areas emitting moisture and alkalinity at rates exceeding floor covering manufacturer's published ASTM F1869 limits, shall receive a corrective coating, at no cost to the OWNER, as follows:
 - a) Mask and protect adjacent walls and floor surfaces from effects of scarification and application of remedial treatment.
 - b) Scarify slab surface in area of application by shot blasting or other method acceptable to corrective coating manufacturer.
 - c) Prepare and fill cracks, control joints and cold joints.
 - d) Apply two-component modified epoxy penetrant and coating with roller and squeegee over required treatment area; saturate surfaces to ensure a through mechanical bond.
 - e) Clean and fill divots, chips, voids and other surface irregularities with one hundred percent Portland cement based patching compound or cementitious fill.
 - f) Apply cementitious surfacing over coating in areas to receive resilient and wood floor coverings to facilitate adhesion; apply to a thickness of 1/8 inch.

3.06 FILLING, LEVELING AND PATCHING

- A. Concrete slabs exhibiting high or low spots and indicated to receive resilient floor covering or soft floor covering, shall have surfaces repaired. High spots shall be honed, or ground with power-driven machines to required tolerances. Low spots shall be filled with latex underlayment, installed in strict accordance with manufacturer's written recommendations.

- B. Holes resulting from form ties or sleeve nuts shall be solidly packed, through exterior walls, by pressure grouting with cement grout, as specified. Grouted holes on exposed surfaces shall be screeded flush and finished to match adjoining surfaces.
- C. Cement Base: Cement base shall be of the height, thickness, and shape detailed. Base shall be reinforced with one inch mesh, 18 gage, zinc-coated wire fabric. Base finish mixture shall be one part Portland cement, 2 parts of fine aggregate and one part pea gravel. Colored cement base shall include a chemically inert mineral oxide pigment in the mix.

3.07 FINISHING

- A. Soda and Acid Wash: Concrete surfaces to receive plaster, paint or other finish, and which have been formed by oil coated forms, shall be scrubbed with a solution of 1-1/2 pounds of caustic soda to one gallon of water. Surfaces where smooth wood or waste molds have been furnished shall be scrubbed with a solution of 20 percent muriatic acid. Wash with clean water after scrubbing.
- B. Sacking: Exposed concrete curbs, walls, and other surfaces shall be sacked by an application of Portland cement grout, floated, and rubbed. Sacking shall not be performed until patching and filling of holes has been completed. Entire sacking operation for any continuous area shall be started and completed within the same day.
 - 1. Mix one part Portland cement and 1-1/2 parts fine sand with sufficient water to produce a grout having consistency of thick paint. Wet surface of concrete sufficiently to prevent absorption of water from grout. Apply grout uniformly with a brush or spray gun, then immediately float surface with a cork or other suitable float, scouring wall vigorously.
 - 2. While grout is still plastic, finish surface with a sponge-rubber float, removing excess grout. Allow surface to dry thoroughly, then rub vigorously with dry burlap to completely remove dried grout. No visible film or grout shall remain after rubbing with burlap.
- C. Sandblasting: Exterior concrete surfaces to receive stucco dash coat finish, where plywood or other smooth forms have been furnished, shall be uniformly sandblasted with sharp quartz sand under sufficient air pressure to remove dirt, form oil and other foreign materials, and roughen surface to provide a proper bond. Such surfaces shall be thoroughly washed with clean water after sandblasting.
- D. Abrasive: Concrete stair treads, landings, ramps and steps on interior and exterior of buildings, and interior exposed concrete floors in shop buildings shall receive an abrasive finish.

- E. Floor Hardener: Exposed interior concrete floors throughout shall be treated with floor hardener.
 - 1. Protect adjacent surfaces. Clean surfaces to receive treatment in accordance with manufacturer's instructions, ensuring that all stains, oil, grease, form release agents, laitance, dust and dirt are removed prior to application.
 - 2. Apply hardener in accordance with manufacturer's instructions as soon as concrete is firm enough to work on after final troweling.
- F. Cement Grout and Dry-Pack Concrete: Cement grout shall be mixed at the Project site and shall be composed of one volume of Portland cement and 2-1/2 volumes of fine aggregate. Materials shall be mixed dry with sufficient water added to make mixture flow under its own weight. When grout is used as a dry pack concrete, add sufficient water to provide a stiff mixture, which can be molded into a sphere.
- G. Broom Finish: Exterior stair treads and landings shall be provided with a non-slip broom finish in addition to abrasive finish specified.
- H. Abrasive Stair Nosing: Nosing shall be installed according to manufacturers written recommendations.

3.08 EXPANSION AND CONSTRUCTION JOINTS

- A. Construction Joints: Details and proposed location of construction joints shall be as indicated on the Drawings, located to least impair strength of structure, in accordance with the following:
 - 1. Thoroughly clean contact surface by sand blasting entire surface not earlier than 5 days after initial placement.
 - 2. A mix containing same proportion of sand and cement provided in concrete plus a maximum of 50 percent of coarse aggregate shall be placed to a depth of at least one inch on horizontal joints. Vertical joints shall be wetted and coated with a neat cement grout immediately before placing of new concrete.
 - 3. Should contact surface become coated with earth, sawdust, or deleterious material of any kind after being cleaned, entire surface shall be re-cleaned before applying mix.
- B. Expansion Joints: Provide expansion joints where indicated in walks and exterior slabs. Space approximately 20 feet apart, unless otherwise indicated. Joints shall extend entirely through slab with joint filler in one piece for width of walk or slab. Joint filler shall be 3/8 inch thick, unless otherwise indicated.

- C. Tooled Joints: Slabs, walks and paving shall be marked into areas as indicated with markings made with a V-grooving tool. Marks shall be round-edged, free from burrs or obstructions, with clean cut angles and shall be straight and true. Walks, if not indicated, shall be marked off into rectangles of not more than 12 square feet and shall have a center marking where more than 5 feet wide.

3.09 TESTING

A. Molded Cylinder Tests:

1. Inspector or testing lab personnel will prepare cylinders and perform slump tests. Samples for concrete strength shall be taken in accordance to ASTM C172. Each cylinder shall be dated, given a number, point in structure from which sample was obtained, mix design number, mix design strength and result of accompanying slump test noted.
2. Separate tests of molded concrete cylinders obtained at same place and time shall be made at age of three days, seven days, and 28 days. A strength test shall be the average of the compressive strength of two cylinders, obtained from the same sample of concrete and tested at 28 days or at test age designated for determination of f'_c .
3. Test cylinders shall be prepared at the Project site and stored in testing laboratory in accordance with ASTM C31, and tested in accordance with ASTM C39.
 - i. Samples for strength tests of each class of concrete placed each day shall be taken not less than once a day, or not less than once for each 50 cubic yards (345 m³) of concrete, or not less than once for each 2,000 square feet (186 m²) of surface area for slabs or walls. Additional samples for seven-day compressive strength tests shall be taken for each class of concrete at the beginning of the concrete work or whenever the mix or aggregate is changed.

B. Core Test: At request of the ARCHITECT, cores of hardened concrete shall be cut from portions of hydrated structures for testing, in accordance with CBC and ASTM C42.

1. Provide 4 inch diameter cores at representative places throughout the structure as designated by the ARCHITECT.
2. In general, provide sufficient cores to represent concrete placed with at least one core for each 4,000 square feet of building area, and at least 3 cores total for each Project.

3. Where cores have been removed, fill voids with drypack, and patch the finish to match the adjacent existing surfaces.
- C. Concrete Consistency: Measure consistency according to ASTM C143. Test twice each day or partial day's run of the mixer.
 - D. Adjustment of Mix: If the strength of any grade of concrete for any portion of Work, as indicated by molded test cylinders, falls below minimum 28 days compressive strength specified or indicated, adjust mix design for remaining portion of construction so that resulting concrete meets minimum strength requirements.
 - E. Air Content Testing: Measure in accordance to ASTM C173 or ASTM C231, for each composite sample taken in accordance to ASTM C172.
 - F. Defective Concrete:
 1. Should strength of any grade of concrete, for any portion of Work indicated by tests of molded cylinders and core tests, fall below minimum 28 days strength specified or indicated, concrete will be deemed defective Work and shall be replaced or adequately strengthened in a manner acceptable to the ARCHITECT and DSA.
 2. Concrete Work that is not formed as indicated, is not true within 1/250 of span, not true to intended alignment, not plumb or level where so intended, not true to intended grades and levels, contains sawdust shavings, wood or embedded debris, or does not fully conform to Contract provisions, shall be deemed to be defective Work and shall be removed and replaced.
 - G. Concrete for Equipment Pads, Mechanical and Electrical Work: Unless otherwise indicated, strength shall have a minimum $f'_c = 3,000$ psi. Exposed concrete shall be provided with a hand trowel finish with radius corners and edges. Form and place concrete where necessary as described in Section 03 1000 Concrete Forming and Accessories, and reinforced as described in Section 03 2000 Concrete Reinforcing. Calcium chloride shall not be furnished in any concrete mix provided for the installation of underground electrical conduits. For concrete encasement of more than one conduit, furnish 3/4 inch maximum aggregate.

3.10 CLEAN UP

- A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

3.11 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

END OF SECTION

DISTRICT OFFICE
NEW ELECTRONIC MARQUEE
ROSEMead SCHOOL DISTRICT

CAST-IN PLACE CONCRETE
033000-20

SECTION 10 1430

Bid Specifications – 6.667mm-HB-SMD-DF - Rosemead School District

Electronic Full Color Outdoor LED Video Display Bid Specifications:

A. Total number of Electronic Full Color Outdoor LED Video Displays: One (1) Double Face (Two (2) Single Faces)

B. Electronic Full Color LED Video Display: Optec Model: Infinity INF-MOD-6.6HB-RGB-V-S-D-QR / Infinity 6.667mm High Brightness 1R1G1B Outdoor SMD

C. IMPORTANT & MANDATORY:

Electronic Full Color LED Video Display **MUST conform to FCC Title 47, Part 15, Class A.** The LED display MUST have the FCC Compliance statement sticker affixed to the exterior of the product. Upon request, LED display manufacturer MUST provide an accredited Third-party Testing Lab Certificate of Compliance for the LED display model quoted for this project. The LED display MUST showcase the following statement on the exterior of the LED displays, as required by 47 CFR Section 15.19(a)(3): *"This device complies with part 15 of the FCC Rules. Operation is subject to the following two Conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation."*

(Federal Communications Commission (FCC) is the governmental agency responsible for licensing the use of radio frequencies in the United States. The FCC requires that digital signs be tested in a worst-case scenario to ensure compliance with emissions limits and to show that the equipment won't cause harmful electromagnetic interference to other devices)

D. Electronic LED Video Display Specifications: Electronic LED Video Display MUST meet or exceed the minimum specifications described below. NO EXCEPTIONS will be considered.

- 1. Optec Model:** Infinity INF-MOD 6.667mm High Brightness 1R1G1B Outdoor SMD type LEDs / INF-MOD-6.6HB-RGB-V-S-D-QR
- 2. Pixel Pitch (Pixel Spacing):** Center-to-Center pixel spacing MUST not exceed 6.667mm (0.26 inch) TRUE pixel pitch (No Virtual pixel pitch product will be accepted).
- 3. Number of Faces:** Two (2) Single Faces - Primary / Secondary configuration
- 4. Pixel Design / Technology:** Each pixel MUST be SMD (3-in-1 LEDs) type TRUE pixel (No virtual or pixel sharing). Each SMD pixel must consist of no more or less than 1 Red, 1 Green and 1 Blue LEDs.
- 5. Pixel Matrix:** Each LED display face MUST be no less than 180 pixels (High) x 384 pixels (Wide).
- 6. Pixel Density:** Each LED display face MUST have minimum of 69,120 total numbers of 3-in-1 LED pixels.
- 7. LED Density:** Each LED display face MUST have minimum of 207,360 total numbers of LEDs (69,120 Red LEDs, 69,120 Green LEDs and 69,120 Blue LEDs).
- 8. Cabinet Design:** The display MUST be an Edge-to-Edge display. The display shall not have any borders. Pixels and LEDs MUST go all the way to the edges to utilize the entire available space for showing content. The cabinet size MUST be same as the actual viewing area or active display area.
- 9. Viewing Area (Active Display Area):** Each LED display Active Display Area MUST not be smaller than 3' 11 1/4" (H) x 8' 4 13/16" (W).
- 10. Cabinet Size:** Each LED display cabinet size MUST not exceed 3' 11 1/4" (H) x 8' 4 13/16" (W) x 5 6/16" (D).
- 11. Cabinet Depth:** Each LED display face cabinet MUST not exceed 5 6/16" in depth. (7 7/8" including angle iron mounting bracket)

12. **Character Size / Number of Lines / Characters per Line:** Minimum character size must be no greater than 1.8 inches. The display shall be able to display 25 lines of copy with 64 characters per line. The display shall have the ability to display true type fonts.
13. **Colors:** RGB 281 Trillion Levels Minimum
14. **Color Processing:** 16-Bit grayscale color processing.
15. **Color Calibrated Brightness:** Color Calibrated White Balanced Brightness MUST be no less than 8,000 NITs.
16. **Viewing Angles:** 160 Degrees Horizontal; 100 Degrees Vertical.
17. **Video Frame Rate:** 60 FPS. The display MUST have 60 Frames per Second Video Frame Rate for smooth full motion video playback.
18. **Refresh Rate:** \pm 3840 Hz (Adjustable) for optimized viewing experience.
19. **On-demand Diagnostics:** The display MUST have On-demand Diagnostics as a standard feature for diagnosing of Display, Power, Data and Tile level issues. Automated Diagnostic health alerts via email shall be available as an optional item. (Automated Diagnostic health alerts via email would require DSL Internet connection or Cell Modem communication whereas On-demand diagnostics shall be accessible even with Wireless Ethernet / Hard-wire Ethernet / Hard-wire Fiber communication as well, along with DSL Internet connection and Cell Modem. The diagnostics shall have following features:
 - a. **Tile Monitor:** The display diagnostics MUST be capable of checking the LED tile status and outages.
 - b. **Power Monitor:** The display diagnostics MUST be capable of verifying the functionality of Power Supplies & connection status.
 - c. **Data Monitor:** The display diagnostics MUST be capable of Inspecting the quality & status of data signals between LED tiles, displays & components.
 - d. **Media Player Monitor:** The display diagnostics MUST be capable of verifying link between player & display.
 - e. **Display Readiness:** The display diagnostics MUST be capable of checking the status of power & data signals to all components of the display.
 - f. **Hours of Operation:** The display diagnostics MUST be capable of keeping a record of operation. If a tile is replaced, it can be adjusted to maintain uniformity.
20. **Redundant Data Signal:** LED panels shall have independent data connections. There shall NOT be daisy chain effect. LED panels shall have dual data signals.
21. **Graphics / Video capability:** LED display shall be able to support JPEG, PNG, AVI, MP4 file formats. The display MUST be able to display text, pictures, graphics, animations, and pre-recorded videos. The display MUST be able to show pre-recorded videos at no less than 60 frames per second.
22. **Color Calibration:** LED panels and the entire display MUST have the factory pre-setting of true color calibrated white balance prior to getting shipped out.
23. **Contrast Enhancement:** LED Pixels MUST have black textured mask and XL (Extra Large) Louvers with unique Light Reflection Design for higher contrast.
24. **Light Sensor:** LED display shall be supplied with the Light Sensor for sensing the ambient light for automatic brightness dimming.
25. **Brightness Dimming:** LED Display shall have minimum 100 dimming levels through automatic dimming with the help of Light Sensor and manual dimming with the help of software scheduling.
26. **Temperature Sensor:** LED Display shall be supplied with a temperature Sensor for real time display of ambient temperature.

27. **Radiation Shield for Light Sensor & Temperature Sensor:** LED display shall be supplied with Light Sensor for brightness dimming and Temperature Sensor for real time display of temperature. Light Sensor and Temperature Sensor shall be enclosed in a white color honeycomb type radiation shield. The wedge-shaped plates of the honeycomb type radiation shield shall provide maximum airflow around the sensor while at the same time minimizing direct exposure to sunlight. The passive shield is shaped to allow natural air convection around the sensor so that the air temperature inside the shield is a good representation of the outside air. The radiation shield shall also provide protection from rain and snow.
28. **LED Lifetime:** The LEDs must be rated for 100,000 hours of lifetime. Lifetime is defined as the point at which the LED degradation reaches 50% of its original brightness.
29. **Power Supplies:** LED display shall have Energy Efficient - Green Leaf standard Power Supplies: Minimum \pm 88% efficient Fan-less power supplies. Power supplies MUST be Fan-less Power Supplies and MUST use heat-sink technology for heat dissipation.
30. **Color Temperature:** 6500K (Adjustable)
31. **Operating Temperature / Humidity:** \pm -20°~140°F / \pm 10~90%
32. **Cabinet Construction:** Extruded Aluminum
33. **Cabinet Color:** Matte Black
34. **Cabinet Finishing:** Matte finish Black plastic spray
35. **Cabinet Ventilation:** Each LED display MUST have Rear Ventilation through Thermostat-Controlled Exhaust Fans and louvered openings for the cool air-intake on the rear of the cabinet to keep the display cool. Double Face LED display (2 x Single Faces back-to-back) shall not be completely enclosed during installation. If the two displays are enclosed in another cabinet, a perforated (1/2-inch holes spaced out at every 1/2 inch) sheet metal shall be provided between the two LED displays on both sides for the entire height of the LED display, for adequate and necessary air circulation / ventilation. Perforated sheet metal housing cabinet shall be provided by others. For either attaching perforated sheet metal or for installation purpose, no holes shall be drilled into Optec cabinet. Drilling holes into Optec cabinet will compromise the weatherproofing and the warranty will be void. Avoiding this will be the responsibility of the sign company and/or their installers.
36. **Venting Requirement:** 683.53 CFM. Ventilation Requirement is essential for rear venting displays. Vent the sign to maintain internal temperature range of -22° F to +120° F. See venting guidelines.
37. **Service / Maintenance Access:** LED display MUST have full front service access for maintenance and repair.
38. **Weather Proofing (Front / Rear):** LED display MUST have minimum IP65 / IP54 weather proofing ratings.
39. **Manufacturing Quality Standard:** ISO 9001
40. **Certifications:** LED display MUST be ETL / UL 48 Listed and MUST be FCC compliant - Title 47, Part 15, Class A.
41. **AC Power Required:** LED display shall have Single Phase 120V AC 50/60 Hz Input.
42. **Electrical Requirements:** Total number of Circuits: Four (4) @ 120V – Two (2) circuits for each face. Total Boot Up Amps* (for 2 faces) (120V): 35.2 Amps. Regular Operating Amps* (for 2 faces) (120V): 10.36 Amps. Total Power required/ face (120V): 2116 Watts/ face. Average Operating Power (120V): 614 Watts/ face. *Total Boot Up Amps is the total power required for startup. *Regular Operating Amps is calculated based on approximate 30% operation average. Electricals must be installed in accordance with the requirements of NEC (National Electrical Codes) or local codes. Electrical Grounding through an Electrical Ground Lug is a must. Refer to the Optec shop drawing for more information.
43. **Display Net Weight:** 404 lbs. per face. Refer to the shop drawing for exact weight information.
44. **Wind Load:** LED Display shall be engineered to withstand the wind load requirements set by the codes.

E. Communication Method:

The LED display shall have direct hard-wire Ethernet cable communication. Ethernet cable shall be supplied and run by others.

F. Software: Optec ME Pro Plus (Media Editor Pro Plus Software Suite)

Display controlling desktop software must be provided with the display. Software must be capable of running on Windows Vista, Windows 7, Windows 8, Windows 10, and Windows 11. Software shall support all True Type Fonts and shall be capable of making it compatible with Open Type Fonts. Software shall have following features: Create, import, layer, edit, manage, and preview with intuitive content creation tools. Manage effects, apps, variable data, and frame duration. Layer content to create messages with impact. Key text over images, animations, and video. Utilize a variety of transition effects like scale, rotate, and fade in/out to create dynamic content. Display customized time, temperature, date, numerals/characters, and variable data. Schedule down to the minute, for one or multiple displays. Control, network and adjust displays and settings. Group scheduling and upload, log played files, and view display communication status. Create and schedule a variety of content layouts with up to 9 user defined media zones. Mix static, variable, and dynamic content on one display. Create or import/export play lists for one or multiple zones and log playback. Edit and preview play lists. Save individual content files to the content library for future use. There shall be up to 100 available hot keys for instantaneous content playback. Create, edit, and customize each hot key including naming and play duration. Monitor and adjust display connectivity, temperature, and brightness.

G. WARRANTY: LED display MUST carry 5-Year Parts Warranty.

H. Parts Availability Guarantee: LED display MUST carry a 10-Year Parts Availability Guarantee.

I. Software Upgrade: LED Display software MUST include 5-Year Software Upgrades.

J. Lead time: LED display lead time MUST not exceed 10 weeks.

K. Software Training: The LED display manufacturer shall provide unlimited weekly software webinar training at no cost for the lifetime of the LED Display.

L. Tech Support: The LED display manufacturer shall provide unlimited phone tech support for the lifetime of the LED Display.

SECTION 26 0100

BASIC MATERIALS AND METHODS

PART 1: GENERAL

1.01 RELATED DOCUMENTS

- A. Addenda, Alternates, Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-01 Specifications collectively apply to work of this Section.

1.02 WORK INCLUDED

- A. The specifications and drawings are intended to cover a complete installation of systems. The omission of expressed reference to any item of labor or material for the proper execution of the work in accordance with present practice of the trade shall not relieve the Contractor from providing such additional labor and materials.
- B. All labor, materials, appliances, tools, equipment, facilities, transportation and services necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of electrical system, complete, as shown on the drawings and/or specified herein. Work includes but is not necessarily limited to the following:
 - 1. Conduits for all wiring systems, unless otherwise specifically noted.
 - 2. All electrical wiring and connections to equipment furnished under other sections of Specifications.
 - 3. All electrical wiring and connections to Owner furnished equipment.
 - 4. Pull wires in conduit runs indicated as conduit only (CO).
 - 5. Building electrical wiring, conduits, junction boxes, and all miscellaneous items of electrical equipment, apparatus and material specified and/or shown on Drawings.
 - 6. All required grounds.
 - 7. All anchors, chases, sleeves and supports for electrical equipment.
 - 8. Excavation necessary for execution and completion of electrical work.

9. Tests of entire system.
10. Guarantees.
11. Shop Drawings.

1.03 GUARANTEE

- A. In addition to guarantee required in Division 01 or specifically specified elsewhere, all materials and equipment provided and installed under this Division of Specifications shall be guaranteed by Contractor in writing for a period of one year from date of acceptance of work by Owner. Should any trouble develop during this period due to defective materials or faulty workmanship, the Contractor shall furnish all necessary labor and materials to correct the trouble without costs to Owner.
- B. Guarantee complete and perfect operation of entire system and that all apparatus will perform in accordance with detailed drawings and Specifications.
- C. Guarantee that all equipment will be supported in such a way as to be free from objectionable vibration and noise.
- D. Guarantee that all licenses and royalties for use of any patented feature of system will be paid before acceptance of system.

1.04 GENERAL REQUIREMENTS

- A. Codes: Construct project in accordance with following codes and regulations.
 1. 2022 California Electrical Code, Title 24 C.C.R.
 2. 2022 California Energy Code, Title 24 C.C.R.
 3. 2022 California Historical Building Code, Title 24 C.C.R.
 4. 2022 California Fire Code, Title 24 C.C.R.
 5. 2022 California Existing Building Code, Title 24 C.C.R.
 6. 2022 California Green Building Standards Code (CALGreen Code), Title 24 C.C.R.
 7. 2022 California Referenced Standards Code, Title 24 C.C.R.
 8. Local codes and ordinances.

Keep a copy of applicable code available at Site while performing work of this Section. Nothing in these Drawings and Specifications to be construed as authority to violate codes and ordinances. Conflict with applicable regulations to be resolved at Contractor's expense before installation.

- B. Permits, Fees and Inspections: Obtain and pay for all necessary permits and fees required by any constituted authority having jurisdiction including utilities. Arrange and pay for all required inspections or examinations and deliver certificates of inspection to Architect.
- C. Record Drawings:
 - 1. Provide record drawings for work of this Section.
 - 2. Keep up-to-date a complete "As-Built" record set of blueline prints corrected daily and showing every change from original Drawings and Specifications and exact "As-Built" locations, sizes, and kinds of equipment.
 - 3. Prints for this purpose may be obtained from Architect at cost of printing. Keep this set of Drawings on job and use only as a record set.
 - 4. Drawings to serve as work progress sheets. Make neat and legible notations in red ink thereon daily as work proceeds, showing work as actually installed. Drawings to be available at all times for inspection, and kept at a location designated by Architect.
 - 5. On completion of work, obtain one set of prints from Architect at cost of printing, and note neatly in scale all changes on record set. Deliver complete set of prints together with one set of blueline prints to Architect together with Contractor's name, address and phone number. Incorrect, non-legible or non-reproducible drawings will not be accepted.
- D. Selection and Ordering of Equipment and Materials: Within two weeks after award of Contract, for purchase and delivery of all equipment and materials required in ample quantities and at proper time. Inform Architect immediately of any inability to obtain suitable delivery of any equipment or material. Send copy of letter verifying date of purchases to Architect.
- E. Shop Drawings and Material Lists:
 - 1. Submit material lists and shop drawings as called for in Division 01, and as supplemented by this Division, and with sufficient promptness to ensure that overall work of project will not be delayed.
 - 2. Submit six copies of a list of materials and equipment manufacturers that Contractor intends to use.

3. Provide shop drawings for following:
4. Do not fabricate work until reviewed shop drawings for work have been received from Architect. Work fabricated or erected in advance of reviewed shop drawings will be at risk of Contractor.
5. Architect's or Engineer's review of shop drawings does not relieve Contractor of responsibility for errors including details, dimensions, or materials, as well as conformance with requirements of Drawings and Specifications.
6. Shop drawings will be checked by Architect and Engineer for conformance to design as a convenience to Contractor. Dimensions will not be checked. Should interferences become evident, notify Architect immediately so that matter may be resolved prior to proceeding with fabrication.
7. No reimbursement based on a claim that work was placed in accordance with dimensions shown on a reviewed shop drawing will be allowed for removing or replacing work already in place.
8. Make available a copy of every reviewed shop drawing at Project Site.
9. Submit shop drawings in coherent groups at one time.
10. Submit actual samples of specified equipment or material to Architect for review when requested.

F. Substitution and Approval of Material:

1. Base all bids and proposals only upon materials, construction and equipment named or described in specification and/or shown on drawing. Should a Contractor wish to use other equipment than that specified, he shall submit proposed substitution by fully describing equipment he prefers to use and by listing credit or additional cost to his bid as a separate item should substitution be acceptable.
2. All equipment and materials proposed for substitution shall be similar in design and equal in quality and function to those specified herein or on drawings. Contractor (not sales vendor) shall demonstrate his proposed substitution and shall specifically note all differences between item specified and proposed substitution. Actual samples and test data, certified by an independent testing laboratory, shall be submitted when requested.
3. Each substitution will be given consideration, but without any obligation expressed or implied on part of Architect to change named requirements of specification. Only one substitution for each item of equipment will be permitted. Contractor assumes sole responsibility for performance and space

requirements for substitute equipment. Decision of Architect shall be final as to whether or not substitution is acceptable.

G. Terminology:

1. Term "provide" used on Drawings and elsewhere in the Specifications shall be considered to mean "furnish and install".
2. Term "UL" means Underwriters Laboratories Inc.

H. Workmanship: See supplementary Conditions, Architect is sole judge of whether execution is in a workmanlike manner.

I. Safety Conditions: Be responsible in preventing energized switches, circuit breakers or circuits from being turned to "On" position during construction period. Be responsible for damages to personnel and/or property resulting from contact with energized circuits, switches, circuit breakers, busses or other electrical apparatus. Construct all electrical work with electrical system de-energized in area. At no time permit work on equipment or apparatus with energized circuits.

J. Verification of Dimensions: All scaled and figured dimensions are approximate and are given for estimating purposes only. Before proceeding with work carefully check and verify all dimensions and sizes and assume all responsibility for fitting of materials and equipment to other parts of equipment and to structure. Where apparatus and equipment have been indicated on drawings, dimensions have been taken from typical equipment of class indicated. Carefully check drawings and see that equipment will fit into spaces provided.

K. Locations:

1. Locations of conduits, outlets, apparatus and equipment indicated on drawings are approximate only and shall be changed to meet architectural and structural conditions as required.
2. Install conduit and equipment in a manner and in locations avoiding all obstructions, preserving headroom, keeping openings and passageways clear and readily accessible for maintenance and repairs. Make changes in locations of conduit or equipment which may be necessary to accomplish this. Drawings are essentially diagrammatic to extent that many offsets, bends, special fittings and exact locations are not indicated.
3. Should any structural interferences prevent installation of outlets, setting of cabinets for lighting panelboards, running of conduits, or installation of other electrical equipment at locations shown on Drawings, necessary minor deviations therefore as determined by Engineer may be permitted. In event changes in indicated locations or arrangements are necessary due to developed conditions in building's construction or rearrangement of

furnishings or equipment, Owner shall be permitted to move any junction box or utility outlet a distance of 10' and such changes shall be made without extra cost providing change is ordered before work is installed. Submit an estimate of cost or credit for other changes and proceed only upon written authority of Architect.

4. Be cautioned that diagrams showing electrical connections are diagrammatic only and must not be used for obtaining lineal runs of wiring or conduit. Wiring diagrams do not necessarily show exact physical arrangement of equipment.
 5. Verify locations of outlets, equipment etc., with Architectural Drawings of interior and exterior details and finish, and coordinate location of electrical work with mechanical and other equipment.
- L. These Specifications and attendant Drawings are intended to cover a complete and operable electrical system. Follow Drawings and Specifications and execute all work according to true intent and meaning. Should any error or omission exist in either or both of these Drawings and Specifications, or conflict one with another, have same explained and adjusted by Engineer before submitting bid price for electrical work; otherwise at own expense, supply proper materials and labor to completely install same, make good any damage to or defect in work of results obtained therefore caused by such error, omission or conflict. Most restrictive, greater quantity or size, better quality or other superior condition of all representations shall prevail. It is intended that outlets be located symmetrical with Architectural elements notwithstanding fact that locations indicated on Drawings may be distorted for clarity.
- M. Omission of expressed reference in Drawings or Specifications to any item of labor or material necessary for proper execution of work in accordance with present good practice of trade will not relieve Contractor from providing such additional labor and materials.
- N. Job Visits by Engineer: Periodic visits to job by Engineer is for express purpose of verifying compliance by Contractor with contract documents. Such visits by Engineer shall not be construed as construction supervision. Neither shall such visits be construed to make Engineer responsible for providing a safe place for performance of work by Contractor or Contractor's employees or safety of supplies of Contractor or his subcontractors.
- O. Cooperation with Others: Organize work that will harmonize with work of all trades so that all work may proceed as expeditiously as possible. Be responsible for correct placement of work and connection of work to all related trades.
- P. Protection of Finish: Provide adequate means for protecting all finished parts of materials and equipment against damage from any cause during progress of work and until acceptance by Architect. Cover all material and equipment in storage and

during construction in such a manner that no finished surfaces will be damaged, marred or splattered with paint. Keep moving parts perfectly clean and dry. No paint spraying will be permitted in building. Replace or refinish damaged material or equipment including face plates or panels without additional costs to Owner.

- Q. Cleaning Equipment and Premises: Thoroughly clean all parts of materials, equipment and exposed parts such as receptacles and panelboards, of cement, plaster and other materials. Remove all oil and grease spots with a non-inflammable cleaning solvent. Brush exposed metal work with steel brushes to remove rust and other spots and leave smooth and clean. During progress of work, carefully clean up and leave premises and all portions of building free from debris. At completion of work, remove all waste materials and debris resulting, leaving everything in a complete and satisfactory condition.
- R. Cutting and Patching: Include all cutting and patching in bid. Do not cut any structural members without first having received written permission from Architect. Cutting of round openings which can be done by use of a rotary drill shall be done by Contractor requiring same. Cutting and patching finish work shall be performed by workmen of the respective trade.
- S. Conditions at Site: Visit Job Site and become familiar with all existing conditions within scope of work and include in Bid Proposal allowance for these conditions. Verify exact locations of services prior to construction. Notify all other Contractors of these utility locations.
- T. Documents: Read all relevant documents, become familiar with job, scope of work, type of general construction, Architectural, Structural, Mechanical and Electrical Drawings and Specifications. Also become familiar with purpose for which these Drawings have been prepared and become cognizant of all details involved.
- U. Acceptance: Before work will be accepted, demonstrate to Owner and Architect that entire installation is complete and in proper operating condition and Contract has been fully and properly executed. Following items shall be prepared and submitted to Architect:
1. Two copies of all test results required under this Division.
 2. Two copies of local and/or state code enforcing authorities final inspection certificates.
 3. Copies of as-built record drawings as required.
 4. Notify Architect in writing when installation is complete and that a final inspection of this work can be performed. In event defects or deficiencies are found during this final inspection they shall be corrected to satisfaction of Architect before final acceptance can be issued.

5. Two Maintenance and Operating Manuals as required.
- V. Field Inspections: Provide proper facilities for access of Owner or Owner's representative to conveniently examine and inspect all portions of work covered in this Contract at any and all reasonable hours.
- W. Completing Work: At completion of work, remove all waste materials and debris resulting from work, leaving everything in a complete and satisfactory condition.
- X. Electrical Superintendent: Include services of a qualified electrical foreman capable of interpreting intent of Drawings and Specifications, to study Plans, Specifications and references, and coordinate all requirements with other trades, authorized to make decisions and issue instructions; be constantly in charge of work and available at job site at all times and at final inspection. Instruct Owner's representative for proper operation and recommend maintenance of all systems.
- Y. Maintenance and Operating Manuals:
1. Before completion and acceptance of work, furnish Owner with two complete sets of operating and maintenance instruction manuals. Bind each set in durable hardboard binder and index.
 2. Compile data for manuals upon approval of material list and sketches so as not to delay final approval of work installed. Operating manuals to contain all pertinent data relating to electrical installation such as fixture cuts, manufacturer's approval, shop drawings, sketches, wiring diagrams and equipment operating instructions.
 3. Instruct Owner's operating personnel with electrical operating procedures before work is considered complete.
- Z. Extra Work or Costs to This Contractor Due to Other Contractors or Trades: Adjusted between this Contractor and offending Contractor at no extra cost to Owner. Notify Architect before such extra work is done.
- AA. Tests:
1. Upon completion of work and adjustment of all equipment, all systems shall be tested under direction of Owner's representative to demonstrate that all equipment furnished and installed and/or connected under provision of these Specifications shall function electrically in manner required. All tests shall be completed prior to final inspection of project.
 2. All systems shall test free from short circuits and grounds and shall be free from mechanical and electrical defects. All circuits shall be tested for proper neutral connection.

3. All instrumentation and personnel required for testing shall be furnished by Contractor.

BB. Noise Control:

1. Perform electrical work to a manner in minimize transmission of noise and preserve acoustical properties of building structure.
2. Where conduits pass through sleeves in interior walls, floors, or ceilings, completely fill space between each conduit and its sleeve to provide an airtight seal.
3. Use glass fiber material, "Duxseal" compound, for acoustic seals.

CC. Seismic Bracing Standards: All pipes, conduits, etc. shall be supported and braced in accordance with SMACNA "Seismic Restraint Manual, Guidelines for Mechanical Systems", including Appendix B, "Additional Requirements for OSHPD" and "Addendum no. 1, September 2000". Comply with CBC, where requirements are more stringent than SMACNA, including, but not limited to the following:

1. Pipes and conduit shall be braced to resist the forces prescribed in California Building Code.
2. Where possible, pipes, conduit and their connections shall be constructed of ductile materials (copper, ductile iron, steel or aluminum and brazed, welded, or screwed connections.) Pipes, conduits and their connections, constructed of nonductile materials (e.g., cast iron, no-hub pipe and plastic), shall have the brace spacing reduced to one-half of the spacing allowed for ductile material in accordance with California Building Code or SMACNA Seismic Restraint Manual.
3. Seismic restraints may be omitted for the following conditions:
 - a. All piping suspended by individual hangers 12 inches or less in length from the top of the pipe to the bottom of the structural support for the hanger.
 - b. All electrical conduit less than 2.5 inches trade size.
4. For rigidly supported, electrical conduit, or cable trays, the product of $C_a l_p$ need not to exceed 1.2 for any value of l_p .
5. All Trapeze assemblies supporting, cable trays and conduit shall be braced to resist the forces and relative displacements per ASCE 7 Chapter 13, considering the total weight of the elements on the trapeze.
6. Conduit supported by a trapeze where none of these elements would individually be braced need not be braced if connection to the pipe/conduit of

directional changes do not restrict movement of the trapeze. If this flexibility is not provided, bracing will be required when the aggregate weight of the pipes and conduit exceed 10 pounds/foot. The weight shall be determined assuming all pipes and conduits are filled with water.

- DD. Bracing Standards Application: Comply with bracing standards by evaluating the complete installation of all utilities and equipment, and providing a comprehensive solution based on Contractor's layout, coordination with other trades, and with the structural design and all other provisions for incorporating systems into the buildings. Show bracing products and layout in shop drawing submittals. The following criteria apply to the bracing of all systems:
1. The design parameters for determining the Total Design Lateral Force shall be as designated on the structural drawing.
 2. Seismic Hazard Levels (SHL) shall be as designated on structural drawings.
 3. Contractor shall submit documentation for each condition, which is not specifically covered in the SMACNA manual, including piping configurations and conditions, structural systems, structural connection methods, and other issues regarding the application of the standards.
 4. Provide expansion anchors, sized per SMACNA guidelines, for use in concrete.
 5. For connections to structural steel, wood framing, etc. provide bolted or welded connections, sized per SMACNA guidelines.
 6. Seismic bracing components consisting of structural shapes.
 7. Seismic bracing cable shall be galvanized steel, conforming to ASTM A603, zinc-coated with minimum 0.4 ounces/sf, pre-stretched, 7 x 19 strand, sized per SMACNA guidelines.
- EE. In hard ceiling space where access to j-boxes, is required, provide ceiling access panel, fire-rated typical.

END OF SECTION

SECTION 26 0500

COMMON WORK RESULTS FOR ELECTRICAL

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. Electrical equipment coordination and installation.
 - 2. Sleeves for raceways and cables.
 - 3. Sleeve seals.
 - 4. Grout.
 - 5. Common electrical installation requirements.

1.03 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.
- B. NBR: Acrylonitrile-butadiene rubber.

1.04 SUBMITTALS

- A. Product Data: For sleeve seals.

1.05 COORDINATION

- A. Coordinate arrangement, mounting, and support of electrical equipment:
 - 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
 - 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
 - 3. To allow right of way for piping and conduit installed at required slope.

4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.
- B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
- C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08 Section "Access Doors and Frames."
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

PART 2: PRODUCTS

2.01 SLEEVES FOR RACEWAYS AND CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. PVC schedule 40, for underground use only.
- D. Sleeves for Rectangular Openings: Galvanized sheet steel.
 1. Minimum Metal Thickness:
 - a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052 inch.
 - b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138 inch.

2.02 SLEEVE SEALS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
 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:

2. Basis-of-Design Product: Subject to compliance with requirements or comparable product by one of the following:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Metraflex Co.
 - d. Wiremold
 - e. Hubbel
3. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
4. Pressure Plates: Stainless steel. Include two for each sealing element.
5. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.03 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3: EXECUTION

3.01 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

- A. Comply with NECA 1.
- B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
- C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- E. Right of Way: Give to piping systems installed at a required slope.

3.02 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- E. Cut sleeves to length for mounting flush with both surfaces of walls.
- F. Extend sleeves installed in floors finished floor level.
- G. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable, unless indicated otherwise in UL listed fire penetration. .
- H. Seal space outside of sleeves with grout for penetrations of concrete and masonry
 - 1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.
- I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants."
- J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."
- K. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel or cast-iron pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

- M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

3.03 SLEEVE-SEAL INSTALLATION

- A. Install to seal exterior wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.04 FIRESTOPPING

- A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

END OF SECTION 260500

SECTION 260519

WIRE AND CABLE-RATED 600 VOLT

PART 1: GENERAL

1.01 RELATED DOCUMENTS

- A. Addenda, Alternates, Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-01 Specifications collectively apply to work of this Section.

1.02 DESCRIPTION

- A. Work includes but is not limited to the following:

1. Building wire.
2. Ground Conductors.
3. Wiring connections and terminations.
4. Conductor Identification.

- B. Related Work:

1. Section 260100 - Basic Materials and Methods.
2. Section 260526 - Grounding.
3. Section 260533 - Conduit.
4. Section 260553 - Electrical Identification.

PART 2: PRODUCTS

2.01 BUILDING WIRE

- A. Wires shall be single conductor type THHN or THWN insulated with polyvinyl chloride and covered with a protective sheath of nylon, rated at 600 volts. Wires may be operated at 90 degrees C. maximum continuous conductor temperature in dry locations, and 75 degrees C. in wet locations and shall be listed by UL Standard 83 for thermoplastic insulated wires, listed by Underwriters Laboratories (UL) for installation in accordance with Article 310 of the California Electrical Code (CEC). Conductors shall be solid copper for 12 AWG and smaller conductors, and stranded

copper for 10 AWG and larger conductors. Conductors shall be insulated with PVC and sheathed with nylon. Wires shall be identified by surface markings indicating manufacturer's identification, conductor size and metal, voltage rating, UL symbol, type designations and optional rating. Indentations for lettering are not permitted. Wires shall be tested in accordance with the requirements of UL standard for types THWN, or THHN.

- B. Conductors shall be solid Class B or stranded Class C, annealed uncoated copper in accordance with UL standards, or another Nationally Recognized Testing Laboratory (NRTL).
- C. Control Circuits: Copper, stranded conductor 600 volt insulation, THWN/THHN.
- D. Minimum branch circuit wiring: No. 12 AWG copper, 600 volt insulation.

2.02 GROUND CONDUCTORS

- A. Equipment ground: Insulated conductor green in color.
- B. Isolated circuit ground: Insulated conductor green in color.
- C. Ground Wires: Bare copper or with green colored insulation.

2.03 CONDUCTOR ARRANGEMENT AND IDENTIFICATION

- A. Ties: T & B "Ty-rap" or 3M Company.
- B. Lacing: Nylon twine.
- C. Markers: Adhesive type, Brady.

2.04 CONDUCTORS

- A. All Wire: New and delivered to job site in unbroken packages.
- B. Each package shall bear Underwriter's and Manufacturer's labels and seals indicating date of manufacture and maximum allowable voltage.

PART 3: EXECUTION

3.01 INSTALLATION

- A. Wires shall not be installed until debris and moisture is removed from conduits, boxes, and cabinets. Wires stored at site shall be protected from physical damage until they are installed and walls are completed.

- B. Wire-pulling compounds furnished as lubricants for installation of conductors in raceways shall be compounds approved and listed by UL, NRTL, or equal. Oil, grease, graphite, or similar substances are not permitted. Pulling of 2 AWG or larger conductors shall be performed with a cable pull machine. Any runs shorter than 50 feet are exempt. When pulling conductors, do not exceed manufacturer's recommended values
- C. Pressure cable connectors, pre-insulated 3M Scotchlok, Hubbell Power, O-Z/Gedney or equal, Y, R or B spring-loaded twist-on type, may be furnished in splicing number 8 AWG or smaller wires for wiring systems; except public address and telephone systems.
- D. Joints, splices, taps, and connections to switchboard neutral, bonding or grounding conductors, conductors to ground busses, and transformer connections for wires 6 gage and larger shall be performed with high-pressure cable connectors approved for installation with copper conductors. Connectors shall be insulated with heavy wall heat shrink WCSM, or cold-applied roll-on sleeve RVS. Insulation level shall be a minimum of 600V and joints, splices, and taps shall be qualified to ANSIC 119.1, UL, NRTL, or equal listed mechanical pressure connections.
- E. Connections to any bussing and high-press cable connectors shall be securely bolted together with corrosion-resistant plated carbon steel, minimum grade five machine screws secured with constant pressure-type locking devices.
- F. Connection of any bonding or grounding conductors shall be securely bolted together with corrosion-resistant plated carbon steel, minimum grade five machine screws secured with constant pressure-type locking devices.
- G. Wire switchboards, panel cabinets, pull boxes, and other cabinets except public address, shall be neatly grouped and tied in bundles with nylon ties at 10-inch intervals. In switchboards, panels and terminal blocks, wires shall be fanned out to terminals. If bundles are longer than 24 inches, a maximum of nine current carrying conductors may be bundled together.
- H. Install conductor lengths with a minimum length within the wiring space. Conductors must be long enough to reach the terminal location in a manner that avoids strain on the connecting lug.
- I. Maintain the conductor required bending radius.
- J. Neutral conductors larger than 6 gage, which are not color identified throughout their entire length, shall be taped, painted white or natural gray, or taped white where they appear in switchboards, cabinet, gutters or pull boxes. Neutral conductors 6 gage and smaller shall be white color identified throughout their entire length.

K. Wiring systems shall be free from short circuits and grounds, other than required grounds. The contractor shall be responsible for the testing of feeder and branch circuit conductor's insulation resistance. The insulation of the conductors shall be tested prior to connections to any panelboards. Insulation testing of panelboards and switchboards shall be independently performed from the insulation testing of any conductors as specified in other sections of this specification.

1. Utilize the services of an approved independent testing laboratory to perform megger time-resistance insulation testing of feeder conductors. Tests must be conducted with wires disconnected at both ends.
 - a. Provide calibration program records to assure the testing instrument to be within rated accuracy. The test equipment accuracy shall be in accord with the requirements stated by the National Institute of Standards and Technology (NIST).
 - b. Test equipment shall be provided with a label stating the date of last calibration. As a minimum the equipment shall have been calibrated within the past 12 months.
 - c. Test reports shall include the following:
 - 1) Identification of the testing organization.
 - 2) Equipment identification.
 - 3) Ambient conditions.
 - 4) Identification of the testing technician.
 - 5) Summary of project.
 - 6) Description of equipment being tested.
 - 7) Description of tests.
 - 8) Test results.
 - 9) Analysis, interpretation and recommendations.

3.02 COLOR CODES

A. General Wiring:

1. Color code conductor insulation as follows:

SYSTEM VOLTAGE		
Conductor	208Y/120	480Y/277
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	Blue	Yellow
Neutral	White	Natural Gray

Neutrals shall be colored-distinguished if circuits of two voltage systems are used in the same raceway.

2. For phase and neutral conductors 6 gage or larger, permanent plastic-colored tape may be furnished to mark conductor end instead of coded insulation. Tape shall cover not less than 2 inches of conductor insulation within enclosure.

3.03 FEEDER IDENTIFICATION

- A. Feeder wires and cables shall be identified at each point the conduit run is broken by a cabinet, box, gutter, etc. Where terminal ends are available, identification shall be by means of heat shrink wire markers, which provide terminal strain relief. Markers shall be by Tyco Electronics, Panduit, Brady Perma-Sleeve, or equal. Identification in other areas shall be by means of wrap-around tape markers from Tyco Electronics, Panduit, Brady Perma-Code or equal. Markers shall include feeder designation, size, and description.

3.04 TAPE AND SPLICE KITS

- A. Splices, joints, and connectors joining conductors in dry and wet locations shall be covered with insulation equivalent to that provided on conductors. Free ends of conductors connected to energized sources shall be taped. Voids in irregular connectors shall be filled with insulating compound before taping. Thermoplastic insulating tape approved by UL, NRTL, or equal for installation as sole insulation of splices shall be furnished and shall be installed according to manufacturer's printed specifications.

3.05 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

3.06 CLEANUP

- A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 26 0529

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

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. This Section includes the following:
 - 1. Hangers and supports for electrical equipment and systems.
 - 2. Construction requirements for concrete bases.
- B. Related Sections include the following:
 - 1. Division 26 Section "Vibration And Seismic Controls For Electrical Systems" for products and installation requirements necessary for compliance with seismic criteria.

1.03 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. IMC: Intermediate metal conduit.
- C. RMC: Rigid metal conduit.

1.04 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

- D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force or as directed by structural engineers specification, whichever is greater.

1.05 SUBMITTALS

- A. Product Data: For the following:
 - 1. Steel slotted support systems.
 - 2. Nonmetallic slotted support systems.
- B. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details and include calculations for the following:
 - 1. Trapeze hangers. Include Product Data for components.
 - 2. Steel slotted channel systems. Include Product Data for components.
 - 3. Nonmetallic slotted channel systems. Include Product Data for components.
 - 4. Equipment supports.
- C. Welding certificates.

1.06 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Comply with NFPA 70.

1.07 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

PART 2: PRODUCTS

2.01 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allied Tube & Conduit.
 - b. Cooper B-Line, Inc.; a division of Cooper Industries.
 - c. ERICO International Corporation.
 - d. GS Metals Corp.
 - e. Thomas & Betts Corporation.
 - f. Unistrut; Tyco International, Ltd.
 - g. Wesanco, Inc.
 3. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 4. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
 5. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 6. Channel Dimensions: Selected for applicable load criteria.
- B. Nonmetallic Slotted Support Systems: Structural-grade, factory-formed, glass-fiber-resin channels and angles with 9/16-inch- diameter holes at a maximum of 8 inches o.c., in at least 1 surface.
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allied Tube & Conduit.
 - b. Cooper B-Line, Inc.; a division of Cooper Industries.
 - c. Fabco Plastics Wholesale Limited.
 - d. Seasafe, Inc.
 3. Fittings and Accessories: Products of channel and angle manufacturer and designed for use with those items.

4. Fitting and Accessory Materials: Same as channels and angles, except metal items may be stainless steel.
 5. Rated Strength: Selected to suit applicable load criteria.
- C. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- D. Conduit and Cable Support Devices: Galvanized steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- E. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
- F. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- G. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Hilti Inc.
 - 2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - 3) MKT Fastening, LLC.
 - 4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.
 2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

- a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Cooper B-Line, Inc.; a division of Cooper Industries.
 - 2) Empire Tool and Manufacturing Co., Inc.
 - 3) Hilti Inc.
 - 4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - 5) MKT Fastening, LLC.
- 3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
- 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
- 5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
- 6. Toggle Bolts: All-steel springhead type.
- 7. Hanger Rods: Threaded steel.

2.02 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

PART 3: EXECUTION

3.01 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.

- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 - 1. Secure raceways and cables to these supports with two-bolt conduit clamps.
- D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.02 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, raceways may be supported by openings through structure members, as permitted in NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Wood: Fasten with lag screws or through bolts.
 - 2. To New Concrete: Bolt to concrete inserts.
 - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 4. To Existing Concrete: Expansion anchor fasteners.
 - 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
 - 6. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69..
 - 7. To Light Steel: Sheet metal screws.
 - 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.

- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.03 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Division 05 Section "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

3.04 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Touchup: Comply with requirements in Division 09 painting Sections for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

SECTION 26 0533

CONDUIT

PART 1: GENERAL

1.01 RELATED DOCUMENTS

- A. Addenda, Alternates, Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-01 Specifications collectively apply to work of this Section.

1.02 DESCRIPTION

- A. Work includes but is not limited to the following:
 - 1. Rigid metal conduit and fittings.
 - 2. Intermediate metal conduit and fittings.
 - 3. Electrical metallic tubing and fittings.
 - 4. Flexible metal conduit and fittings.
 - 5. Liquidtight flexible metal conduit and fittings.

PART 2: PRODUCTS

2.01 RIGID STEEL CONDUIT AND FITTINGS

- A. Rigid Steel Conduit: Hot dipped galvanized inside and out, galvanized threads, mild steel, zinc coated, inside and outside protective coating. Standard lengths: 10'-0".
- B. Bushings: Threaded insulated metallic type except sizes 1" and smaller may be non-metallic type. Setscrew bushings are not acceptable.
- C. Couplings, elbows, bends and other fittings: Same material and finish as rigid steel conduit. All shall be threaded type.

2.02 RIGID ALUMINUM CONDUIT AND FITTINGS

- A. Conduit: Extruded from 6063-T24 alloy of maximum 1/10% copper content and containing lubricating inside liners; rigid threaded type.
- B. Bushings: Insulated metallic except that sizes 1" and smaller may be non-metallic.

2.03 INTERMEDIATE METAL CONDUIT (IMC) AND FITTINGS

- A. Conduit: Galvanized steel, zinc coated, protective coating inside and out.
- B. Fittings and Conduit Bodies: Use fittings and conduit bodies specified above for rigid steel conduit.
- C. Conduit: May be used in lieu of rigid steel conduit where permitted by code, except in concrete, underground, runs longer than 100 feet for all power feeders with conduit greater than 2 inches.

2.04 ELECTRICAL METALLIC TUBING (EMT) AND FITTINGS

- A. Conduit: Hot dipped galvanized or sherardized inside and out, zinc coated with protective enamel coating inside. Provide bushings at ends of conduits.
- B. Connectors: Steel, insulated, bused tap-on or wrench tightened compression type. (Couplings similar) Indentor or screw type not acceptable.
- C. Conduit: May be used in lieu of rigid steel conduit where permitted by code, except exposed, in concrete and for runs more than 100' for all power feeders with conduit greater than 2 inches.

2.05 FLEXIBLE METAL CONDUIT AND FITTINGS

- A. Conduit: Steel single strip, hot dipped galvanized on all 4 sides prior to fabrication. Flexible aluminum conduit will not be allowed.
- B. Connectors: Die cast with ridges that thread into conduit. (Binding screw type connectors are not acceptable.)
- C. Conduit: May be used in lieu of rigid steel conduit where specifically indicated; at connections to vibrating equipment; at drops to light fixtures from J-boxes; at locations judged by Architect impractical to use rigid conduit. Maximum length for any application shall be 6 feet.

2.06 LIQUIDTIGHT FLEXIBLE CONDUIT AND FITTINGS

- A. Conduit: Steel, single strip, hot dipped galvanized on 4 sides prior to fabrication.
- B. Connectors: Insulated, special Appleton "STN" Series.
- C. Jacket: Liquidtight, polyvinyl chloride plastic.

- D. Conduit: Use for final connection to motor terminal boxes and transformers. Use at exterior locations, damp locations, wet locations and for flex connections in kitchen, restrooms and similar areas.

2.07 CONDUIT SUPPORTS

- A. Conduit Clamps, Straps, and Supports: Steel or malleable iron. Clamps: Unistrut Nos. P111 thru P1124, Kindorf No. C105. Straps: One or two hole as required.
- B. Conduit hangers, racks and trapezes: Steel, threaded rods, channel iron "U" shaped racks equal to "Unistrut".
- C. Individual conduit hangers: Steel, threaded rods with malleable iron split rings.
- D. Hanger rods: 3/8" minimum diameter for 2" and smaller conduit, factory made. 1/2" minimum for 2-1/2" and larger conduit.
- E. Wire supports: 12 gauge zinc coated iron tie wire, or 16 gauge galvanized double annealed steel tie wire.

2.08 CONDUIT ROOF JACKS AND FLASHING

- A. Roof Jacks:
 - 1. For Single Conduits Through Roof: Stonemen Stormtite Series #1100-4; seamless 4 pound lead flashing assembly, 8" skirt, steel reinforced varipitch boot; caulk type cast iron counterflashing sleeve, with vandalproof set screws, and Perma-seal waterproofing compound.
 - 2. Sleeves for Conduits: Sleeves shall be adjustable type, of 26 gage galvanized iron, Adjust-to-Crete Co. Adjust-to-Crete, or Jet Line Products Inc. Jet-Line, or equal.
 - 3. Where conduit enters a building through a concrete foundation below grade, or ground water level, or where it is necessary to seal around a conduit where it passes through a concrete floor or wall, provide O-Z/Gedney Type FSK Thru Wall and Floor Seal, or equal.

2.09 CONDUIT PULLING CORDS

- A. Pull Wire: No. 12 galvanized iron or nylon pull wire rated 250 pounds tensile strength.

2.10 CONDUIT FITTINGS, ELLS AND BUSHINGS

- A. Special conduit fittings: Crouse-Hinds "Condulets" or Appleton "Unilets".

- B. Ells: Same quality, same finish and same make as conduit.
- C. Bushings: Thomas & Betts or approved equal.
- D. Seismic separations and expansion joints: OZ type "AX" complete with bonding strap and clamps. At exterior locations use OZ type "EX".

2.11 CONDUIT SEALS AND SEALING COMPOUND

- A. Vertical seals: Crouse Hinds type "EYD" or Appleton type "SF".
- B. Horizontal Seals: Crouse Hinds type "EYS" or Appleton type "ESU".
- C. Sealing compound: Crouse Hinds "CHICO" or Appleton "APELCO".
- D. Fireproofing Compound: Dow Corning No. 3-6548 RTV or equal by 3M Company or Nelson.

2.12 MC CABLE

- A. Metal Clad (MC) cable system is not allowed.

PART 3: EXECUTION

3.01 CONDUIT SIZING, ARRANGEMENT, AND SUPPORT

- A. Arrange conduit to maintain headroom and present a neat appearance.
- B. Unless indicated otherwise, conceal conduit within or behind finished walls and ceiling.
- C. Route exposed conduit and conduit above accessible ceilings parallel and perpendicular to walls and adjacent piping.
- D. Maintain minimum 6 inch clearance between conduit and piping. Maintain 12 inch clearance between conduit and heat sources such as flues, steam pipes, and heating appliances.
- E. Arrange conduit supports to prevent distortion of alignment by wire pulling operations. Fasten conduit using galvanized straps, lay-in adjustable hangers, clevis hangers, or bolted split stamped galvanized hangers.
- F. Group conduit in parallel runs where practical and use conduit rack constructed of steel channel with conduit straps or clamps. Provide space for 25 percent additional conduit.

- G. Do not fasten conduit with wire or perforated pipe straps. Remove all wire used for temporary conduit support during construction, before conductors are pulled.
- H. Do not support conduit from any equipment subject to vibration. Support from structural members only.
- I. Structural Considerations for Conduit Routing:
 - 1. Where conduits are to pass through or will interfere with any Structural member, or where notching, boring or cutting of the structure is necessary, or where special openings are required through walls, floors, footings, or other buildings elements, to accommodate the electrical work, such work shall conform to State Building Code.
 - 2. Where conduits are terminated in groups at panelboards, switchboards and signal cabinets, etc., provide templates or spacers to hold conduits in proper position and to preserve alignment. Conduits terminating at signal cabinets shall enter cabinets in following approved locations only: Conduits entering top, side, and bottom of cabinets shall be aligned in a single row, centered 2" from rear of cabinet; conduits entering back of cabinet shall be aligned in a single row centered 2" from top of cabinet. Conduits shall not be spaced closer than 3" on centers.
 - 3. 1" and smaller conduits above metal lath ceilings shall be tied to ceiling channels. 1-1/4" conduits above metal lath ceilings shall be rigidly suspended with pipe hangers or pipe racks or shall be secured to superstructure with factory made pipe straps. Conduits in metal lath or steel stud partitions, shall be tied to furring channels or studs. In ceiling spaces and in partitions, tie wires shall be spaced not more than 5'-0" apart, shall hold conduit tight against channels and studs at point of tie and shall not bear any of weight of conduit. Tie wire shall be #16 gage galvanized double annealed steel tie wire.
 - 4. Where auxiliary supports, saddles, brackets,, etc., are required to meet special conditions they shall be made rigid and secure before conduit is attached thereto.
 - 5. Conduit in ceiling spaces, in stud walls and under floors shall be supported with factory made pipe straps or shall be suspended with pipe hangers or pipe racks. Pipe straps shall be attached to and shall hold conduit tight at point of support against ceiling and floor joists, rafters, and wall studs, or 2" x 4" headers fitted between joists or wall studs.

6. Conduits installed on exposed steel trusses and rafters shall be fastened with factory made conduit straps or clamps which shall hold conduit tight against supporting member at point of support.
7. Conduits under buildings shall be strapped with factory made conduit straps to underside of concrete floor or joists, or wood floor joists, or shall be suspended with pipe hangers or pipe racks. Conduits under building shall not rest on ground but shall be suspended from building or shall be buried below surface of ground. 1" and larger conduits under buildings shall be suspended with conduit hangers or racks.
8. Pipe hangers for individual conduits shall be factory made, consisting of a pipe ring and threaded suspension rod. Pipe ring shall be malleable iron, split and hinged, and shall securely hold conduit, or shall be springable wrought steel. Rings shall be bolted to or interlocked with suspension rod socket. Rods shall be 3/8" for 2" conduit hangers and smaller and shall be 1/2" for 2-1/2" conduit hangers and larger.
9. Pipe racks for groups of parallel conduits and for supporting total weights not exceeding 500 pounds shall be trapezed type and shall consist of a cross channel, Steel City Kindorf #B-900, Unistrut #P-1000 suspended with a 3/8" minimum diameter steel rod at each end. Each rod shall be fastened with nuts, top and bottom to cross channel and with a square washer on top of channel. Each conduit shall be clamped to top for cross channel with conduit clamps, Steel City Kindorf #C-105 or Unistrut Nos. P-1111 through P-1124. Conduits shall not be stacked one on top of another, but a maximum of 2 tiers maybe on same rack providing an additional cross channel is installed. Where a pipe rack is to be longer than 18", or if weight it is to support exceeds 500 pounds, submit details of installation to the Architect for approval.
10. Factory-made pipe straps shall be one or 2-hole formed galvanized clamps, heavy duty type, except where otherwise specified.
11. Hangers straps, rods, or pipe supports under concrete shall be attached to inserts set at time concrete is poured. Under wood use bolts, lag bolts, or lag screws; under steel joists or trusses use beam clamps.

3.02 CONDUIT INSTALLATION

- A. Cut conduit square using a saw or pipe cutter; de-burr cut ends.
- B. Bring conduit to the shoulder of fittings and couplings and fasten securely.
- C. Use conduit hubs or sealing locknuts for fastening conduit to cast boxes, and for fastening conduit to sheet metal boxes in damp or wet locations.

- D. Install no more than equivalent of two 90-degree bends between boxes for conduits 2" diameter and larger, three for conduit under 2" diameter. Locate pull boxes as required.
- E. Use conduit bodies to make sharp changes in direction, as around beams.
- F. Use hydraulic one-shot conduit bender or factory elbows for bends in conduit larger than 2 inch size.
- G. Avoid moisture traps where possible; where unavoidable, provide junction box with drain fitting at conduit low point.
- H. Support rigid, intermediate and thin wall conduit at 8'-0" maximum on centers and 3'-0" from junction boxes.
- I. Support flexible and liquidtight flexible conduit at 4'-0" maximum on centers and 12" from junction boxes.
- J. Provide No. 12 AWG insulated conductor or suitable pull string in empty conduit, except sleeves and nipples.
- K. Install expansion-deflection joints where conduit crosses building expansion or seismic joints.
- L. Where conduit penetrates fire-rated walls and floors, seal opening around conduit with UL listed fire barrier, "3M" calk or equal.
- M. Route conduit to roof mounted devices and equipment through roof jacks. Provide flashing/roof jacks for all new and existing conduits which penetrate roof to appropriate Roofing Section(s) for installation.
- N. Run conduit to equipment on roof concealed in attic space. Penetrate roof at equipment locations only.
- O. For conduits to roof mounted HVAC equipment, penetrate roof with roof jacks outside footprint of HVAC units. Do not penetrate roof inside HVAC units.
- P. Do not use aluminum conduit below grade, cast in concrete or in masonry in contact with earth.
- Q. Cut threads on rigid conduit to standard taper and to a length such that all bare metal exposed by threading operation will be completely covered by couplings or fittings used. In addition, cut lengths of thread such that all joints will become secure and wrench tight just preceding point where conduit ends would butt together in

couplings and where conduit ends would butt into ends or shoulders of other fittings. Securely tighten all threaded connections.

- R. Make joints in rigid conduit installed in concrete or masonry liquid-and-gas-tight, with red lead and oil, or other approved joint compound and engage not less than five threads.
- S. Keep bends and offsets in conduit runs to an absolute minimum. Replace all deformed, flattened or kinked conduit. Provide large radius factory made bends or power bend rigid metal conduit of 1-1/4" trade size or larger.
- T. Penetration Membrane: Where penetration cannot be avoided, cut and re-seal membrane at point of penetration.
- U. Run exposed conduit parallel with or at right angles to building line, beams, or ceilings. Place symmetrical bends or metal boxes at changes in direction or taps.
- V. Stub from each panel which is flush mounted in a wall, from top of panel a minimum of 3-3/4" conduits to nearest ceiling space or other accessible locations and cap for future use. Tag to indicate panel origination.
- W. Independently support conduit rising from floor for motor connections if over 24" above floor. Support shall not be a motor or duct work which may transmit vibrations.
- X. Provide pull wire in all conduit runs indicated as conduit only (C.O.).
- Y. Do not run conduit closer than 12" to any hot water pipe, steam pipe, heater flue or vent.
- Z. Terminate conduit stub-ups through floor for connection to equipment of junction boxes in couplings flush with top of concrete slab floor.
- AA. Use rigid metal conduit where legally required, where exposed to weather, where located in unheated areas, or where subject to mechanical injury, here defined as exposed conduit less than 7'-6" above floor in areas accessible to anyone other than authorized operating or maintenance personnel.
- BB. Where a conduit from one structure crosses to another structure, e.g., from a building to an arcade or from one arcade to another arcade, use a section of liquid-tight flex conduit at the crossing with sufficient slack to allow the two structures to move during an earthquake without breaking the conduit. For stub up to relocatable buildings, provide liquid-tite flex from stub up to first box on back of building.
- CC. Provide a green insulated ground wire in all flexible conduit runs regardless of length.

- DD. Install an equipment ground (green) insulated conductor in each non-metallic conduit.
- EE. Flash and counterflash all conduit runs passing through roof.
- FF. Use electrical metallic tubing above grade in dry locations only and where not subject to mechanical injury or otherwise prohibited. Concrete and masonry in contact with earth are not considered dry locations.
- GG. Use liquid tight flexible conduit for final connections to motors and vibrating equipment. Use flexible conduit where required for equipment servicing for connections to recessed lighting fixtures from nearby accessible junction boxes, and for concealed runs in dry locations where structural conditions prevent use of other types of conduit.
- HH. Size all conduits as legally required or larger where indicated or preferred. Where portions of a conduit run are increased in size, for whatever reason, make all remaining portions in that run same size.
- II. Do not cut concrete, masonry or structural members except where approved by Architect.

END OF SECTION

SECTION 26 0534

BOXES

PART 1: GENERAL

1.01 RELATED DOCUMENTS

- A. Addenda, Alternates, Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-01 Specifications collectively apply to work of this Section.

1.02 DESCRIPTION

- A. Work includes but is not limited to the following:

- 1. Wall and ceiling outlet boxes.
- 2. Pull and junction boxes.
- 3. Sealant.

- B. Related Work:

- 1. Section 260100 - Basic Materials and Methods.
- 2. Section 260533 - Conduit
- 3. Section 262726 - Wiring Devices.

PART 2: PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS-OUTLET BOXES

- A. Raco
- B. Steel City
- C. Bowers

2.02 OUTLET BOXES

- A. Sheet Metal Outlet Boxes: One piece galvanized, pressed steel, knockout type, 4-11/16" sq. by 2-1/8" deep in all locations unless otherwise indicated or required.

- B. Cast Boxes: Aluminum, or Cast ferrous alloy, deep type, gasketed cover, threaded hubs.
- C. Where Wiremold type boxes have to be used, e.g., on existing concrete wall, provide proper box such that the total depth of a box including the device mounted on the box, will not exceed 4 inches.

2.03 PULL AND JUNCTION BOXES

- A. Interior and non-weatherproof boxes shall be constructed of blue or galvanized steel with ample laps, spot welded, and shall be rigid under torsional and deflecting forces. Boxes shall have auxiliary angle iron framing where necessary to ensure rigidity. Covers shall be fastened to box with a sufficient number of brass machine screws to ensure continuous contact all around. Flush type boxes shall be drilled and tapped for cover screws at Site if boxes are not installed plumb. All surfaces of pull and junction boxes and covers shall be given one coat of metal primer, and one coat of aluminum paint.
- B. Weatherproof pull and junction boxes shall conform to foregoing for interior boxes with following modifications: Cover of flush mounting boxes shall have a weather-tight gasket cemented to and trimmed even with cover all around. Surface or semi-flush mounting pull and junction boxes shall be UL approved as rain-tight and shall be complete with threaded conduit hubs. All exposed portions of boxes shall be galvanized and finished with a prime coat and coat of baked-on gray enamel.
- C. All junction and pull-boxes shall be rigidly fastened to the structure and shall not depend on conduits for support.
- D. Cast Metal Boxes for Outdoor and Wet Location Installations: Type 4 and Type 6, flat-flanged, surface-mounted junction box, UL listed as rain-tight. Galvanized cast iron OR Cast aluminum box and cover with ground flange, neoprene gasket, and stainless steel cover screws.

2.04 ACCEPTABLE MANUFACTURERS-SEALANT

- A. Crouse Hinds "CHICO"
- B. Permacel
- C. Ductseal

2.05 ACCEPTABLE MANUFACTURERS - FIRE PROOFING SEALANT

- A. Dow Corning
- B. 3M Company

- C. Nelson

PART 3: EXECUTION

3.01 COORDINATION OF BOX LOCATIONS

- A. Provide electrical boxes as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections, and code compliance.
- B. Electrical box locations shown on Contract Drawings are approximate unless dimensioned. Verify exact location of floor boxes and outlets in offices and work areas with Owner's representative prior to rough-in.
- C. Locate and install boxes to allow access.
- D. Locate and install to maintain headroom and to present a neat appearance.

3.02 OUTLET BOX INSTALLATION

- A. Unless otherwise noted on plan or specifically allowed by the Engineer, conceal all boxes flush in wall or in ceiling space above drop ceiling. In finished areas and where it is not possible to conceal conduits and boxes, for example, on existing concrete wall, provide Wiremold type metallic surface raceways and boxes.
- B. Do not install boxes back-to-back in walls. Provide minimum 6 inch separation, except provide minimum 24 inch separation in acoustic-rated walls.
- C. Provide knockout closures for unused openings.
- D. Support boxes independently of conduit except for cast box that is connected to two rigid metal conduits, both supported within 12 inches of box.
- E. Use multiple-gang boxes where more than one device are mounted together; do not use sectional boxes. Provide barriers to separate wiring of different voltage systems.
- F. Install boxes in walls without damaging wall insulation.
- G. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
- H. Position outlets to locate lighting fixtures as shown on reflected ceiling plans.
- I. In inaccessible ceiling areas, position outlets and junction boxes within 6 inches of recessed lighting fixture, to be accessible through lighting fixture ceiling opening.

- J. Provide recessed outlet boxes in finished areas; secure boxes to interior wall and partition studs. Accurately position to allow for surface finish thickness. Use stamped steel stud bridges for flush outlets in hollow stud wall, and adjustable steel channel fasteners for flush ceiling outlet boxes. Install plaster rings to interface with equipment to be mounted thereon.
- K. Align wall-mounted outlet boxes for switches, thermostats, and similar devices.
- L. Provide cast outlet boxes in exterior locations and wet locations. Provide cast bell-boxes at interior locations where box is exposed to view. (do not use regular 4/s or handy box with exposed knockouts and unfinished appearances for these interior exposed applications).
- M. Where boxes are installed in fire rated ceiling or walls, be responsible for preserving integrity of fire rating as required.
- N. In fire-rated wall, use 4" square deep boxes. Do not aggregate more than 100 square inches of boxes for any 100 square feet of wall or partitions. Separate outlet boxes on opposite sides of walls or partition by a minimum horizontal distance of 24 inches. Where the separation cannot be achieved due to site condition, provide 2-hour rated fire-proof material behind boxes to maintain fire rating of walls.

3.03 PULL AND JUNCTION BOX INSTALLATION

- A. Locate pull boxes and junction boxes above accessible ceilings or in unfinished areas.
- B. Support pull and junction boxes independent of conduit.

END OF SECTION

SECTION 26 0553

ELECTRICAL IDENTIFICATION

PART 1: GENERAL

1.01 RELATED DOCUMENTS

- A. Addenda, Alternates, Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-01 Specifications collectively apply to work of this Section.

1.02 DESCRIPTION

- A. Work includes but is not limited to the following:
 - 1. Nameplates.
 - 2. Wire and cable markers.
- B. Related Work:
 - 1. Section 260100 - Basic Materials and Methods.
 - 2. Section 260519 - Wire and Cable -Rated 600 Volt.
 - 3. Section 260533 - Conduit.
 - 4. Section 260534 - Boxes.

PART 2: PRODUCTS

2.01 MATERIALS

- A. Nameplates: Engraved three-layer laminated plastic, white letters on a black background.
- B. Wire Markers: Cloth markers, split sleeve or tubing type.

PART 3: EXECUTION

3.01 INSTALLATION

- A. Degrease and clean surfaces to receive nameplates.

- B. Install nameplates parallel to equipment lines.
- C. Secure nameplates to equipment fronts using screws or rivets. Secure nameplate to outside face of panelboard doors.
- D. Embossed tape will not be permitted for any application.

3.02 WIRE IDENTIFICATION

- A. Provide wire markers on each conductor in panelboard gutters, pull boxes, and at load connection. Identify with branch circuit or feeder number for power and lighting circuits, and with control wire number as indicated on schematic and interconnection diagrams or equipment manufacturer's shop drawings for control wiring.

3.03 NAMEPLATE ENGRAVING SCHEDULE

- A. Provide nameplates of minimum letter height as scheduled below.
- B. Exterior metal pull boxes: 1/4 inch identifying systems in boxes.
- C. Terminal Cabinets: 1/4 inch identifying systems.

3.04 MARK CONDUCTOR RUNS

- A. Apply markers after conductors installed in conduits.
- B. Apply in panelboards and in junction boxes.
- C. Mark feeders in panelboards, switchboards and distribution sections.

3.05 MARK JUNCTION BOXES

- A. Mark covers of junction boxes with non-erasable marker to indicate circuit numbers or systems contained within boxes.
- B. Mark fire alarm boxes with red marker and identifying as "FA".
- C. Paint fire alarm conduits red at intervals such that conduits can be clearly identified for fire alarm system.

END OF SECTION

SECTION 26 2726

WIRING DEVICES

PART 1: GENERAL

1.01 RELATED DOCUMENTS

- A. Addenda, Alternates, Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-01 Specifications collectively apply to work of this Section.

1.02 DESCRIPTION

- A. Work includes but is not limited to the following:
 - 1. Device plates and box covers.
- B. Related Work:
 - 1. Section 260100 - Basic Materials and Methods.
 - 2. Section 260534 - Boxes.
 - 3. Section 260553 - Electrical Identification.

PART 2: PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS – WALL SWITCHES

- A. Harvey Hubbell Company.
- B. Pass and Seymour.
- C. Leviton.

2.04 ACCEPTABLE MANUFACTURERS - WALL PLATES (Match manufacturer of Device)

- A. Harvey Hubbell Company.
- B. Pass and Seymour.
- C. Leviton.

- D. TayMac.
- E. Match manufacturer of switches and receptacles.

2.05 WALL PLATES

- A. Interior Device Plates: Sierra Electric .040 stainless steel to suit device; multi-gang where required; blank plates at junction boxes and capped outlets.
- B. Weatherproof Cover Plates: Receptacles in wet locations shall be installed with an outlet enclosure clearly marked "Suitable for Wet Locations While In Use". There must be a gasket between the enclosure and the mounting surface, and between the cover and base to assure a proper seal. The enclosure must employ stainless steel mounting hardware and enclosure shall be recessed where possible and by TayMac Corporation or equal.
- C. Highest specification grade.

PART 3: EXECUTION

3.01 INSTALLATION

- A. Install wall switches 48 inches above floor to top of wall box, "OFF" position down. Verify mounting height with Architect prior to installation.
- B. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface-mounted outlets in non-public places.
- E. Install devices and wall plates flush and level.
- F. Install plates with all four edges in continuous contact with finished wall surfaces without use of mats or similar devices.
- G. Provide blank cover plates for all boxes as required.

END OF SECTION