DSA DIVISION OF THE STATE ARCHITECT
DEPARTMENT OF GENERAL SERVICES

DSA-103 Issued 12/30/2016

List of Required Structural Tests & Special Inspections - 2016 CBC

INCREMENT #:

DSA File No.: 37-C1
Application No.: A04-116580
Date Submitted: 12/5/2017
Revised:
Revised:

School Name	Palomar College North Education Center	District	Palomar Community College District

IMPORTANT: This form is only a summary list of structural tests and some of the special inspections required for the project. Generally, the structural tests and special inspections noted on this form are those that will be performed by the Geotechnical Engineer of Record, Laboratory of Record, or Special Inspector. The actual complete test and inspection program must be performed as detailed on the DSA approved documents. The appendix at the bottom of this form identifies work NOT subject to DSA requirements for special inspection or structural testing. The project inspector is responsible for providing inspection of all facets of construction, including but not limited to, special inspections not listed on this form such as structural wood framing, high-load wood diaphragms, cold-formed steel framing, anchorage of non-structural components, etc., per Title 24, Part 2, Chapter 17A.
NOTE: This form is also available for projects submitted for review under the 2007, 2010, and 2013 CBC.

INSTRUCTIONS: Click a plus sign (+) before any category or subcategory to reveal additional tests and special inspections. A shaded box indicates a test or special inspection that may be required, depending on the scope of the construction and other issues. A shaded box can be clicked indicating your selection of that test. **Note:** A minus (-) on a category or subcategory heading indicates that it can be collapsed. However, any selections you may have made will be cleared. Click on the "COMPILE" button to show only the tests and inspections finally selected. **For more information on use of this form, see DSA-103.INSTR.**

Note: References are to the 2016 edition of the California Building Code (CBC) unless otherwise noted.

REQUIRED	TEST OR SPECIAL INSPECTION	TYPE [1]	PERFORMED BY [2]	CODE REFERENCE AND NOTES
-	**SOILS**			
-	**1. GENERAL:**	**Table 1705A.6**		
X	a. Verify that: • site has been prepared properly prior to placement of controlled fill and/or excavations for foundations, • foundation excavations are extended to proper depth and have reached proper material, and • materials below footings are adequate to achieve the design bearing capacity.	Periodic	GE*	* By geotechnical engineer or his or her qualified representative. (See Appendix for exemptions.)
-	**2. COMPACTED FILLS:**	**Table 1705A.6**		
X	b. Verify use of proper materials, densities and inspect lift thicknesses, placement, and compaction during placement of fill.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative.
X	c. Test compaction of fill.	Test	LOR*	* Under the supervision of the geotechnical engineer.
-	**CONCRETE**	**Table 1705A.3, ACI 318-14 Sections 26.12 & 26.13**		
-	**7. CAST IN PLACE CONCRETE**			
	Material Verification and Testing:			
X	a. Verify use of required design mix.	Periodic	SI*	**Table 1705A.3 Item 5, 1910A.1** (1909.2.3+). * To be performed by qualified batch-plant inspector and concrete sampling technician
X	b. Identifiy, sample, and test reinforcing steel.	Test	LOR	**1910A.2** (1909.2.4+); ACI 318-14 Section 26.6.1.2. DSA IR 17-10
X	c. During concrete placement, fabricate specimens for strength tests,perform slump and air content tests, and determine the temperature of the concrete.	Test	LOR	**Table 1705A.3 item 6**; ACI 318-14 Sections 26.5 & 26.12

+ In the CODE REFERENCE AND NOTES column indicates DSA-SS/CC sections that may be used by community colleges, per 2013~~6~~ CBC Sec. 1.9.2.2.

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X	d. Test concrete (f'_c).	Test	LOR	**1905A.1.16** (1909.3.7+); ACI 318-14 Section 26.12.
	Inspection:			
-	**11. POST-INSTALLED ANCHORS:**			
X	a. Inspect installation of post-installed anchors	See Notes	SI*	**Table 1705A.3 Item 4a (Continuous) & 4b (Periodic)** (see Appendix for exemptions). ACI 318-14 Sections 17.8 & 26.13 * May be performed by the project inspector when specifically approved by DSA.
X	b. Test post-installed anchors.	Test	LOR	**1910A.5** (1909.2.7+). (See Appendix for exemptions.)
-	**12. OTHER CONCRETE:**			
+	**MASONRY**	**TMS 402-13/ACI 530-13/ASCE 5-13 Table 3.1.3 & TMS 602-13/ACI 530.1-13/ASCE 6-13 Table 5**		
+	**STEEL, ALUMINUM**	**Table 1705A.2.1, AISC 303-10, AISC 360-10, AISC 341-10, AISC 358-10, AISI S100-07/S2-10**		
+	**WOOD**			
+	**OTHER**			

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Appendix: Work Exempt from DSA Requirements for Special Inspection or Structural Testing

Exempt items given in IR A-22 or the 2016 CBC (including DSA amendments) and those items identified below with an "X" by the design professional are NOT subject to DSA requirements for the structural tests and special inspections noted. The project inspector shall verify all construction complies with the approved construction documents.

Exempted by Design Prof.	Soils:
X	1. Deep foundations acting as a cantilever footing designed based on minimum allowable pressures per 2016 CBC Table 1806A.2 and having no geotechnical report for the following types of structures: free standing sign, scrolling message sign, scoreboard, covered walkway or shade structure with dead load less than 5 psf and other light-weight structures of which the apex is less than 8' above the highest adjacent grade.
X	2. Shallow foundations meeting the exception item #1 criteria specified in 2016 CBC Section 1803A.2.

(Optional) List details for applicable exempt items:

Exempted by Design Prof.	Concrete/Masonry:
X	1. Post-installed anchors for the following: 1) exempt non-structural components (e.g., mechanical, electrical, plumbing equipment) given in ASCE 7-10, Section 13.1.4 (and modified by CBC Section 1616A.1.18) or 2) interior nonstructural wall partitions meeting criteria listed in exempt item 3 for "Welding."
X	2. Concrete batch plant inspection is not required for items given in CBC Section 1705A.3.3.2 subject to the requirements and limitations in that section. Exempt retaining walls shall be less than 4'-0" above the top of foundation not supporting a surcharge and free standing nonbearing non-shear walls up to 6'-0" above adjacent grade.
X	3. Masonry retaining walls less than 4'-0" above the top of foundation not supporting a surcharge and free standing nonbearing non-shear masonry walls up to 6'-0" above adjacent grade do not require mortar or masonry core testing or DSA special inspection.
X	4. Epoxy shear dowels in site flatwork.

Exempted by Design Prof.	Welding:
X	1. Solid-clad and open-mesh gates with maximum leaf span or rolling section for rolling gates of 10' and apex height less than 8'-0" above lowest adjacent grade. When located above circulation or occupied space below, these gates are not located within 1.5x gate/fence height (max 8'-0") to the edge of floor or roof.
X	2. Handrails, guardrails, and modular or relocatable ramps associated with walking surfaces less than 30" above adjacent grade (excluding post base connections per the 'Exception' language in Section 1705A.2.1); fillet welds cannot be ground flush.
X	3. Non-structural interior cold-formed steel framing spanning less than 15'-0", such as in interior partitions, interior soffits, etc. supporting only self weight and light-weight finishes or adhered tile, masonry, stone, or terra cotta veneer no more than 5/8" thickness and apex less than 20'-0" in height and not over an exit way. Maximum tributary load to a member shall not exceed the equivalent of that occurring from a 10'x10' opening in a 15' tall wall for a header or king stud.
X	4. Manufactured support frames and curbs using hot rolled or cold-formed steel (i.e., light gauge) for mechanical, electrical, or plumbing equipment weighing less than 2000# (equipment only) (connections of such frames to superstructure elements using welding will require special inspection as noted in selected item(s) for section 19, 19.1 and/or 19.2 of listing above).
X	5. Manufactured components (e.g., Tolco, B-Line, Afcon, etc.) for mechanical, electrical, or plumbing hanger support and bracing (connections of such components to superstructure elements using welding will require special inspection as noted in selected item(s) for section 19, 19.1 and/or 19.2 of listing above).
X	6. TV Brackets, projector mounts with a valid listing (see DSA IR A-5) and recreational equipment (e.g., playground structures, basketball backstops, etc.) (connections of such elements to superstructure elements using welding will require special inspection as noted in selected item(s) for section 19, 19.1 and/or 19.2 of listing above).
X	7. Any support for exempt non-structural components given in ASCE 7-10, Section 13.1.4 (and modified by CBC Section 1616A.1.18) meeting the following: 1) when supported on a floor/roof, <400# and resulting composite center of mass (including component's center of mass) <= 4' above supporting floor/roof, 2) when hung from a wall or roof/floor, <20# for discrete units or <5 plf for distributed systems.

(Optional) List details for applicable exempt items:

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List of required verified report(s):

1 Soils testing and Inspection: Geotechnical Verified Report - Form DSA-293

2 All Structural Testing: Laboratory Verified Report - Form DSA-291

KEY to Columns	
1 Type -	**2 Performed By -**
Continuous – Indicates that a continuous special inspection is required	**GE** – Indicates that the special inspection is to be performed by a registered geotechnical engineer or his or her authorized representative
Periodic – Indicates that a periodic special inspection is required	**LOR** – Indicates that the test or inspection is to be performed by a testing laboratory accepted in the DSA Laboratory Evaluation and Acceptance (LEA) Program. See section 4-335, 2013 CCR Title 24, Part 1.
Test – Indicates that a test is required	**SI** – Indicates that the special inspection is to be performed by a special inspector
COMPILE	

Bradley Glassick, HMC

Name of Architect or Engineer in general responsible charge

Name of Structural Engineer (When structural design has been delegated)

Dec 5, 2017

Signature of Architect or Structural Engineer — date

LICENSED ARCHITECT BRADLEY E GLASSICK NO. C-32437 REN. 02-28-19 STATE OF CALIFORNIA

IDENTIFICATION STAMP
DIV OF THE STATE ARCHITECT
APP. # 04-116580
AC N/A F/LS N/A SS
DATE DEC 0 8 2017

[redacted]

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(Optional) List details for applicable exempt items:

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DSA Submittal – Phase 2

PROJECT MANUAL // **HMC ARCHITECTS**

PALOMAR COLLEGE - NORTH EDUCATION CENTER - PHASE 2 SITE WORK

PROJECT NO. 5015019-102// 12.05.2017

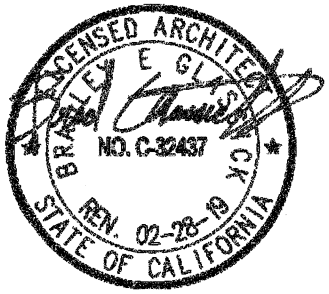
PALOMAR COMMUNITY COLLEGE

35090 Horse Ranch Creek Road
Fallbrook, CA 92028

HMC Architects

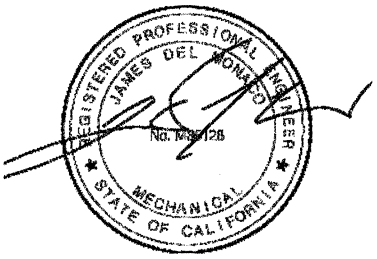
PALOMAR COLLEGE - NORTH EDUCATION CENTER
INTERIM VILLAGE - PHASE 2 SITE WORK
FALLBROOK, CA

December 5, 2017
HMC # 5015019-102

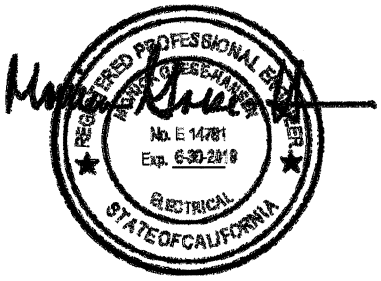


HMC ARCHITECTS
Architect

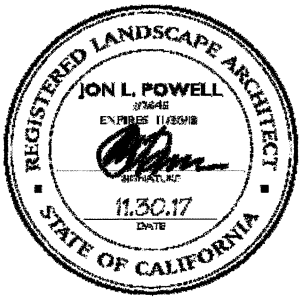
MASSON & ASSOCIATES ENGINEERING
Civil Engineering



PS2 ENGINEERING, INC.
Mech/Plumb/Fire Prot/Low Voltage Engineers



JCE, Inc
Elect/Fire Alarm Engineers, Inc



DPA, Inc.
Landscape Design

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT

04 116580

ACS FLS DT SS DHS
DATE DEC 8 2017
ACS: SCOTT DAVIDSON
FLS: D. TRUBINT

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SECTION 00 11 16

NOTICE INVITING BIDS

NOTICE IS HEREBY GIVEN that [_____] invites sealed proposals for the construction of:

[_____] at [_____] in [_____], California. Bid Forms together with required Attachments to the Bid Form shall be delivered to the office of [_____] not later than [_____] on [_____], 20___. Bid Forms received within the stipulated time will be promptly opened in public and read aloud at said address. Bid Forms or Attachments thereto received after the stipulated time will be rejected without consideration.

OBTAINING BID SETS: Each Bid Form shall be in accordance with Contract Documents dated: [_____, 20___, and prepared by ___tbd____ Architects, address, city, zip _____. General Contractors and Subcontractors may purchase Contract Documents at local print shop, as directed by Owner.

INSPECTION OF PROJECT SITE; PRE-BID CONFERENCE: A Mandatory Pre-Bid Conference will be held on [_____] 20__, at [_____] at [_____] which all General Contractors bidding the project are required to attend. Bids will not be accepted from bidders that did not attend the Mandatory Pre-Bid Conference.

BID SECURITY: Each proposal shall be accompanied by cash, a cashier's check, certified check or bid bond executed by an admitted surety insurer for ten percent (10%) of the amount of the base bid in the proposal, made payable to the order of the District.

PERFORMANCE AND PAYMENT BONDS: The successful bidder, simultaneously with the execution of the Agreement, will be required to furnish a Labor and Material Bond in an amount equal to 100 percent of the Contract sum and a Faithful Performance Bond in an amount equal to 100 percent of the Contract Sum. Said bonds shall be from an admitted California Surety satisfactory to the District and listed in the Federal Register, issued by the Department of Treasury and licensed in California. Said bonds shall remain in full force and effect through the guarantee period. Facsimile of each required bond is appended to the Bidding Documents.

PREVAILING WAGES: The District has initiated and enforces a Labor Compliance Program ("LCP") that has received initial approval from the Director of the Department of Industrial Relations ("DIR") in accordance with Labor Code 1770, et seq., which requires the payment of the general rate of per diem wages or the general rate of per diem wages for holiday and overtime work for any State Funded School Facilities project. Wage rates, holidays, overtime, travel and subsistence provisions for this project shall be in accordance with "General Wage Determination Made by the Director of Industrial Relations Pursuant To California Labor Code, Part 7, Chapter 1, Article 2, Sections 1770, et seq., for [_____] County. Wage Rates shall conform with those posted in the District Office.

All Contractors and subcontractors who bid or work on a public works project must register and pay an annual fee to the Department of Industrial Relations (DIR).

No Contractor or subcontractor may be listed on a bid proposal for a public works project (submitted on or after March 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.

No Contractor or subcontractor may work on a public works project unless registered with DIR.

No Contractor or subcontractor may be awarded a contract for public work on a public works project (awarded on or after April 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.

This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

EXAMINATION OF RECORDS: Government Code Section 10532 requires that the records of both the School District and the Contractor shall be subject to the examination and audit of the Auditor General for a period of three (3) years after final payment of the contract.

SUBSTITUTION FOR RETENTIONS: Pursuant to Public Contract Code Section 22300, Contractor will be permitted the option to deposit securities with an escrow agent as a substitute for retention earnings withheld by District to ensure performance.

HAZARDOUS MATERIALS: Pursuant to Public Contract Code, Section 7104, the Contractor shall agree to the provisions of said section concerning sub-surface hazardous materials. Certification is contained in the Agreement Form.

LICENSE REQUIREMENTS: Bidders are required pursuant to California Business and Professions Code 7028.15 to hold a valid State Contractor's License, Type [_____], as classified in Public Contract Code Section 3300 prior to execution of the Agreement. Bidders shall conform to California Business and Professions Code 7059 for Specialty Contractor's Licensing Provisions. Certification is contained in the Bid Form.

DISTRICT REQUIREMENTS TO MATCH PRODUCTS: In accordance with Public Contract Code Section 3400 (c) notice is given to bidders the District requires certain products specified by brand name followed by "no equals permitted", "District Standard" or "no Substitutions permitted" in the Specifications in order to match products in use on a particular public improvement either completed or in the course of construction. Subsection (b) of 3400 is not applicable for that particular product.

BOARD OF EDUCATION [TRUSTEES]
[SUPERVISORS]

_____

Dates Published: _____

By _____

Clerk

END OF SECTION

INFORMATION FOR BIDDERS

PROJECT: The Work shall consist of everything necessary for and incidental to executing and completing all work required to comply with the Contract Documents referring to:

<>

~~BID SET DEPOSITS: Bid Set Deposits will be returned in full to Bidders when all sets issued have been received at the designated pickup location in good condition within 14 calendar days after date of bid opening. Sets received after 14 calendar days, or sets received in marked, defaced, annotated or otherwise unusable condition for construction purposes will not qualify for deposit return and said deposit shall be forfeited. Sets not returned shall not be used for construction purposes. The successful bidder may retain bid sets without forfeiture; the number of such sets will be deducted from the number allowed for construction purposes as provided for herein. Subcontractors shall obtain construction sets ONLY from the successful bidder.~~

ADDENDA: Addenda issued during time of bidding shall be included in bid and shall be made a part of the Contract. Bidder shall list in the Bid Form each addendum received.

1. Addenda will be prepared and issued to Bidders at the option of the Architect.
2. Name, address, telephone number and fax number of the individual who is responsible for the bidding procedure and the receipt of Addenda shall be filed at the pick-up location.
3. Addenda will be issued only to Bidders who have obtained bid sets at the designated pick-up location and to Plan Rooms where bid documents are on file.
4. Addenda issued more than 4 working days prior to the day that Bids are designated to be opened shall be mailed to Bidders and Plan Rooms via UPS or Golden State Overnight, with no prior telephone notification.
5. Bidders who have obtained bid sets at the designated pick-up location will be notified by telephone when Addendum is issued less than 4 working days prior to day bids are to be opened. The Addendum will be transmitted to Bidders and Plan Rooms via UPS or Golden State Overnight. However, Bidders may obtain copies at the Architect's Office.

BID SECURITY: As stipulated in the Notice Inviting Bids, each bid shall be accompanied by cash, a cashier's check or certified check payable to the District, or a satisfactory bid bond in favor of the District, executed by the bidder as principal and an admitted surety company as surety, in an amount not less than 10 percent of the base bid in the Bid Form. The cash, check or bid bond shall be given as a guarantee that the bidder shall execute the contract if it be awarded to him, in conformity with the contract documents and shall provide the surety bonds as specified in the General Conditions. In case of refusal or failure to enter into said contract, the cash, cashier's check, certified check or bid bond, as the case may be, shall be paid to the District, as liquidated damages.

BID FORM: Bids to receive consideration shall be made in compliance with the following instructions:

A. Bids shall be delivered in accordance with Notice Inviting Bids.

B. Bids shall contain no recapitulation of work to be performed. Bid Forms other than those specifically requested will not be considered.

C. Bids shall include all items of expense pertinent to contract.

D. Bids shall be presented for consideration on the Bid Form included herein. Use of other forms constitutes grounds for rejection.

E. Bidders shall carefully examine drawings, read specifications and all forms contained in the Project Manual, shall visit the site of work and fully inform themselves as to all existing conditions and limitations and shall include in their bids a sum to cover cost of all items included in the Contract Documents.

No Contractor or subcontractor may be listed on a bid proposal for a public works project (submitted on or after March 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code Section 1771.1(a)].

WITHDRAWAL OF BIDS: Any bidder may withdraw his bid, either personally or by telegraphic or written notice at any time prior to the time scheduled for receiving bids. No bid, once opened and read, may be withdrawn for a period of sixty (60) days after opening.

OPENING OF BIDS: Bids shall be opened and publicly read aloud at the time and place stipulated in the Notice Inviting Bids.

AWARD OR REJECTION OF BIDS:

A. (a)The lowest bid shall be the lowest bid price on the base contract without consideration of the prices on the additive or deductive items.

[(b)The lowest bid shall be the lowest total of the bid prices on the base contract and those additive or deductive items that were specifically identified in the bid solicitation as being used for the purpose of determining the lowest bid price.]

[(c)The lowest bid shall be the lowest total of the bid prices on the base contract and those additive or deductive items that, when taken in order from a specifically identified list of those items in the solicitation, and added to, or subtracted from, the base contract, are less than, or equal to, a funding amount publicly disclosed by the local agency before the first bid is opened.]

[(d)The lowest bid shall be determined in a manner that prevents any information that would identify any of the bidders or proposed subcontractors or suppliers from being revealed to the public entity before the ranking of all bidders from lowest to highest has been determined.]

OR

A. The contract will be awarded to the lowest responsible bidder based on the lowest total bid determined by the Base Bid adjusted by adding to or subtracting from the Base Bid each accepted Alternate, if any, as selected by the Owner.

B. The Owner, however, reserves the right to reject any or all bids and to waive any irregularities and informalities in any bid or in the bidding for any reason.

C. Qualified bids are not acceptable to the District. Bids with qualifications will be rejected without consideration.

D. Bidders are advised that bids or attachments thereto received after the stipulated time will be rejected.

E. Bidders are advised that CERTIFICATIONS TO BID FORM 1, 2 and 3 described herein, are required and shall be submitted as stipulated herein. Missing, incomplete, or non-responsive certificates will serve as grounds for rejection of entire bid.

AGREEMENT: Contract (Agreement Form) which the successful bidder as contractor will be required to execute is included in this Project Manual and shall be carefully examined by the bidder prior to submitting his Bid Form.

INTERPRETATION OF DRAWINGS: If any person contemplating submitting a bid for proposed Work is in doubt as to true meaning of any part of the drawings, specifications or other forms in the Project Manual, or finds discrepancies in, or omissions from said documents, he shall submit to Architect a written Request For an Interpretation or Request for Information (RFI) thereof. Person submitting request will be responsible for its prompt delivery. Any interpretations of proposed documents will be made by addendum duly issued and a copy of such addendum will be transmitted to each person receiving a set of such documents as provided herein. District will not be responsible for any other explanation or interpretation of documents. Bidders are cautioned to accept interpretations in writing only.

SUBCONTRACTORS: Bidders are hereby notified that District and Architect will not recognize subcontractors as having any function in work other than employees of General Contractor. Bidders shall refer to the General Conditions with reference to employees and to the Bid Form and the General Conditions with reference to subcontractors. The Bidders shall be responsible that subcontractors have read the General Conditions, Supplementary General Conditions and are familiar with terms and conditions of the Contract Documents as said terms and conditions may affect their work, prior to submitting bid.

DRAWINGS AND PROJECT MANUALS FURNISHED: Architect shall furnish successful bidder with Fifteen (15) complete sets of drawings and project manuals pertinent to work for construction purposes. Additional copies required may be purchased from Architect for an amount equal to printing costs. Bidders are hereby notified that all such drawings and project manuals are the property of the District and are loaned to the successful bidder for duration of work. Any re-use, in whole or in part, for any purpose, is prohibited.

TIME FOR COMPLETION: Time is of the essence in execution of this contract. Bidder shall refer to the Bid Form with reference to time of execution.

OTHER REQUIREMENTS: The bidder's attention is specifically directed to requirements of the General Conditions as they may be modified herein by the Supplementary Conditions, with reference to liability and property insurance, and to the provisions in the Agreement for progress payments, hold harmless agreement, final payment, subsurface hazard materials encountered

and liquidated damages. In this contract, cost of premiums for insurance coverage shall be as follows:

1. Comprehensive General Liability: Contractor's cost, included in contract sum. Refer to Article 11, Supplementary Conditions for Required Amount of Coverage.
2. Property Damage Liability: Contractor's cost, included in contract sum.
3. Workers' Compensation: Contractor's cost, included in contract sum.
4. Owner's Liability Insurance: District's option.
5. Property Insurance: Contractor's cost included in contract sum.
6. Boiler and Machinery Insurance: District's option.

REQUIRED CERTIFICATIONS, BID FORM: All bidders are required to execute and submit together with the BID FORM, the following certifications:

1. Bidder's Non-Collusion Affidavit, identified herein as Attachment No. 1 to Bid Form.
3. Site Visit Certification herein as Attachment No. 3 to Bid Form.

REQUIRED CERTIFICATIONS, AGREEMENT: Prior to execution of the AGREEMENT, the successful bidder shall submit the following certifications:

1. Bidder's Certificate Regarding Worker's Compensation, identified herein as Attachment No. 1 to Agreement.
2. Drug-Free Work Place Certification, identified herein as Attachment No. 2 to Agreement.
3. Contractor Certification – Education Code 45125.2 [45125.1], identified herein as Attachment No. 3 to Agreement.
4. **[Prevailing Wage Certification, identified herein as Attachment No. 4 to Agreement.]**

[5. Pre-Job Conference Checklist herein as Attachment No. 5 to Agreement.]

6. Performance Bond and Payment Bonds.

All bidders are advised to retain certifications until the successful bidder has been confirmed and an Agreement for the work has been executed.

BID DEPOSIT RETURN: The cash, check or Bid Bond of three or more low bidders, the number being at the discretion of the District, will be held for sixty (60) days or until posting by the successful bidder of the bonds and certificates of insurance required and return of executed copies of the appropriate agreement form, whichever first occurs, at which time the deposits will be returned. Cash, check or Bid Bond of other bidders will be returned after opening of the bids.

A. supported by competent, admissible and creditable evidence.

END OF SECTION

SECTION 00 31 00

AVAILABLE PROJECT INFORMATION

PROJECT NAME:

The following document(s) are available for bidders' review and can be obtained from the Owner's Representative.

1. Geotechnical Investigation Report (Soils Report).
2. Site Surveys.
3. Hazardous Materials Surveys.
4. Boundary Survey.
5. [ ]

Specific Requirements are included in the provided information that Bidders are required to comply with. Bidders are requested to review documents carefully for information contained therein affecting the bidders' proposal.

END OF SECTION

SECTION 00 41 00

BID FORM

Name of Bidder _____

Date _____

Address _____

Telephone _____

BASE BID

The undersigned, having carefully examined the site and having carefully examined the Information for Bidders, Contract Forms, General Conditions, Supplementary Conditions, Project Manual and Drawings prepared by tbd Architects, xxxxx Street., city, CA zip for construction of:

<>

hereby proposes to furnish everything necessary for and incidental to the execution and completion of the work, in strict conformance with the Drawings and the Project Manual, dated _____, **20___**, including all work specified in Addenda Nos. _____dated _____ , and all Allowances, for the sum of:

_____DOLLARS

($_____), including all applicable taxes, permits and licenses.

CASH ALLOWANCE

_____DOLLARS ($_____), per Section 01 20 00. Include in the Base Bid.

ALTERNATE NO. [_____] [Additive] [Deductive] TO BASE BID in accordance with Section 01 20 00.

[Additive Alternate, THE SUM OF:]
[Deductive Alternate, THE SUM OF:]

_____DOLLARS

($_____), including all applicable taxes, permits and licenses.

UNIT COST ITEM

_____, per Section 01 20 00

LICENSES: Bidders are required pursuant to California Business and Professions Code 7028 to hold a valid State Contractor's License, **Type B [A] [C - ___]** , as classified in Public Contract

Code Section 3300 prior to execution of the Agreement. Bidders shall conform to California Business and Professions Code [7055 for Specialty Contractor's Licensing Provisions. The undersigned hereby certifies that prior to award of contract, he will be licensed by the State of California, as required by California Business and Professions Code 7028.15 [7028], that such license will be in full force and effect and that any and all subcontractors employed by him on the work will be similarly licensed. License Number: (_____). License Expiration Date: (_____). This information is provided under penalty of perjury.

[TIME FOR PROJECT COMPLETION: All work under this Contract shall be completed within a period of _____ consecutive calendar days commencing five (5) days from and after notice by District to Contractor to begin work.]

[TIME FOR COMPLETION: All work under this contract shall be completed on or before _____. It is the intent of the District to issue a Notice to Proceed immediately after the regularly scheduled meeting of the board on _____. Should the Notice to Proceed be delayed more than 5 calendar days beyond the date of the board meeting, through no fault of the Contractor, the completion date will be extended by the amount of the delay.]

LIQUIDATED DAMAGES FOR DELAYED PROJECT COMPLETION: The State of California Government Code, Section 53069.85 provides that public work projects may establish time limits within which the whole or any specified portion of the work contemplated shall be completed and that for each day completion is delayed beyond the specified time, the Contractor shall pay to such agency involved, a specified sum of money to be deducted from any payments due or to become due to the Contractor. In accordance with said Government Code, Section 53069.85, the undersigned hereby agrees that if all work is not completed as set forth above under the section TIME FOR PROJECT COMPLETION, or as specifically extended by written consent of the District, the undersigned will pay to the District the sum of **[THREE HUNDRED DOLLARS ($300.00)] [FIVE HUNDRED DOLLARS ($500.00)] [ONE THOUSAND DOLLARS ($1,000.00)]** per day for each and every consecutive calendar day delay in the completion of all work and that the District may deduct the amounts thereof from any monies due or that may become due to the Undersigned. This article does not exclude recovery of damages under provisions of the contract documents.

EXECUTION OF CONTRACT: The undersigned further agrees that if he is notified of the acceptance of his Bid Form within sixty (60) consecutive calendar days after time set for opening of bids, he will execute and deliver to District, within five (5) days after having received written notice thereof, the contract attached herein as a part of these documents, including the bonds and certificates of insurance specified herein.

BID SECURITY: The required bid security is hereto attached.

BONDS: The undersigned further agrees to provide a Performance Bond in the amount of one hundred (100) percent of the contract sum and a Payment Bond in the amount of one hundred (100) percent of the contract sum. Said bonds shall be from an admitted California Surety satisfactory to the District and listed in the Federal Register issued by the Department of Treasury and licensed in California. Said bonds shall remain in full force and effect through the guarantee period.

BIDDER'S NONCOLLUSION AFFIDAVIT: Executed Affidavit identified as Attachment No. 1 to Bid Form, is hereto attached.

SITE VISIT CERTIFICATION: Executed certificate identified as Attachment No. 3 to Bid Form, is hereto attached.

DESIGNATION OF SUBCONTRACTORS

A. In accordance with Section 4104.(a) (1), Public Contract Code, the undersigned hereby sets forth below the name and address of each and every subcontractor who will perform work or labor or render service to the Contractor in relation to the work or improvements to be performed under this contract in an amount in excess of one-half of one percent of the total bid.

B. If the undersigned fails to specify a subcontractor for any portion of the work to be performed under the Contract, it is hereby agreed the General Contractor is Fully Qualified and shall perform that portion of work himself and that he shall not be allowed to subcontract that part of work except as expressly provided for hereinafter. Fully Qualified means holding the specialty license required for that trade.

C. Subletting or subcontracting of any portion of the work to which no subcontractor was designated in the original Bid Form shall only be permitted in case of public emergency or necessity and then only after specific written agreement by District.

SUBCONTRACT	SUBCONTRACTOR	ADDRESS	LICENSE NO.

(use additional sheets if necessary)

Name of Bidder _____

Signed _____

Title _____

END OF SECTION

SECTION 00 43 95

(ATTACHMENT NO. 1 TO BID FORM)

BID BOND

KNOW ALL PERSONS BY THESE PRESENTS, that we

_____

As CONTRACTOR/PRINCIPAL and _____
As Surety, an admitted Surety insurer pursuant to code of Civil Procedure, Section 995.120, legally doing business in California at _____
are held and firmly bound unto the _____
hereinafter called the OWNER, in the penal sum of TEN PERCENT (10%) OF THE TOTAL AMOUNT OF THE BID of the CONTRACTOR/PRINCIPAL submitted to the said OWNER for the Work described below for the payment of which sum is lawful money of the United States, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLICATION IS SUCH that whereas the CONTRACTOR/PRINCIPAL has submitted the accompanying bid dated _____, 20__, for the construction all Work for the complete project known as:

<Project Name>

NOW THEREFORE, the CONTRACTOR/PRINCIPAL shall not withdraw said bid within 60 calendar days after said opening; and the CONTRACTOR/PRINCIPAL, when given Notice of Award, shall within FIVE (5) calendar days after the prescribed forms are presented to him for signature, return executed copies of the Agreement to the OWNER, in accordance with the bid as accepted and give bond with good and sufficient surety or sureties, as may be required, for the faithful performance and proper fulfillment of such contract and for the payment for labor and materials used for the performance of the contract, or in the event of the withdrawal of said bid within the period specified or the failure to enter into such contract and give such bonds within the time specified, the CONTRACTOR/PRINCIPAL shall pay the OWNER the difference between the amount specified in said bid and the amount for which the OWNER may procure the required work and/or supplies of the latter amount be in excess of the former, together with all costs incurred by the OWNER in again calling for bids, then the above obligation shall be void and of no effect, otherwise to remain in full force and effect.

Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract on the call for bids, or to the work to be performed thereunder, or the specifications accompanying the same, shall in any way affect its obligation under this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of said contract or the call for bids, or to the work, or the specifications.

In the event suit is brought upon this bond by the OWNER and judgement is recovered, CONTRACTOR/PRINCIPAL and Surety shall pay all costs incurred by the OWNER in such suit, including a reasonable attorney's fee to be fixed by the court.

IN WITNESS WHEREOF the above-bound parties have executed this instrument under their several seals this _____ day of _____, 20__, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

(Corporate Seal)
CONTRACTOR/PRINCIPAL

BY: (Signature)

Print Name

(Corporate Seal)
Surety

BY: (Signature)

Print Name

TITLE

Address

Telephone Number

(Attach Attorney-in-Fact Certificate)

END OF SECTION

SECTION 00 45 46

ATTACHMENT NO. 4 TO BID FORM

SITE VISIT CERTIFICATION

I certify that I have visited the site of the proposed work and have fully acquainted myself with the conditions relating to construction and labor. I fully understand the facilities, difficulties, and restrictions attending the execution of the work under contract.

I certify under penalty of perjury under the laws of the State of California at the foregoing is true and correct.

I fully indemnify [_____], the Architect, the Construction Manager (where applicable), and all of their respective officers, agents, employees, and consultants from any damage, or omissions, related to conditions that could have been identified during my visit to the site.

_____
(Signature of Bidder)

_____
(Typed name of Bidder)

SUBSCRIBED BEFORE ME on this _____ day of _____, 20___ _____

_____
(Notary Public)

My commission expires: _____

END OF SECTION

SECTION 00 52 00

AGREEMENT BETWEEN OWNER AND CONTRACTOR

THIS CONTRACT made in 5 copies on this _____ day of _____ in the year 20___, BY AND BETWEEN [_____] [_____] County, California, hereinafter called the OWNER and [_____] hereinafter called the CONTRACTOR. (Contractor's License No._____).

WITNESSETH: That the OWNER and Contractor for the considerations hereinafter named agree as follows:

ARTICLE 1

SCOPE OF THE WORK: Contractor shall furnish all of the materials and perform all of the work indicated on the drawings and described in the Project Manual entitled:

Title <>

prepared by: tbd Architects
_____Street
_____, CA zip

acting as and in these contract documents entitled the Architect; and shall do everything required by the Agreement, the General Conditions of the Contract for Construction, Supplementary Conditions, Technical Specification Sections and Drawings dated _____, 20__, and Addenda Nos. _____ dated _____.

ARTICLE 2

[TIME FOR PROJECT COMPLETION: All work under this Contract shall be completed within a period of _____ consecutive calendar days commencing five (5) days after receiving written notification from the OWNER to proceed with the work.] [All work under this contract shall be completed on or before _____].

[TIME FOR COMPLETION: All work under this contract shall be completed on or before _____. It is the intent of the OWNER to issue a Notice to Proceed immediately after the regularly scheduled meeting of the board on _____. Should the Notice to Proceed be delayed more than 5 calendar days beyond the date of the board meeting, through no fault of the Contractor, the completion date will be extended by the amount of the delay.]

ARTICLE 3

THE CONTRACT SUM: The OWNER shall pay the Contractor for the performance of this Contract, subject to the additions and deductions provided herein, the sum of:

_____ DOLLARS

($_____), including all applicable taxes and licenses.

ARTICLE 4

PROGRESS PAYMENTS: Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the OWNER shall make progress payments on account of the Contract Sum to the Contractor **[as provided in Article 9 of the General Conditions and amended by the Supplementary Conditions.]**

ARTICLE 5

PERFORMANCE RETENTION: Pursuant to Public Contract Code Section 22300, Contractor has the option to deposit securities with an escrow agent approved by the OWNER as a substitute for retention earnings withheld by the OWNER to ensure performance.

ARTICLE 6

HOLD HARMLESS AGREEMENT: The Contractor agrees to and does hereby indemnify and hold harmless the OWNER, its officers, agents, and employees from every claim or demand made and every liability, loss, damage, or expense of any nature whatsoever, which may be incurred by reason of:

A. Liability for damages for (1) death or bodily injury to persons, (2) injury to property, or (3) any other loss, damage or expense arising under either (1) or (2) above, sustained by the Contractor or any person, firm or corporation employed by the Contractor upon or in connection with the work called for in this Agreement except for liability for damages referred to above which result from the sole negligence or willful misconduct of the OWNER, its officers, employees, agents or independent contractors who are directly employed by the OWNER, or for defects in design furnished by such persons.

B. Any injury to or death of persons or damage to property, sustained by any person, firm, or corporation, including the OWNER, arising out of, or in any way connected with the work covered by this Agreement, whether said injury or damage occurs either on or off school OWNER property, except for liability for damages which result from the sole negligence or willful misconduct of the OWNER, its officers, employees, agents or independent contractors who are directly employed by the OWNER, or for defects in design furnished by such persons.

C. The Contractor, at his own expense, cost, and risk, shall defend any and all actions, suits, or other proceeding that may be brought or instituted against the OWNER, its officers, agents, or employees on any such claim, demand, or liability and shall pay or satisfy any judgment that may be rendered against the OWNER, its officers, agents, or employees in any action, suit, or other proceedings as a result thereof.

ARTICLE 7

A. Wage rates for this project shall be in accordance with the "General Wage Determination Made By The Director of Industrial Relations Pursuant To California Labor Code, Part 7, Chapter 1, Article 2, Sections 1770, et seq., for

[_____] County. Wage rates shall conform with those posted in the OWNER Office.

B. The following labor code sections are hereby referenced and made a part of this agreement:

1. Section 1735, Anti-Discrimination Requirements.
2. Section 1775, Penalty for Failure to Comply with Prevailing Wage Rates.
3. Section 1776, Payroll Records.
4. Section 1773.3, Wages.
5. Section 1777.5 and 1777.6, Apprenticeship Requirements.
6. Section 1810 and 1811, Working Hour Restrictions.
7. Section 1813, Penalty for Failure to Pay Overtime.
8. Section 1815, Overtime Pay.

[F. Mandatory Attendance at Pre-Job Conference: Contractor [and Sub-Contractors] are required to attend the OWNER's Pre-Job Conference. At the Pre-Job Conference, the OWNER's Labor Compliance Program (LCP) Plan will be explained and its Pre-Job Conference checklist will be reviewed. Contractor and Sub-Contractors are required to sign the Checklist to verify attendance of the Pre-Job Conference. The Checklist is included in the LCP Plan and Attachment _____ to the Agreement.]

ARTICLE 8

RECORD AUDIT: In accordance with Government Code, Section 10532, records of both the OWNER and the Contractor shall be subject to examination and audit by the Auditor General for a period of three (3) years after final payment.

ARTICLE 9

CERTIFICATIONS:

A. Certifications of compliance with requirements for Worker's Compensation (Attachment No. 1 to Agreement), Drug-Free Work Place (Attachment No. 2 to Agreement) and Contractor Certification Education Code 45125.2 (Attachment No. 3 to Agreement) [Prevailing Wage Certification (Attachment No. 4 to Agreement)] are hereby made a part of this Agreement.

ARTICLE 10

FINAL PAYMENT: Final payment, constituting the entire unpaid balance of the Contract Sum, shall be paid by the OWNER to the Contractor 35 days after a Notice of Completion has been recorded, unless otherwise stipulated in the Notice of Completion, provided the Work has then been completed, the Contract fully performed, and a final Certificate for Payment has been issued by the Architect.

ARTICLE 11

THE CONTRACT DOCUMENTS: The General Conditions of the Contract for Construction, Supplementary Conditions, Technical Specification Sections, Drawings and Addenda thereto, the

Performance Bond and Payment Bond, together with this Agreement form the Contract. They are fully a part of the Contract as if hereto attached or herein repeated.

ARTICLE 12

SUBSURFACE HAZARDOUS MATERIALS:

A. In the event trenches or other excavations extend deeper than four (4) feet below the surface, the Contractor shall promptly, and before the following conditions are disturbed, notify the OWNER in writing of any:

1. Material that the Contractor believes may be material that is hazardous waste, as defined in Section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II or Class III disposal site in accordance with the provisions of existing law.
2. Subsurface or latent physical conditions at the site differing from those indicated.
3. Unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in the work of the character provided for in the contract.

B. Upon receipt of said notification the OWNER will investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, and cause a decrease or increase in the Contractor's cost of or the time required for performance of any part of the work, the OWNER will issue a change order under the procedures described in the General Conditions.

C. In the event that a dispute arises between the OWNER and the Contractor whether the conditions materially differ, or involve hazardous waste or cause a decrease or increase in the Contractor's cost of or time required for performance of any part of the work, the Contractor shall not be excused from any scheduled completion date provided for by the contract, but shall proceed with all work to be performed under the contract. The Contractor shall retain any and all rights provided either by contract or by law which pertain to the resolution of disputes and protests between the contracting parties.

ARTICLE 13

LIQUIDATED DAMAGES: It is agreed that the Contractor will pay the OWNER the sum of **[THREE HUNDRED DOLLARS ($300.00)] [FIVE HUNDRED DOLLARS ($500.00)] [ONE THOUSAND DOLLARS ($1,000.00)]** per calendar day for each and every day of delay beyond the time prescribed herein for finishing said work, as Liquidated Damages and not as a penalty or forfeiture. In the event the same is not paid, the Contractor further agrees that the OWNER may deduct the amount thereof from any money due or that may become due the Contractor under the Contract. This Article does not exclude recovery of damages under provisions of the Contract Documents.

ARTICLE 14

BACKGROUND CHECK: Contractor agrees to comply with all provisions of Education Code Section 45125.2. Contractor shall certify that pursuant to Education Code Section 45125.2 that at least one supervising employee, for whom a background check has been conducted by the

Department of Justice and has ascertained that said supervising employee has not been convicted of serious or violent felonies, as specified in Penal Code Section 1192.7(c), and 667.5(c), respectively will be supervising on site at all times with employees for whom background checks have not been conducted.

Or

[BACKGROUND CHECK: Contractor agrees to comply with all provisions of Education Code Section 45125.1. Contractor shall conduct criminal background check of all employees assigned to the OWNER, and will certify that no employees who have been convicted of serious or violent felonies as specified in Education Code 45125, will have contact with students, pursuant to this Agreement. Contractor must provide the OWNER with a list of all employees providing services pursuant to this Agreement, and designate to which sites they will be assigned. Failure to comply with this law may result in, at OWNER's sole discretion, termination of this Agreement.]

ARTICLE 15

The Architect shall be the Initial Decision Maker to render decisions in accordance with the General Conditions of the Contract for Construction.

_____	_____
Contractor	OWNER
By _____	By _____
_____	_____
Official Title	Official Title
_____	
Address	
	_____
	Legal Counsel

END OF SECTION

SECTION 00 54 30

ATTACHMENT NO. 4 TO AGREEMENT

PREVAILING WAGE CERTIFICATION

PROJECT / CONTRACT NO.: _____between the _____ _____SCHOOL (the DISTRICT and _____ _____CONSTRUCTION CO. (the CONTRACTOR or the BIDDER) (the Contract or the Project).

In accordance with the Department of Industrial Relations workers who perform certain off-site sheet metal and electrical work must be paid prevailing wages. (www.dir.ca.gov/DLSR/Coverage/2000-027.pdf and http://www.dir.ca.gov.)

Date: _____

Proper Name of Bidder: _____

Signature: _____

By: _____

Its: _____

END OF SECTION

SECTION 00 61 13.13

PAYMENT BOND
CALIFORNIA PUBLIC WORK

KNOW ALL MEN BY THESE PRESENTS:

THAT WHEREAS, the [_____] District (sometimes hereinafter referred to as "Obligee") has awarded to (hereinafter designated as the "Contractor"), an agreement dated: _____, for work described as follows:
[_____]

(hereinafter referred to as the "Public Works Contract") and

WHEREAS, said Contractor is required to furnish a bond in connection with said Public Works Contract, and pursuant to Section 3247 of the California Civil Code;

Now, therefore, we, _____, the undersigned Contractor, as Principal; and _____ a corporation organized and existing under the laws of the State of California, and duly authorized to transact business under the laws of the State of California, as Surety, are held and firmly bound unto the [_____] District and to any and all persons, companies or corporations entitled to file stop notices under Section 3181 of the California Civil Code in the sum of:
_____ Dollars ($_____), said sum being not less than one hundred (100%) percent of the total amount payable by the said Obligee under the terms of the said Public Works Contract, for which payment well and truly to be made, we bind ourselves, our heirs, executors, successors, administrators, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that if said Contractor, his or its heirs, executors, administrators, successors or assigns, or Subcontractors, shall fail to pay for any materials, provisions or other supplies, implements, machinery or power used in, upon, for, or about the performance of the Public Work contracted to be done, or to pay any person for any work or labor of any kind, or for bestowing skills or other necessary services thereon, or for amounts due under the Unemployment Insurance Code with respect to such work or labor, or for any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of said Contractor and his Subcontractors pursuant to Section 13020 of the Unemployment Insurance Code with respect to such work and labor as required by the provisions of Section 3247 through 3252 of the Civil Code, the Surety or Sureties hereon will pay for the same in an amount not exceeding the sum specified in this bond, otherwise the above obligation shall be void.

In case suit is brought upon this bond, the same Surety or Sureties will pay a reasonable attorney's fee to be fixed by the Court. In addition to the provisions hereinabove, it is agreed that this bond will insure to the benefit of any and all persons, companies and corporation entitled to serve stop notices under Section 3181 of the Civil Code, so as to give a right of action to them or their assigns in any suit brought upon this bond.
The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or additions to the terms of the said Public Works Contract or to the work to be performed thereunder or the Specifications accompanying the same shall in any way affect its

obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work or to the specifications.

No final settlement between the Obligee and the Contractor hereunder shall abridge the right of any beneficiary hereunder whose claim may be unsatisfied.

Principal and Surety agree that if the Obligee is required to engage the services of any attorney in connection with the enforcement of this bond, each shall pay the Obligee's reasonable attorney's fees incurred, with or without suit, in addition to the above sum.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this _____ day of _____, 20___.

PRINCIPAL:

_____

By: _____

SURETY:

_____

By: _____
Attorney-In-Fact

IMPORTANT: Surety companies executing Bonds must possess a certification of authority from the California Insurance Commissioner authorizing them to write surety insurance defined in Section 105 of the California Insurance Code, and if the work or project is financed, in whole or in part, with federal grant or loan funds, must also appear on the Treasury Department's most current list (Circular 570 as amended).

THIS IS A REQUIRED FORM.

(Name and Address of Surety) _____

_____

(Name and Address of Agent or Representative for service of process in California, if different from above) _____

_____

_____

(Telephone number of Surety and Agent or Representative for service of process in California) _____

_____

STATE OF CALIFORNIA)
COUNTY OF _____) ss.

On this _____ day of _____, in the year 20___, before me, _____, a Notary Public in and for said state, personally appeared _____, known to me to be the person whose name is subscribed to the within instrument as the Attorney-In-Fact of the (Surety) acknowledged to me that he subscribed the name of the
_____ (Surety) thereto and his own name as Attorney-In-Fact.

Notary Public in and for said State

(SEAL)

Commission expires:

NOTE: A copy of the Power-of-Attorney to local representatives of the bonding company must be attached hereto.

END OF SECTION

SECTION 00 61 13.16

CONTRACT PERFORMANCE BOND
CALIFORNIA PUBLIC WORK

KNOW ALL MEN BY THESE PRESENTS:

THAT WHEREAS, the [_____] District (sometimes referred to hereinafter as "Obligee") has awarded to _, hereinafter designated as the "Contractor" an agreement for the work described as follows:
[_____]

(Hereinafter referred to as the "Public Work"" and WHEREAS, the work to be performed by the Contractor is more particularly set forth in that certain contract for the said Public Work dated _____, incorporated herein by this reference; and

WHEREAS, the Contractor is required by said Public works Contract to perform the terms thereof and to provide a bond both for the performance and guaranty thereof.

NOW, THEREFORE, we, _____ the undersigned Contractor, as Principal, and _____,_a corporation organized and existing under the laws of the State of _____,_and duly authorized to transact business under the laws of the State of California, Surety, are held and firmly bound unto the [_____]_____District in the sum of Dollars ($_____), said sum being not less than one hundred (100%) percent of the total amount payable by the said Obligee under the terms of the said Public Works Contract, for which amount well and truly to be made, we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that, if the bounded Principal, his or its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and agreements in the said Public Works Contract and any alteration thereof made as therein provided, on his or its part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their intent and meaning; and shall faithfully fulfill the one-year guarantee of all materials and workmanship; and shall indemnify and save harmless the Obligee, its officers and agents, as stipulated in said Public Works Contract, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect. In case suit is brought upon this bond, the said Surety will pay to Obligee a reasonable attorney's fee to be fixed by the Court.

The said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Public Works Contract or to the work to be performed thereunder or the Specifications accompanying the same shall in any way affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work or to the Specifications.

No final settlement between the Obligee and the Contractor shall abridge the right of any beneficiary hereunder whose claim may be unsatisfied.

Principal and Surety agree that if the Obligee is required to engage the services of any attorney in connection with the enforcement of this bond, each shall pay the Obligee's reasonable attorney's fees incurred, with or without suit, in addition to the above sum.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this _____ day of _____, 20____.

PRINCIPAL:

_____

By: _____

SURETY:

_____

By: _____
Attorney-In-Fact

The rate of premium on this bond is _____ per thousand. The total amount of premium charges, $_____.
(The above must be filled in by corporate attorney.)

IMPORTANT: Surety companies executing Bonds must possess a certificate of authority from the California Insurance Commissioner authorizing them to write surety insurance defined in Section 105 of the California Insurance Code, and if the work or project is financed, in whole or in part, with federal grant or loan funds, must also appear on the Treasury Department's most current list (Circular 570 as amended).

THIS IS A REQUIRED FORM

Any claims under this bond may be addressed to:

(Name and Address of Surety) _____

_____

(Name and Address of Agent or Representative for service of process in California, if different from above) _____

_____

_____

(Telephone number of Surety and Agent or Representative for service of process in California) _____

_____

STATE OF CALIFORNIA)
COUNTY OF _____) ss.

On this _____ day of _____, in the year 20___, before me, _____, a Notary Public in and for said state, personally appeared

_____, known to me to be the person whose name is subscribed to the within instrument as the Attorney-In-Fact of the (Surety) acknowledged to me that he subscribed the name of the _____ (Surety) thereto and his own name as Attorney-In-Fact.

Notary Public in and for said State

(SEAL)

Commission expires:

NOTE: A copy of the Power-of-Attorney to local representatives of the bonding company must be attached hereto.

Federal regulations (Code Sections 6041 and 6209) require non-corporated recipients of $600.00 or more to furnish their taxpayer identification number to the payer. The payer then in turn must furnish Form 1099 to both the payee and Internal Revenue Service showing the total payments.

The regulations also provide that a penalty may be imposed for failure to furnish taxpayer identification number.

In order to comply with these regulations, we request your federal tax identification number or social security number, whichever is applicable.

Please complete the information below:

COMPANY NAME _____

ADDRESS _____
Street City State Zip

TYPE OF BUSINESS ENTITY

_____ Individual

_____ Sole Proprietorship

_____ Partnership

_____ Corporation

_____ Other

TAXPAYER IDENTIFICATION #

_____

Employer identification #

_____

Social Security #

_____

Date:

_____
Signature

Title

Under penalties of perjury, I certify that the number indicated on this form is my correct taxpayer identification number.

END OF SECTION

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General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

THE OWNER:
(Name, legal status and address)

THE ARCHITECT:
(Name, legal status and address)

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding requirements.

§ 1.1.2 The Contract

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 The Work

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5 The Drawings

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6 The Specifications

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 Instruments Of Service

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 Initial Decision Maker

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

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§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications and Other Instruments of Service

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 1.6 Transmission of Data in Digital Form

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 Information and Services Required of the Owner

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

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§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.3 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.4 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

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§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

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§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 Warranty

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct,

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but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

.1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

.2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and

.3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed superintendent. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed superintendent or (2) that the Architect requires additional time to review. Failure of the Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The Architect's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 Documents and Samples at the Site

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

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§ 3.12 Shop Drawings, Product Data and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled

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to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.13 Use of Site

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce

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other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a successor architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications Facilitating Contract Administration

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the

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Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

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§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. Failure of the Owner or Architect to reply within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

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§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

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§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:

.1 The change in the Work;
.2 The amount of the adjustment, if any, in the Contract Sum; and
.3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
.2 Unit prices stated in the Contract Documents or subsequently agreed upon;
.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
.4 As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

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§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

.1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;

.2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;

.3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;

.4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and

.5 Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be

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furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration; or by other causes that the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Architect, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the

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Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

.1 defective Work not remedied;
.2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
.3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
.5 damage to the Owner or a separate contractor;
.6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
.7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Architect will reflect such payment on the next Certificate for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

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§ 9.6.2 The Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

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§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

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§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

.1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;

.2 failure of the Work to comply with the requirements of the Contract Documents; or

.3 terms of special warranties required by the Contract Documents.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

.1 employees on the Work and other persons who may be affected thereby;

.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and

.3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

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§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

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§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Liability Insurance

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

.1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;

.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;

.3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;

.4 Claims for damages insured by usual personal injury liability coverage;

.5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;

.6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;

.7 Claims for bodily injury or property damage arising out of completed operations; and

.8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.2 Owner's Liability Insurance

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.3 Property Insurance

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's

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risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 Boiler and Machinery Insurance

The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 Loss of Use Insurance

The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

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§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

§ 11.3.7 Waivers of Subrogation

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.

§ 11.4 Performance Bond and Payment Bond

§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

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§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 Correction of Work

§ 12.2.1 Before or After Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

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ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 Written Notice

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 Rights and Remedies

§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

§ 13.5 Tests and Inspections

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

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§ 13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 13.7 Time Limits on Claims

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;

.2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;

.3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or

.4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

.1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;

.2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;

.3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or

.4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

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§ 14.2.2 When any of the above reasons exist, the Owner, upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 Accept assignment of subcontracts pursuant to Section 5.4; and

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

.1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 Notice of Claims

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker.

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Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 Continuing Contract Performance

Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.5 Claims for Additional Time

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.6 Claims for Consequential Damages

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

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§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 Arbitration

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

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§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.

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SECTION 00 73 00

SUPPLEMENTARY CONDITIONS

ARTICLE 1: GENERAL PROVISIONS

1.1.1 CHANGE the second sentence to read:

A modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the work issued by the Architect.

1.2.1 ADD the following:

In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities:

1. The Agreement.
2. Addenda, with those of later date having precedence over those of earlier date.
3. The Supplementary Conditions.
4. The General Conditions of the Contract for Construction.
5. Drawings and Technical Specifications.
6. In the case of an inconsistency between Drawings and Specifications or within either Document not clarified by addendum, the better quality or greater quantity of Work shall be provided in accordance with the Architect's interpretation.
7. Any work called for in the Drawings and not mentioned in the Specifications, or vice versa, shall be performed as though fully set forth in both.

1.2.2 ADD the following sentence:

Such organization shall not operate to make the Architect an arbiter to establish subcontract limits.

ARTICLE 2: OWNER

2.1.2 DELETE subparagraph.

2.2.1 DELETE subparagraph.

2.2.3 ADD the following sentence:

The Owner will establish lot lines, restrictions and a permanent bench mark. All other grade lines, levels and bench marks shall be established and maintained by the Contractor.

2.4 CHANGE the second sentence to read:

In such case an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor the cost of correcting such deficiencies, including the cost of additional Architectural, Engineering, Managerial,

and Administrative Services made necessary by such default, neglect or failure.

ARTICLE 3: CONTRACTOR

3.2.1 ADD the following sentence:

No allowance shall subsequently be made on behalf of the Contractor on account of an error on his part or his negligence or failure to acquaint himself with the conditions of the site.

3.5 WARRANTY

3.5.1 ADD the following new subparagraphs:

Besides warranties required elsewhere, Contractor shall, and hereby does, warrant all work for a period of one year after date of certified completion and shall repair or replace any or all such work, together with any other work, which may be displaced in so doing, that may prove defective in workmanship and/or materials within a one-year period from date of certified completion without expense whatsoever to Owner, ordinary wear and tear, unusual abuse of neglect excepted. Owner will give notice of observed defects with reasonable promptness. Contractor shall notify Owner upon completion of repairs.

In the event of failure of Contractor to comply with above-mentioned conditions within seven calendar days after being notified in writing, Owner, under provisions of Article 12, will proceed to have defects repaired and made good at expense of Contractor who hereby agrees to pay costs and charges therefor immediately on demand.

3.5.2 ADD the following new subparagraph:

If, in the opinion of the Owner, defective work creates a dangerous condition or requires immediate correction or attention to prevent further loss to the Owner or to prevent interruption of operations of the Owner, the Owner will attempt to give the notice required by this article. If the Contractor cannot be contacted or does not comply with the Owner's request for correction within a reasonable time as determined by the Owner, the Owner may, notwithstanding the provisions of this article, proceed to make such correction or provide such attention and the costs of such correction or attention shall be charged against the Contractor. Such action by the Owner will not relieve the Contractor of the warranties provided in this article or elsewhere required in the specifications.

3.5.3 ADD the following new subparagraph:

This article does not in any way limit the warranty on any items for which a longer warranty is specified or on any items for which a manufacturer gives a warranty for a longer period. Contractor shall furnish Owner all appropriate warranty certificates upon the date of certified completion.

3.7.1 ADD the following sentence:

Conform to Division 01 General Conditions.

3.13.1 ADD the following new subparagraph:

The Contractor shall verify all grades, lines, levels, and dimensions indicated on the drawings and shall report all inconsistencies to the Architect before commencing work.

ADD the following new paragraph:

3.19 RECORDS, ACCOUNTS AND AUDITS

3.19.1 Notwithstanding any provisions herein to the contrary, Contractor agrees to furnish upon written request a breakdown of the Contract Price which will follow Owner's cost accounting system to be used by Owner for accounting purposes and will form the basis for establishing progress payments to be made to Contractor as herein provided.

ARTICLE 4: ADMINISTRATION OF THE CONTRACT

4.1.2 ADD the following sentence:

Duties of the Architect, Structural Engineer or Professional Engineer per California Administrative Code, Part 1, Title 24, California Code of Regulations.

4.2.10 ADD the following sentence:

The Owner will provide one or more project inspector(s) to work under the technical direction of the Architect. His duties and responsibilities shall be as set forth per California Administrative Code, Part 1, Title 24, California Code of Regulations.

ARTICLE 5: SUBCONTRACTORS

5.2.1 DELETE that portion of the first sentence which reads:

"As soon as practicable after award of the contract".

ARTICLE 7: CHANGES IN THE WORK

7.3.7 DELETE from the first sentence the words: "a reasonable amount" and SUBSTITUTE "an allowance for overhead and profit in accordance with Subparagraph 7.3.11 below."

ADD the following subparagraph:

7.3.11 In Subparagraph 7.3.7, the allowance for the combined overhead and profit included in the total cost to the Owner shall be based on the following schedule:

.1 Ten percent (10%) overhead, five percent (5%)profit, of the estimated cost of the portion of the extra work to be performed by the General Contractor. This amount shall be adjusted to fifteen percent (15%) overhead, and ten percent (10%) profit on changes totaling less than two thousand dollars

($2,000).

[*****OR*****]

[1 Zero percent (0%) overhead, five percent (5%)profit, of the estimated cost of the portion of the extra work to be performed by the General Contractor. This amount shall be adjusted to Five percent (5%) overhead, and ten percent (10%) profit on changes totaling less than two thousand dollars ($2,000).]

.2 Ten percent (10%) overhead, five percent (5%) profit of the estimated cost of that portion of the extra work to be performed by the Subcontractor, plus five percent (5%) handling cost by the General Contractor. This amount shall be adjusted to fifteen percent (15%) overhead, ten percent (10%) profit on changes totaling less than one thousand dollars ($1,000), plus five percent (5%) handling cost by the General Contractor.

[*****OR*****]

[2 Zero percent (0%) overhead, five percent (5%) profit of the estimated cost of that portion of the extra work to be performed by the Subcontractor, plus five percent (5%) handling cost by the General Contractor. This amount shall be adjusted to Five percent (5%) overhead, ten percent (10%) profit on changes totaling less than one thousand dollars ($1,000), plus five percent (5%) handling cost by the General Contractor.]

3 Ten percent (10%) overhead, five percent (5%) profit of the estimated cost of that portion of the extra work to be performed by the Sub-Subcontractor, plus five percent (5%) handling to the Subcontractor plus five percent (5%) to the General Contractor. This amount shall be adjusted to fifteen percent (15%) overhead, ten percent (10%) profit on changes totaling less than one thousand dollars ($1,000), plus five percent (5%) handling to the Subcontractor, plus five percent (5%) handling cost by the General Contractor.

[*****OR*****]

[3 Zero percent (0%) overhead, five percent (5%) profit of the estimated cost of that portion of the extra work to be performed by the Sub-Subcontractor, plus five percent (5%) handling to the Subcontractor plus five percent (5%) to the General Contractor. This amount shall be adjusted to Five percent (5%) overhead, ten percent (10%) profit on changes totaling less than one thousand dollars ($1,000), plus five percent (5%) handling to the Subcontractor, plus five percent (5%) handling cost by the General Contractor.]

7.4.1 REVISE subparagraph as follows:

Begin subparagraph with sentence "All minor changes to the Work require Change Orders." Replace phrase "written order" with "Change Order".

ARTICLE 8: TIME

DELETE Paragraph 8.1.1. SUBSTITUTE the following:

Time is of the essence. Unless otherwise provided, the Contract Time is the period of time allocated in the Contract Documents for FINAL COMPLETION of the work as defined in the Proposal and/or Agreement, and as further defined in

Subparagraph 9.10.1 including authorized adjustments thereto.

8.1.4 DELETE subparagraph. SUBSTITUTE the following:

In this Contract, the term "day" shall mean a calendar day of 24 hours beginning at 12:00 midnight. The term "working day" shall mean any calendar day except Saturdays, Sundays and legal holidays at the place of building.

8.3.1 DELETE subparagraph 8.3.1. Substitute the following:

If the Contractor should claim that any instruction, request, drawing, specification, action, condition, omission, default, or other situation obligates the Owner to pay additional compensation to the Contractor or to grant an extension of time for the completion of the contract, he shall notify the Owner in writing, of such claim within ten (10) days from the date he has actual or constructive notice of the factual basis supporting the claim. The Contractor's failure to notify the Owner within such ten (10) day period shall be deemed a waiver and relinquishment of the claim against the Owner. If such notice be given within the specified time, the procedure for its consideration shall be as stated above in this Article. If the Contractor is delayed in completing the work by reason of any change made pursuant to this Article, the time for completion of the work shall be extended by Change Order for a period commensurate with such delay. The Contractor shall not be subject to any claim for liquidated damages for this period of time, but the Contractor shall have no claim for any other compensation for any delay.

DELETE subparagraphs 8.3.2 and 8.3.3.

ADD the following new subparagraph:

8.3.4 The Contractor shall have all materials delivered at the site in such quantities as required for the uninterrupted progress of the Work and the least obstruction of the premises and any adjoining property. No extension of time will be allowed for failure by the Contractor to order the material on time or in sufficient quantities.

8.3.5 EXCUSABLE DELAY

At the end of the sentence, ADD the following sentences:

Rain days shall be considered as "unusually severe weather" only when the rainfall exceeds the normal and expected precipitation for the time period in question and the location in question, as described in the Weather Channel www.weather.com or other similar weather tracking database. Normal and expected rainfall shall not constitute a claim for delay nor justify an extension of contract time. Additionally, "Normal and expected rainfall" shall not interrupt progress on the work in general. Progress may only be interrupted on specific tasks which cannot be accomplished in the rain or due to saturated soil.

ADD the following new subparagraph

8.3.6 CONDITIONS FOR EXTENSIONS OF TIME

The Contractor shall have all materials delivered at the site in such quantities as required for the uninterrupted progress of the Work and the least obstruction of the premises and any adjoining property. No extension of time will be allowed

for failure by the Contractor to order the material on time or in sufficient quantities. Allowable time extension for any change in the work the Contractor shall be entitled only to such adjustment in time by which completion of the entire work is delayed due solely to performance of the changed work. However, no extension of time shall be granted for a change in the work unless the Contractor demonstrates to the satisfaction of the Owner that the work is on the Critical Path and submits an updated schedule showing that an extension of time is required and that the Contractor is making, or has made, every reasonable effort to guarantee completion of the additional work caused by the change within the time originally allotted for the contract. No additional compensation for delays shall be granted unless delays can be demonstrated and substantiated having impacted the Critical Path schedule.

ARTICLE 9: PAYMENTS AND COMPLETION

ADD the following new subparagraph:

9.2.2 Use data from Schedule of Values to prepare Applications for Payment. Provide dollar value in each column for each line item for portion of work performed and for stored products. List each authorized change order on AIA G703, listing change order number and dollar amount.

9.2.3 The schedule of values shall, as a minimum, list a separate line item for each of the following: Mobilization, General Requirements, General Contractor's overhead for Project, General Contractor's fee for Project, Bond and Insurance costs, and a value for each specification section heading.

DELETE Subparagraph 9.3.1. SUBSTITUTE the following:

On or about the 15th of each month, the Contractor shall prepare a typewritten or electronic media form draft of the application for payment for review by the Architect, which provides for a progress payment to the Contractor based on 90% of the proportion of the Contract Sum properly allocable to labor, materials and equipment incorporated in the Work and 90% of the portion of the Contract Sum properly allocable to materials and equipment suitably stored at the site or at some other location agreed upon in writing by the parties, up to the 25th day of that month, less the aggregate of previous payments in each case; and upon Certified Completion of the entire Work, 90% of the Contract Sum, less such retainages as the Architect shall determine for all incomplete work and unsettled claims upon approval by the Architect, three notarized copies of AIA Document G702 "Application and Certificate for Payment," or other document approved by the Owner and Architect, and an updated construction schedule shall be submitted.

9.8.3.1 ADD the following new Clause:

Costs of Multiple Inspections: More than two (2) requests of the Owner to make inspections required under paragraph 9.8.3 shall be considered an additional service of Architect and its consultants, and all subsequent costs will be invoiced to Contractor and withheld from remaining payments.

ADD the following new subparagraphs:

9.9.4 Upon approval of the Architect and Surety, the Owner may release the ten percent (10%) retention on those areas accepted for Beneficial Occupancy by the Owner, prior to completion of the entire project. If such release is requested by the Contractor, he shall submit to the Architect a written request for said release together with all lien waivers for approval.

9.9.5 The Contractor agrees to Owner use and Beneficial Occupancy of a portion or unit of the Project before formal acceptance by the Owner under the following conditions:

.1 Occupancy by the Owner shall not be construed by the Contractor as being an acceptance of that part of the Project to be occupied.

.2 The Contractor shall not be held responsible for any damage to the occupied part of the Project resulting from the Owner's occupancy.

.3 Occupancy by the Owner shall not be deemed to constitute a waiver of existing claims in behalf of the Owner or Contractor against each other.

.4 If the Project consists of more than one building, and one of the buildings is to be occupied, the Owner, prior to occupancy of the building, shall secure permanent property insurance on the building to be occupied and necessary beneficial occupancy permits from the governmental agencies in jurisdiction. Final approval and occupancy permits from agencies in jurisdiction are still the responsibility of the Contractor, which may be required for use and occupancy.

.5 The Contractor shall make available in the areas occupied, on a 24-hour day and seven-day week basis if required, any utility services, heating and cooling as are in condition to be put in operation at the time of early occupancy. All responsibility for the operation and maintenance of said equipment shall remain with the Contractor while it is so operated. However, an itemized list of each piece of equipment so operated with the date operation commences shall be made and certified by the Architect. This list shall be the basis for the commencement of Guarantee Periods on the equipment being operated for the benefit of the Owner's early occupancy. The Owner shall pay for all utility costs which arise out of the occupancy by the Owner during construction.

.6 With the exception of Clause 9.9.5.4, use and occupancy by the Owner prior to Project acceptance does not relieve the Contractor of his responsibility to maintain all insurance and bonds required of the Contractor under the Contract until the Project is complete and the NOTICE OF COMPLETION is recorded by the Owner.

9.10.6 Upon completion of the work, the Contractor shall deliver to the Architect all required Certificates of Inspection.

ARTICLE 11: INSURANCE AND BONDS

11.1.1 After the words "is located" insert "or, if not so licensed or otherwise lawfully authorized to do business so as to protect Owner and claimants under the Insolvency or Guarantee Fund, in a company or companies approved by Owner following examination of company financial, reinsurance and other data requested by Owner or Owner's representative."

11.1.1.1 DELETE the semicolon at the end of Clause 11.1.1.1 and ADD: including private entities performing Work at the site and exempt from the coverage on account of

number of employees or occupation, which entities shall maintain voluntary compensation coverage at the same limits specified for mandatory coverage for the duration of the Project.

11.1.1.2 DELETE the semicolon at the end of Clause 11.1.1.2 and ADD: persons or entities excluded by statute from the requirements of Clause 11.1.1.1 be required by the Contract Documents to provide the insurance required by that Clause.

11.1.1.4 ADD the word "non-bodily" after the word "personal."

ADD the following new clause:

11.1.1.9 Without limiting the scope of required insurance coverage described above, Contractor shall also provide the specific types and amounts of insurance listed in Subparagraph 11.1.2. Owner does not represent that compliance with the requirements of Subparagraph 11.1.2 satisfies the obligation imposed by Subparagraph 11.1.1.

ADD the following new clause:

11.1.1.10 "Occurrence" coverage is a requirement.

11.1.2 DELETE first sentence. MODIFY second sentence to read:

Coverages shall be made on an occurrence basis, and shall be maintained without interruption from date of commencement of the work until date of final payment and termination of any coverage required to be maintained after final payment.

ADD the following new clause:

11.1.2.1 Contractor shall, at its expense, procure and maintain in effect for the duration of this Contract, or as otherwise specified, insurance providing at least the following scope of coverage, or any greater scope of coverage required by law, under forms of policies satisfactory to the Owner. Coverages shall be maintained without interruption from date of commencement of the Work, or earlier required date, until date of final payment and termination of any coverage required to be maintained after final payment. The cost of such insurance shall be included in the Contract Sum. The insurance required by Subparagraph 11.1.1 shall be written for not less than the following limits, or greater if required by law:

1. Workers' Compensation or Certified Self-Insurance:

   a. State: Statutory

   b. Applicable Federal (e.g., Longshoremen's): Statutory

   c. Employer's Liability:

      $1,000,000 per Occurrence
      $1,000,000 Disease, Policy Limit
      $1,000,000 Disease, Each Employee

2. Comprehensive or Commercial, or Commercial General Liability (including Premises-Operations; Independent Contractors' Protective; Products and

Completed Operations; Broad Form Property Damage), such general liability coverage not to be subject to deductibles or self-insured retentions exceeding $25,000 per occurrence unless approved by Owner. If Commercial General Liability coverage is provided, the policy shall be amended to provide that the general aggregate limit shall apply, in total, to this Project only.

a. Bodily Injury: $2,000,000 Each Occurrence, $4,000,000 Aggregate.

b. Property Damage: $2,000,000 Each Occurrence, $4,000,000 Aggregate.

c. Products and Completed Operations: $2,000,000 Aggregate.

d. Property Damage Liability Insurance shall provide X, C and U coverage, $2,000,000.

e. Broad Form Property Damage Coverage shall include Completed Operations, $2,000,000.

3. Contractual Liability:

a. Bodily Injury: $2,000,000 Each Occurrence, $2,000,000 Aggregate.

b. Property Damage: $2,000,000 Each Occurrence, $2,000,000 Aggregate.

4. Personal Injury, with Employment and Contractual Exclusions deleted: $2,000,000 Aggregate.

5. Business Auto Liability or Its Equivalent (including owned, non-owned and hired vehicles):

a. Bodily Injury: $2,000,000 Each Person,
$2,000,000 Each Occurrence.

b. Property Damage: $2,000,000 Each Occurrence.

6. If the General Liability coverages are provided by a Commercial Liability policy, the:

a. General Aggregate shall be not less than $2,000,000 and it shall apply, in total, to this Project only.

b. Medical Expense Limit shall be not less than $5,000 on any one person.

7. Umbrella Excess Liability:

a. $10,000 retention for self-insured hazards each occurrence.

8. Contractor shall require its subcontractors to take and maintain similar public liability and property damage insurance and comprehensive automobile liability insurance in amount of $1,000,000 each occurrence

and $2,000,000 aggregate.

11.1.3 DELETE subparagraph. SUBSTITUTE the following:

Certificates of Insurance acceptable to the Owner and specifically setting forth evidence of all coverage required by Subparagraphs 11.1.1, and 11.1.2 shall be filed by Contractor with the Owner prior to commencement of the Work. These Certificates and the insurance policies required by this Paragraph 11.1 shall contain a provision that coverages afforded under the policies will not be cancelled, allowed to expire, nor materially reduced in scope of coverage, except exhaustion of aggregate limits, until at least 60 days' prior written notice has been given to the Owner. Contractor shall furnish to the Owner copies of any endorsements that are subsequently issued amending coverage or limits. If any of the foregoing insurance coverages are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage shall be submitted with the final Application for Payment as required by Subparagraph 9.10.2.

ADD the following new clause:

11.1.2.3 The Contractor shall either (1) require each of his Subcontractors to procure and to maintain during the life of his Subcontract, Subcontractor's Comprehensive General Liability, in the same amounts as specified above, or (2) insure the activity of his Subcontractors in his own policy.

ADD the following new clause:

11.1.2.4 The Owner, Architect and Engineers shall be named as additional insureds under each required insurance and each insurance shall include a waiver of subrogation right with respect to the Owner, Architect and Engineers.

11.2.1 DELETE subparagraph. SUBSTITUTE the following:

The Owner shall be responsible for purchasing and/or maintaining the Owner's usual liability insurance or self-insurance, and may also purchase and/or maintain other insurance or self-insurance for protection against claims which may arise from operations under the Contract.

11.3.1 INSERT after the word "Project," in the fourth line, "excluding property and/or work commonly excluded under standard property insurance policies, such as grading and underground piping, and excluding property and equipment and tools owned by Contractor, Subcontractors or others which is not to be installed in the project."

11.3.1.1 After the words "malicious mischief" in the third line, INSERT, "excluding earthquake, flood and other perils commonly excluded under all-risk insurance policies."

11.4.1 DELETE subparagraph. SUBSTITUTE the following:

The Contractor shall furnish a Performance Bond in an amount equal to one hundred percent (100%) of the Contract Sum as security for the faithful performance of this Contract and also a Labor and Material Payment Bond in an amount not less than one hundred percent (100%) of the Contract Sum or in a

penal sum not less than that prescribed by State or local law as security for the payment of all persons performing labor on the Project under this Contract and furnishing materials in connection with this Contract. The Performance Bond and the Labor and Material Payment Bond may be in one or in separate instruments in accordance with local law and shall be delivered to the Owner not later than the date of execution of the Contract. The cost of said bonds shall be included in the contract sum.

ARTICLE 12: UNCOVERING AND CORRECTION OF WORK

12.3 DELETE paragraph. SUBSTITUTE the following:

If the Owner prefers to accept Work which is not in accordance with the requirements of the Contract Documents, but which meets minimum Code requirements, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced by an amount equal to the entire cost of replacing the Work to make it as originally specified or intended. Such adjustment shall be effected whether or not final payment has been made.

ADD the following new subparagraphs:

12.3.2 A reduction, "reduced" as used in subparagraph 12.3.1, is hereby defined as an amount equal to the entire cost of replacing the Work to make it as originally specified or intended.

12.3.3 Changes in the Work shall comply with Article 7.

ARTICLE 13: MISCELLANEOUS PROVISIONS

13.5.3 ADD the following sentence:

Costs of retesting, re-inspections, and re-approvals as described herein, including compensation for the Architect's services and expenses, shall be paid for by the Owner and deducted from the contract sum by a change order.

ADD the following new Article:

ARTICLE 16: ADDITIONAL CONDITIONS

16.1 STANDARDS

16.1.1 Any item or method specified or noted by reference to a number, symbol or title of a standard specification, designation, procedure or the like (such as Commercial Standards, Federal Specifications or Trade Association) shall comply with the specified standard, including amendments, as of the date of the Contract Drawings and Specifications. The standards shall have full force and effect as they may be modified or further amended hereinafter in these Specifications and excepting any conflict with the law of the place of building.

16.1.2 Any item or method specified or noted by reference to manufacturer's instruction or specifications shall be installed accordingly as if said instructions or specifications were fully repeated in the Documents with exceptions as in the paragraph next above.

16.1.3 The Contractor, upon entering into an Agreement with the Owner to do the Work of this contract, shall, by that act, agree that the Contract Documents are adequate and proper for this work.

16.2 FAIR EMPLOYMENT PRACTICE

16.2.1 In connection with the performance of work under this contract the Contractor agrees as follows:

.1 The Contractor will not discriminate against any employee or applicant for employment because of sex, race, creed, color, or national origin. The Contractor will take affirmative action to insure that applicants are employed, and that employees are treated during employment without regard to their sex, race, creed, color or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other form of compensation, and selection for training, including apprenticeship.

.2 The Contractor will, in all solicitation or advertisements for employees placed by or on the behalf of the Contractor, state that all applicants will receive consideration for employment without regard to sex, race, creed, color or national origin.

END OF SECTION

SECTION 01 10 00

SUMMARY OF WORK

PART 1 - GENERAL

1.01 SUMMARY OF WORK

A. This Contract includes work necessary for and incidental to execution and completion of

Project Name
Client
Location

B. in accordance with Contract Documents dated _____ prepared by _____ Architects, Address Street, City, California 9_zip___.

1.02 GENERAL DESCRIPTION OF WORK

A. Work under this Contract includes furnishing all labor, materials, services and transportation, except as specifically excluded which is required for completion of Project in accordance with provisions of Contract Documents.

B. The intent of these Contract Documents is to modify the facility for compliance with 2016 California Building Code (CCR, Title 24, Part 2, Chapter 11B) requirements for accessibility to persons with disabilities. Should any conditions arise, or be discovered, that are not covered by the Contact Documents, and that would cause the finished work to fail to comply with those requirements, a Change Order will be executed and approved DSA-ACS before proceeding with the Work.

D. The Project is designed to comply with Certification Level according to the U.S. Green Building Council's Leadership in Energy & Environmental Design (LEED) Rating System, as specified in Section 01 35 43, Special Environmental Requirements:

E. LEED Objective. It is the intent of these Documents to provide the Owner with a Project that when complete will earn sufficient LEED Credit Points to qualify for LEED Certification. Failure of contractors, sub-contractors, and material suppliers, at any tier, and employees or agents of these to cooperate in the implementation of this Objective may jeopardize the Owner's ability to certify the Project. Work of this Section may affect the attainment of the following LEED Pre-requisites and anticipated Credit Points.

1.	SS1.0	Code Compliance	P
2.	SS1.1	Environmental Sensitive Land	1
3.	SS1.3	Central Location	1
4.	SS1.5	Joint-Use of Parks	1
5.	SS1.6	Reduced Footprint	1
6.	SS2.1	Public Transportation	1
7.	SS2.2	Bicycles	1
8.	SS2.3	Minimize Parking	1
9.	SS3.0	Construction Site Runoff Control	P

10. SS3.2 Treat Stormwater Runoff 1
11. Anticipated Point Total ##

F. Work to be included as part of this Contract:
1. [_____]
2. [_____]

G. Work to be performed by Owner and not included in Contract:
1. Abatement of Hazardous Materials including Asbestos, PBCs, Lead paint, mold, [ ]. Contractor is hereby notified that the District will abate the hazardous material(s) under separate contract during the course of construction of this Contract. Contractor shall notify the District immediately of any hazardous material(s) encountered and allow the District minimum of 2 weeks for the District to remove or abate the hazardous material(s). Include this additional time in the Contractor's Construction Schedule. Contractor shall cooperate with District's subcontractors during this separate work. Other Work not affected by Hazardous removal shall continue uninterrupted.
2. [_____]
3. [_____]

H. The following restrictions apply to access and to use of site [**and existing buildings:**]
1. General: During construction period, Contractor shall have full use of premises for construction operations, including use of site. Contractor's use of premises is limited only by Owner's right to perform work or to retain other contractors on portions of Project.
2. Use of Site: Limit use of premises to Work in areas indicated. Confine operations to areas within Contract limits indicated. Do not disturb portions of site beyond areas in which Work is indicated. Allow for Owner occupancy and use by public.
3. Use of Existing Building: Maintain existing building in weather-tight conditions throughout construction period. Repair damage caused by construction operations. Take all precautions necessary to protect building and its occupants during construction period.
4. Driveways and Entrances: Keep driveways and entrances serving premises clear and accessible to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.
5. Partial Owner Occupancy: Owner reserves right to occupy and to place and install equipment in completed areas of building before Certified Completion, provided such occupancy does not interfere with completion of Work. Such placing of equipment and partial occupancy shall not constitute acceptance of total Work.
6. [Full Owner Occupancy: Owner will occupy site and existing buildings during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform Work so as not to interfere with Owner's operations.]
7. [Limit site disturbance, including earthwork and clearing of vegetation, to 40 feet beyond building perimeter; 5 feetbeyond primary roadway curbs, walkways, and main utility branch trenches; and 25 feet beyond pervious paving areas.]

1.03 PERMISSIBLE WORKING DAYS AND HOURS

A. Work may be conducted on regularly scheduled school attendance days between the hours of 7:00 A.M. and 4:00 P.M.

B. Work may be conducted at any hour during Saturdays, Sundays and non-school session days, at no extra cost to the Owner, when written notification to Owner has been submitted and anticipated schedule of Work activities has been approved.

C. Conform to Division 01, General Requirements for required payment for Inspector's services performed during overtime hours.

1.04 INTERRUPTION OF EXISTING UTILITY SERVICES

A. When necessary to interrupt any existing utility service to make connections, minimum of 48 hours advance notice shall be given to Owner and Architect. Interruptions in utility services shall be of shortest possible duration for Work at hand and shall be approved by Architect.

B. In event any utility service is interrupted without required 48 hours notice, Contractor shall be financially liable for all damages suffered by Owner due to unauthorized interruption.

1.05 VERIFICATION OF EXISTING CONDITIONS

A. Contractor shall be responsible to examine site of Work and after investigation to decide for himself/herself character of materials, equipment and utilities to be encountered and all other existing conditions affecting Work. Contractor is also responsible to provide sufficient costs to cover provisions of all items of Work under existing conditions referred to herein.

1.06 PHASING

A. Conduct work sequence in following phases:

B. Phase 1: Work of this phase shall be substantially complete and ready for occupancy within [ ] days of Notice to Proceed.]
   a. Phase 1 - Text out summary of Work in Phase I. Start and Completion Dates: [____]
   b. Phase 2 - Text out summary of Work in Phase II. Start and Completion Dates: [____].]PRODUCTS

1.07 NOT USED.

PART 2 - EXECUTION

2.01 NOT USED.

END OF SECTION

SECTION 01 20 00

PRICE AND PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Alternates.

B. Unit Prices.

C. Allowances.

D. Changes in the Work.

E. Schedule of Values.

1.02 ALTERNATES

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
   1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
   2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

B. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
   1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

C. Alternates quoted on the Bid Form will be reviewed and accepted or rejected at Owner's option. Accepted alternates will be identified in Owner-Contractor Agreement.

D. **[Owner will determine the Lowest Responsible Bid per Section 20103.8(a) of California Public Contract Code.][Owner will determine the Lowest Responsible Bid per Section 20103.8(b) of California Public Contract Code.][Owner will determine the Lowest Responsible Bid per Section 20103.8(c) of California Public Contract Code.][Owner will determine the Lowest Responsible Bid per Section 20103.8(d) of California Public Contract Code.]**

E. Execute accepted alternates under the same conditions as other work of the Contract.

F. Schedule of Alternates:

1. Alternate No. 1: < **Insert title of alternate**>
   a. Base Bid: **<Insert brief description of base-bid requirement> [as indicated on Sheet <Insert title of sheet>] [and] [as specified in Section <Insert Section number> "<Insert Section title>."]**
   b. Alternate: **<Insert brief description of alternate requirement> [as indicated on Sheet <Insert title of sheet>] [and] [as specified in Section <Insert Section number> "<Insert Section title>."]**
2. Alternate No. 2: < **Insert title of alternate**>
   a. Base Bid: **<Insert brief description of base-bid requirement> [as indicated on Sheet <Insert title of sheet>] [and] [as specified in Section <Insert Section number> "<Insert Section title>."]**
   b. Alternate: **<Insert brief description of alternate requirement> [as indicated on Sheet <Insert title of sheet>] [and] [as specified in Section <Insert Section number> "<Insert Section title>."]**

1.03 UNIT PRICES

A. Unit Price is an amount proposed and stated in Bid Form as price per unit of measurement for materials or services or both that will be added to or deducted from Contract Price by Change Order in event estimated quantities of Work required by Contract Documents are increased or decreased.

B. Unit Prices include all necessary material, labor, overhead, profit and applicable taxes.

C. Refer to individual Specification Section for construction activities requiring establishment of Unit Prices.

D. Owner reserves right to reject Contractor's measurement of work-in-place that involves use of established unit prices, and to have this Work measured by independent surveyor acceptable to Contractor at Owner's expense.

E. Schedule of Unit Prices:

	Item	Unit of Measure	Specification Section
1.	[ ]	[ ]	[ ]
2.	[ ]	[ ]	[ ]
3.	[ ]	[ ]	[ ]
4.	[ ]	[ ]	[ ]
5.	[ ]	[ ]	[ ]
6.	[ ]	[ ]	[ ]

F. Measurement and Payment
1. Unit Quantities: Quantities and measurements indicated in Bid Form are for Contract purposes only. Quantities and measurements supplied or placed in Work shall determine payment.
2. Payment Includes: Full compensation for required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of item of Work; overhead and profit.
3. Defect Assessment: Replace Work, or portions of Work, not conforming to specified requirements. If, in opinion of Architect, it is not practical to remove and replace Work, Architect will direct appropriate remedy or adjust payment.

1.04 ALLOWANCES

A. Cash Allowance
   1. Reference the General Conditions and Supplementary Conditions in addition to these requirements.
   2. Cash Allowance:
      a. Description: Cash allowance for all costs associated with the installation of the Work of _____.
      b. Amount as indicated in the Bid Form [**Bidding Requirements**]
      c. Include all Allowances in the Contract Sum.
   3. Architect Responsibilities:
      a. Prepare and issue a Construction Change Directive or Request for Proposal/Work Change Proposal Request describing Work required.
      b. Prepare Change Order reflecting adjustments to Contract amount relative to allowance.
   4. Contractor Responsibilities:
      a. Itemize all costs associated with cost request in accordance with the General Conditions and Supplementary Conditions and herein in order to justify all costs affecting the allowance.
      b. Include cost for materials, delivery, un-packaging, unloading, storage if any, taxes and installation costs.

B. Materials Allowance
   1. Reference the General Conditions and Supplementary Conditions in addition to these requirements. Include all Allowances in Contract Sum.
   2. Architect Responsibilities:
      a. Consult with Contractor for consideration and selection of products, suppliers and installers.
      b. Select products in consultation with Owner and transmit decision to Contractor.
      c. Prepare Change Order.
   3. Contractor Responsibilities:
      a. Assist Architect in selection of products, suppliers and installers.
      b. Obtain proposals from suppliers and installers and offer recommendations.
      c. On notification of selection by Architect, Owner, execute purchase agreement with designated supplier and installer.
      d. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
      e. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.
      f. Include cost for materials, delivery, un-packaging, unloading, storage if any, and installation costs.

1.05 CHANGES IN THE WORK

A. Approval by Division of the State Architect (DSA) Required: Changes in the Work affecting Structural Safety, Access or Fire and Life Safety, will be submitted for DSA approval, using Form DSA-140 (Application for Approval of Construction Change Document – Category A) in accordance with CAC Section 4-338(c), prior to commencing the work described therein. Changes not affecting Structural Safety, Access or Fire and Life Safety (Form DSA-141 Application for Concurrence of Construction Change Document - Category B) will not be submitted for approval, only if required by DSA in writing.

B. Minor Changes in the Work: Architect will issue through Construction Manager supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710 or Architect's form, accompanied by Form DSA-141 or approved Form DSA-140.

C. Proposal Requests
   1. Owner-Initiated Proposal Requests - Work Change Proposal Request (WCPR): Architect will issue [**through Construction Manager**] a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time, on AIA Document G709 or Architect's form, referencing Form DSA-140 or DSA-141. If necessary, the description will include supplemental or revised Drawings and Specifications.
      a. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
      b. Within time specified in the General and Supplementary Conditions after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
         1) Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
         2) Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
         3) Include costs of labor and supervision directly attributable to the change.
         4) Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
         5) Quotation Form: Use CSI Form 13.6A, "Change Order Request (Proposal)," with attachments CSI Form 13.6D, "Proposal Worksheet Summary," and Form 13.6C, "Proposal Worksheet Detail."
            a) The CSI Forms mentioned above are available for purchase at www.cisresources.org.
   2. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect [**through Construction Manager**].

a. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
b. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
c. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
d. Include costs of labor and supervision directly attributable to the change.
e. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
f. Comply with requirements in Section 01 60 00 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
g. Proposal Request Form: Use CSI Form 13.6A, "Change Order Request (Proposal)," with attachments CSI Form 13.6D, "Proposal Worksheet Summary," and Form 13.6C, "Proposal Worksheet Detail."
    1) The CSI Forms mentioned above are available for purchase at www.cisresources.org.

D. Construction Change Directive to the Contractor
1. Construction Change Directive: Architect will issue [**through Construction Manager**] a Construction Change Directive on AIA Document G714 or Architect's form, accompanied by DSA-approved Form DSA-140 or Form DSA-141 or both, and completed WCPR (Work Change Proposal Request). Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. Copy will be issued to the Project Inspector.
    a. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
2. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
    a. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract, using CSI Form 13.6A, "Change Order Request (Proposal)," with attachments CSI Form 13.6D, "Proposal Worksheet Summary," and Form 13.6C, "Proposal Worksheet Detail.".
        1) The CSI Forms mentioned above are available for purchase at www.cisresources.org.

E. Change Orders Procedures: On Owner's approval of a completed Construction Change Directive, Architect will prepare and issue [**through Construction Manager**] a Change Order for signatures of the Owner and Contractor on AIA Document G701 or Architect's form. Copies of signed Change Order will be distributed to Architect, IOR and Contractor, and submitted for Board Approval.
1. Stipulated Price Change Order: Based on Contractor's Change Order Request as approved by Architect.

2. Time and Material Change Orders: Submit itemized account and supporting data after completion of change within time limits indicated in Conditions of Contract. Architect will determine change allowable in Contract Price and Contract Time as provided in Contract Documents.
3. Maintain detailed records of work done on Time and Material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in Work.
4. Refer to the General and Supplementary Conditions for additional requirements.
5. Execution of Change Orders: Architect will issue Change Orders for signature of parties as provided in Conditions of the Contract.
6. [**Unit Price Change Order: For pre-determined unit prices and quantities, Change Order will be executed on fixed unit price basis. For unit costs or quantities of units of Work that are not pre-determined, execute Work under Construction Change Directive. Change in Contract Price or Contract Time will be computed as specified for Time and Material Change Order.**]

1.06 SCHEDULE OF VALUES

A. Submit printed schedule on AIA Forms G702 and G703 - Application and Certificate for Payment and Continuation Sheet. Contractor's standard form or electronic media printout will be considered, submit sample forms to Architect for approval.

B. Submit application for progress payment in accordance with the General and Supplementary Conditions.

C. Submit Schedule of Values in duplicate within 15 calendar days after date of Owner-Contractor Agreement for Architect's approval.

D. Format: Utilize Table of Contents of this Project Manual. Identify each line item with number and title of the major Specification Section. Identify site mobilization and bonds and insurance. On projects of more than one building, list buildings separately. List mechanical, electrical, plumbing and fire protection Work separately for each building and for site Work.

E. Break down the plumbing and mechanical portions of the work at a minimum into a rough, finish, including air balance and electrical portion.

F. Break out rough grading, fine grading, and underground utilities.

G. Include separate line items, showing amount of General Contractor's overhead and profit, bonds and insurance, supervision, and then remainder of general items.

H. Revise schedule to list approved Change Orders, with each Application for Payment.

I. [**Include in each line item, amount of Allowances specified in this section. For Unit Cost Allowances, identify quantities taken from Contract Documents multiplied by unit cost to achieve total for item.**]

PART 2 - PRODUCTS

2.01 NOT USED.

PART 3 - EXECUTION

3.01 NOT USED.

END OF SECTION

SECTION 01 26 10

REQUESTS FOR INFORMATION (RFI)

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Administrative requirements for Requests for Information (RFI).

1.02 DEFINITIONS

A. Request for Information:
   1. Written request prepared by Contractor requesting additional information necessary to clarify an item which he believes is not clearly shown or called for in the drawings or specifications, or to address problems which have arisen under field conditions, hereinafter referred to as RFI.
   2. Properly prepared request for information shall include detailed written statement that indicates specific Drawings or Specification in need of clarification and nature of clarification requested.
      a. Drawings shall be identified by Drawing number and location on Drawing sheet.
      b. Specifications shall be identified by Section number, page and paragraph.
   3. Contractor's documents with similar titles, such as "Request for Interpretation" or "Request for Clarification" shall be considered RFIs.
   4. RFIs and Architect's responses are not Changes in the Work; if a Change in the Work is required in response to an RFI, separate documents shall be issued in accordance with Section 01 20 00.

B. Improper RFIs:
   1. RFIs that are not properly prepared or incomplete.
   2. Improper RFIs will be processed by Architect at Architect's standard hourly rate and Architect will charge Owner, and such costs will be deducted from moneys still due the Contractor. Architect will notify Contractor before processing of improper RFIs.

C. Frivolous RFIs:
   1. RFIs that request information that is clearly shown on Contract Documents.
   2. Frivolous RFIs may be returned unanswered or may be processed by Architect at Architect's standard hourly rate and Architect will charge Owner, and such costs will be deducted from moneys still due Contractor. Architect will notify Contractor before processing of frivolous RFIs.

1.03 CONTRACTOR'S REQUESTS FOR INFORMATION

A. When the Contractor is unable to determine from Contract Documents, material, process or system to be installed, Architect will be requested to make clarification of indeterminate item.

1. Whenever possible, such clarification shall be requested at next appropriate project meeting, with response entered into meeting minutes. When clarification at meeting is not possible, because of urgency of need, or complexity of item, Contractor shall prepare and submit RFI to Architect.

B. Contractor shall endeavor to keep number of RFIs to a minimum. In the event the process becomes unwieldy, in the opinion of Architect, because of number and frequency of RFIs submitted, the Architect may require the Contractor to abandon process and submit future requests as either submittals, substitutions or requests for change.

C. RFIs shall be submitted on form acceptable to Architect. Forms shall be completely filled in, and if prepared by hand, shall be fully legible after photocopying or transmission by facsimile (fax) or eMail scan. Each page of attachments to RFIs shall bear RFI number in lower right corner.

D. RFI's shall be originated by Contractor:
1. RFIs from subcontractors or material suppliers shall be submitted through, reviewed by, and signed by Contractor before submittal to Architect.
2. RFIs sent by subcontractor or suppliers directly to Architect or Architect's consultants shall not be accepted and will be returned unanswered.

E. Contractor shall carefully study Contract Documents to ensure that requested information is not available therein. RFIs which request information available in Contract Documents will be deemed "improper" or "frivolous" as noted above.

F. In cases where RFIs are issued to request clarification of coordination issues, for example pipe and duct routing, clearances, specific locations of Work shown diagrammatically, and similar items, Contractor shall fully lay out suggested solution using drawings or sketches drawn to scale, and submit same with RFI. RFIs which fail to include suggested solution will be returned unanswered with requirement that Contractor submit a complete request.
1. Contractors are encouraged to utilize photocopies of Contract Documents to completely illustrate their questions, and to provide sketches as required to communicate question, concepts and suggestions.

G. Do not use RFIs for following purposes:
1. To request approval of submittals.
2. To request approval of substitutions.
3. To request changes which entail additional cost or credit.
4. To request changes which entail change of time of completion.
5. To request different methods of performing Work than those drawn and specified.

H. In event Contractor believes that clarification by Architect results in additional cost or time, Contractor shall not proceed with Work indicated by RFI until Change Order or Construction Change Directive is prepared and approved in accordance with Section 01 20 00. RFIs shall not automatically justify cost increase in Work or change in project schedule.
1. Answered RFIs shall not be construed as approval to perform extra Work.
2. Unanswered RFIs will be returned with stamp or notation: Not Reviewed.

I. Contractor shall prepare and maintain log of RFIs, and at any time requested by Architect, Contractor shall furnish copies of log showing outstanding RFIs. Contractor shall note unanswered RFIs in log.

J. Contractor shall allow up to 7 days review and response time for RFIs, however, Architect will endeavor to respond in timely fashion to RFIs.

1.04 ARCHITECT'S RESPONSE TO RFIs

A. Architect will respond to RFIs on one of following forms:
   1. Properly prepared RFIs:
      a. If no Change in the Work is required, Architect will respond in space provided on the RFI form.
      b. If a Change in the Work is required, Architect will issue in accordance with Section 01 20 00.
   2. Improper or Frivolous RFIs:
      a. Notification of Processing Fee(s).
      b. Unanswered RFIs will be returned with stamp or notation: "Not Reviewed".

B. Architect may opt to retain RFIs for discussion during regularly scheduled project meetings for inclusion of responses in meeting minutes in lieu of responding on written form.

PART 2 - PRODUCTS

2.01 NOT USED

PART 3 - EXECUTION

3.01 NOT USED

END OF SECTION

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Project Management and Coordination: Project Coordination, Project Meetings.

B. Construction Progress Documentation: Construction Progress Schedule, Two-week Look Ahead Schedule, Construction Photographs.

C. Submittal Procedures: Shop Drawings, Product Data, Samples, Deferred Approval Items, Finishes Materials Schedule, Coordinated Drawings.

1.02 PROJECT COORDINATION

A. Coordinate scheduling, submittals, and Work of various Sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate Work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

C. Coordinate space requirements and installation of mechanical and electrical Work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installation, for maintenance, and for repairs.

D. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.

E. Coordinate completion and clean up of Work of separate sections in preparation for Certified Completion and for portions of Work designated for Owner's occupancy.

F. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.03 PRECONSTRUCTION MEETING

A. Architect will schedule meeting after Notice of Award.

B. Attendance Required: Architect, Prime Contractors, Major Subcontractors, Project Inspector and key Owner personnel.

C. Agenda:

1. Contract Agreement:
   a. Transmit 5 signed originals of the Agreement to the Owner.
   b. Transmit Attachment Certifications to the Owner.
   c. Transmit Performance and Payment Bonds to the Owner.
   d. Contractor to transmit Certificates of Insurance to the Owner.
   e. Owner to transmit copy of Certificates of Property Insurance to Contractor.
   f. Review General and Supplementary Conditions.
2. Receive documentation from Contractor:
   a. Construction Progress Schedule.
   b. Schedule of Values.
   c. List of Subcontractors with addresses and phone numbers.
   d. List of Submittals and estimated date of submittal.
   e. Documentation for LEED Requirements.
3. Project Administration:
   a. Application for Payment, Stop-Notice Release, Record Drawings.
   b. Change Order Requests, Change Orders, Request For Proposals, Construction Change Directive/Instruction Bulletins. Preparation of Change Orders by Architect according to 2016 California Administrative Code, Code of Regulations Title 24 Part 1, Section 4-233 .
   c. Submittals
   d. Deferred Approvals Submittals
   e. Substitution procedures.
   f. Site Meetings.
   g. Testing Laboratory.
   h. Verified Reports.
   i. Phasing.
   j. Critical work sequencing and long-lead items.
   k. Designation of key personnel and their duties.
   l. Lines of communications.
   m. Procedures for RFIs.
   n. Procedures for testing and inspecting.
   o. Distribution of the Contract Documents.
   p. Sustainable design requirements.
   q. Preparation of record documents.
   r. Work restrictions.
   s. Working hours.
   t. Procedures for moisture and mold control.
   u. Procedures for disruptions and shutdowns.
   v. Construction waste management and recycling.
   w. Parking availability.
   x. Storage areas.
   y. Equipment deliveries and priorities.
   z. Security.
   aa. Progress cleaning.
4. Special Owner Conditions:
   a. Temporary Facilities.
   b. Owner Occupancy.
   c. Work by Owner.
   d. Access to Site - Owner Contact.
5. Construction Process:
   a. Contractor shall discuss overview of construction.

b. Contractor shall identify items to be selected by Architect/Owner and date selections must be made.
c. Contractor shall review special requirements for equipment, safety, and noise.

6. Pre-Job Conference:
   a. Prevailing Wage Requirements.
   b. Checklist and signatures.

D. Architect will record minutes and distribute copies within seven days after meeting to participants and those affected by decisions made.

1.04 PROGRESS MEETINGS

A. Architect will schedule and administer meetings throughout progress of Work as needed.

B. Architect will make arrangement for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendance Required: Project Coordinator, Prime Contractors, Major Subcontractors and Suppliers, Project Inspector, key Owner personnel and Architect as appropriate to agenda topics for each meeting.

D. Agenda:
1. Review minutes of previous meetings.
2. Review of Work progress.
3. Field observations, problems, and decisions.
4. Identification of problems that impede planned progress.
5. Review of submittals schedule and status of submittals.
6. Maintenance of Construction Progress Schedule.
7. Corrective measures to regain projected schedules.
8. Maintenance of quality and work standards.
9. Effect of proposed changes on progress schedule and coordination.
10. Other business relating to Work.
11. Deferred Approval submittals and timelines.
12. Review of Mockup rooms and/or Assembly.

E. Architect will record minutes and distribute copies within seven days after meeting to participants, and those affected by decisions made.

1.05 PREINSTALLATION MEETING

A. When required in individual Specification Sections, convene pre-installation meeting before starting Work of Section.

B. Require attendance of parties directly affecting, or affected by, Work of specific Section.

C. Notify Architect four days in advance of meeting date.

D. Prepare agenda and preside at meeting:

1. Review conditions of installation, preparation and installation procedures.
2. Review coordination with related Work.

E. Contractor shall record minutes and distribute copies within three days after meeting to participants, Architect and those affected by decisions made.

1.06 SUBMITTAL PROCEDURES

A. Transmit separate request for EACH Section submittal directly to Architect.
1. Bind submittals sturdily, neatly label covers.
2. Include Architects job number as it appears on Contract Documents.
3. Include Authority Having Jurisdiction application or approval number.

B. Submittal number shall use a sequential number followed by a hyphen then the Specification Section followed by a hyphen and then the revision number (e.g., 0001-051200-0). Resubmittals shall have the original number and include the revision number as the suffix (e.g., 0001-051200-1).

C. Identify Project, Contractor, Subcontractor or supplier; pertinent Drawing sheet and detail number(s), and Specification Section number, as appropriate.
1. Provide name telephone number of individual who may be contacted for further information.

D. Apply Contractor's dated stamp with Contractor's original signature or initials affixed thereto, certifying that review, verification of products required, field dimensions, adjacent construction Work, and coordination of information is according to requirements of Work and Contract Documents. Stamped signatures or initials are not acceptable.

E. Schedule submittals to expedite Project. Coordinate submission of related items.
1. Make submittals according to Construction Schedule and adequate enough in advance of scheduled dates of installation to provide required time for reviews for securing necessary approvals for possible revision and re-submittal and for placing orders and securing delivery.
2. Schedule submittals such that related materials and assemblies that support or are affected by the submitted materials are either submitted simultaneously or in order of installation sequence such that impacts and coordination can be evaluated as part of the review.
3. Late submittals, not in accordance with the "Schedule for Submission of Shop Drawings, Product Data and Samples" and the Construction Schedule, will not be considered an acceptable reason for initiating a substitution requests caused by late ordering and procurement of materials.

F. Identify variations from Contract Documents and Product or system limitations that is detrimental to performance of completed Work.

G. Substitutions: Submit only as approved per Section 01 60 00, state effect of approved substitution on construction schedule, and changes required in other work or products.

H. Owner-Directed Substitution Approval: Substitution submittals specifically directed by Owner to be approved by the Architect for this project shall pertain to a specific item only. The Architect's stamped approval of Owner-Directed Substitution does not constitute approval for any other item, other projects or parts of project. A Change Order shall be prepared to effect the Owner's authorization of Owner-Directed Substitution.

I. Provide space for Contractor and Architect review stamps.

J. Revise and resubmit submittals in their entirety, identify changes made since previous submittal.

K. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

L. Determine and verify field dimensions and conditions, materials, catalog numbers and similar data.

M. Coordinate as required with all trades and all public agencies involved.

N. Unless otherwise specifically authorized by Architect, make submittals in groups containing associated items within the same Section. Architect may reject partial submittals as not complying with provisions of this Section.

O. Where individual Sections require structural calculations, prepare submittal under direction of qualified California Licensed Structural Engineer and shall bear the Engineer's stamp and signature.

P. Format of Submittals: Submit Electronic Submittals, including but not limited to Product Data, Shop Drawings, Schedules, Certifications, tests, logs, for ease of information distribution. At Contractor's option he may submit standard printed data on reproducible media and in number of copies required per this Section and other project Sections. Identify submitted items that are applicable to the project, including any deviations, with arrows, clouds, or other distinct graphic, or in highlighted writing that can be reproduced with black and white copiers easily discernible from background information.

Q. Submittals for Deferred Approved Items, refer to listed items in this Section and the specific requirements therein in addition to requirements above.

1.07 CONSTRUCTION PROGRESS SCHEDULE

A. Submit Construction Progress Schedule in duplicate within 15 calendar days after the date on the Notice to Proceed for Architect's review.
   1. Schedule shall reflect amount of time stipulated in Agreement.
   2. If the Contractor proposes an earlier completion dated than stipulated in the Agreement, Change Order will be issued reflecting revised completion date at no change in Contract Sum.

B. Revise and resubmit as required.

C. Scheduling may utilize programs including: Microsoft Project Schedule, Primavera Project Planner (P3), Primavera SureTrak Project Manager, Meridian Project Systems or similar programs addressing the requirements.

D. Submit computer generated network analysis diagram in accordance with Section 01 32 16.13 using Critical Path Method, generally as outlined in Associated General Contractors of America (AGC) publication "Construction Planning and Scheduling", latest Edition.

E. Prepare final Construction Progress Schedule. Provide separate time for each activity and vertical line to identify first workday of each week. Use same breakdown of Work indicated in Schedule of Values. As Work progresses, mark to indicate actual completion.
   1. Submit within 15 calendar after the date on the Notice to Proceed
   2. Prepare schedule on reproducible media, of width sufficient to show data for entire construction period.
   3. Coordinate each element with other activities. Show each activity in proper sequence. Indicate sequences necessary for completion of related Work.
   4. Indicate fabrication, delivery and installation activities.
   5. Indicate Owner-Furnish, Owner-Installed or Owner-Furnish, Contractor-Installed items in Schedule.
   6. Schedule Distribution: Distribute copies to Owner, Architect, subcontractor and parties required to comply with dates.
   7. Updating: Revise schedule after each meeting or activity where revisions have been made.
   8. Indicate Completion Date and allow time for Architect's procedures necessary for certifying Completion.

F. Indicate complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate early and late start, early and late finish, float dates and duration. Ownership of float time is shared commodity, not for exclusive use by either party. Use float time to make up Work behind schedule until float time is depleted. Submittals returned in less time than allowed by Contract, shall be used to reduce Contractor time extension requests.

G. Indicate Milestones and target date and their activities including completion dates.

H. No Time extensions will be granted nor delay damages paid until a delay occurs that impacts the schedule consumes all available float or contingency time available, and extends the work beyond the contract completion date.

I. Indicate estimated percentage of completion for each item of Work at each submission.

J. Schedule for Submission of Shop Drawings, Product Data and Samples: Incorporate "Schedule for Submission of Shop Drawings, Product Data and Samples" in Construction Progress Schedule. This schedule shall include submittal dates required for shop drawings, product data, samples and product delivery dates, including Deferred Approval Items, if any, and including those items furnished by Owner. Provide time in schedule for Architect's review of submittals according to Contract Time. Allow 21 calendar days for submittals requiring consultants' review.

K. Submit revised schedules with each Application for Payment identifying changes since previous version.

L. As a minimum allow 15 calendar days in schedule for final inspections before final acceptance. Include time to correct punch list items prior to final acceptance.

M. Substantially Completed buildings, alterations, additions and relocatables: in projects consisting of different buildings, alterations, additions and relocatables, scheduled to be substantially completed and delivered to the Owner for beneficial occupancy prior to Final Completion of entire project, indicate in the Construction Schedule each building, alteration, addition and relocatable progress, completion date, Punch List items and time for completion of Punch list items.
   1. DSA 152-Project Inspection Cards: The Inspector shall post the forms in his/her job file and shall electronically post the forms. Inspection Cards required: DSA-issued 152-Project Inspection Cards for EACH building, alteration, addition, each relocatable, and one for the site work when site work is involved. The Project Inspector is responsible to sign off applicable blocks and sections on the form as the Work progresses as required in accordance with DSA Procedures. No one is allowed to modify the Project Inspection Cards except the Project Inspector.
   2. Relocatable Buildings: EACH relocatable building shall have its independent 152-Project Inspection Card. For new relocatable buildings constructed in the manufacturer's facility, an "in-plant" Inspection Card, an "on-site" Inspection Card and a site work Inspection Card are required.

1.08 TWO-WEEK LOOK AHEAD SCHEDULE

A. Submit a Two Week Look Ahead Schedule and shall contain the following:
   1. Prepare detailed two-week schedule projections for the Work to be performed during the following weeks beyond the week it is presented at the weekly construction meeting or at the request of the Architect during the construction period.
   2. Be plotted in bar chart or time scale logic format and be of such size that all activity numbers and descriptions are clearly legible.
   3. Be sorted by sub contractor responsibility, actual start, early start and total float.
   4. Include activity ID, description and float for each activity.
   5. Include all activities, completed, in progress and scheduled to start within the time frame of the date minus one week to the data date plus two weeks.
   6. Schedule shall be updated and provided at each regular progress meeting for review and comparison to approved project schedule status.

1.09 CONSTRUCTION PHOTOGRAPHS

A. Photographer : Engage qualified photographer to take construction photographs.

B. Digital Images: Provide images in uncompressed TIFF format, produced by a digital camera with minimum sensor size of 14 megapixels, and at an image resolution of not less than 1600 by 1200.
   1. Provide 2 sets (CD's or flash drives) of copies to Owner.

C. Date Stamp: Unless otherwise indicated, date and time stamp each photographs as it is being taken so stamp is integral to photograph.
   1. Identify each print with job name, location from which photograph was taken, photographer's name address and photograph number.

D. Pre-Construction Photographs: Before starting construction, take 4 color photographs of Project site and surrounding properties from different vantage points, as directed by Architect. Show existing conditions adjacent to property.

E. Periodic Construction Photographs: Take 4 color photographs monthly, coinciding with cutoff date associated with each Application of Payment. Photographer shall select vantage points to best show status of construction and progress since last photographs were taken. Take photographs same time of day.
   1. Field Office Prints: Retain 1 set of prints of periodic photographs in field office at Project site available at all times for reference. Identify photographs same as for those submitted to Architect.
   2. Final Completion Construction Photographs: Take 8 color photographs after date of Substantial Completion for submission as Project Record Documents. Architect will direct photographer for desired vantage points.
   3. Submit Construction Photographs to Owner monthly, submit before Application for Payment.

1.10 LEED SUBMITTALS

A. Comply with requirements specified in Division 01, General Requirements.
   1. Number of Copies: Submit 3 copies of LEED submittals, unless otherwise indicated.
   2. See the following sections for additional submittal requirements necessary to demonstrate compliance with LEED version 2.2:
      a. Section 01 35 43, Special Environmental Requirements.
      b. Section 01 74 19, Construction Waste Management.
      c. Section 01 81 19, Construction Indoor Air Quality.
   3. Building commissioning shall be included in the design and construction processes of the building project to verify that the building systems and components meet the Owner's or Owner Representative's project requirements. Commissioning shall be performed in accordance with California Green Building Standards Code, Section 5.410.2 by trained personnel with experience on projects of comparable size and complexity. All occupancies shall comply with the California Energy Code as prescribed in California Energy Code Section 120.8.
      a. Commissioning Submittal requirements shall include:
         1) Owner's or Owner Representative's project requirements.
         2) Basis of Design.
         3) Commissioning measures shown in the construction documents.
         4) Commissioning plan.
         5) Functional performance testing.
         6) Documentation and training.
         7) Commissioning report.

1.11 SHOP DRAWINGS

A. Within 15 days from Notice to Proceed, submit to Architect for review and acceptance, "Schedule for Submission of Shop Drawings, Product Data and Samples" (Submission Schedule) listing required submittals and review dates. Schedule shall allow sufficient time for checking by Architect. Incorporate Submission Schedule in Construction Progress Schedule. Days: Calendar Days.
   1. Additionally, submit all Shop Drawings, Product Data and Samples according to the following guidelines. Guidelines are provided to allow Architect and Engineers adequate time for review and is not intended to dictate contractor's means and methods:
      a. Contract of 60 to 90 days: Submit within 15 days from acceptance of Submission Schedule. Allow Architect 15 days to respond (defined as reviewed and returned). Re-submittals: allow contractor 7 days, allow Architect 10 days to respond.
      b. Contract of 90 to 180 days: Submit within 30 days from Notice to Proceed. Allow Architect 15 days to respond. Re-submittals: allow Contractor 10 days, and Architect 15 days to respond.
      c. Contract of 180 to 270 days: Submit within 45 days from Notice to Proceed. Allow Architect 21 days to respond. Re-submittals: allow Contractor 10 days, and Architect 15 days to respond.
      d. Contract of 270 to 360 days: Submit within 60 days from Notice to Proceed. Allow Architect 21 days to respond. Re-submittals: allow Contractor 10 days, and Architect 15 days to respond.
      e. Contract of 360 to 450 days: Submit within 60 days from Notice to Proceed. Allow Architect 21 days to respond. Re-submittals: allow Contractor 15 days and Architect 21 days to respond.
      f. Contract of 450 days and longer: Contractor to schedule submittals. Allow Architect 30 days to respond. Re-submittals: allow Contractor 15 days and Architect 21 days to respond.

B. Submit newly prepared information, drawn to accurate scale. Highlight, encircle or otherwise indicate deviations from Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to Project will not be approved as shop drawings.

C. Shop drawings shall include fabrications and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Include following information:
   1. Dimensions
   2. Identification of products and materials included.
   3. Compliance with specified standards.
   4. Notation of coordination requirements.
   5. Notation of dimensions established by field measurement.

D. Contractor shall review, stamp with his approval as herein required, and submit with reasonable promptness and in orderly sequence, according to Submittal Schedule, all shop drawings required by Contract Documents or subsequently by Architect as covered by modifications. Shop drawings shall be properly identified. At time of submission Contractor shall inform Architect in writing and with highlighted annotation on shop drawings of any deviation in shop drawings from requirements of Contract Documents.

E. Stamp: Each page of shop drawings shall bear Contractor's stamp, which shall signify Contractor's representation that he has determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and has checked and coordinated information contained in shop drawings. Each stamp shall be accompanied by wet signature or initial of employee of Contractor who may be contacted for information. Stamped signatures or initials are not acceptable.

F. Method of Review: Submit Electronic Shop Drawing Submittals. Submit standard .pdf document shop drawings. Identify submitted items that are applicable to the project, including any deviations, with arrows, clouds, or other distinct graphic, or in highlighted writing that can be reproduced with black and white copiers easily discernible from background information.
   1. Comments or corrections will be noted on submittals and returned to Contractor, who shall identify all changes made since previous submittal and resubmit in same manner. When reviewed, submittals will be stamped and returned to Contractor who shall make distribution of electronic copies as required.

G. Processing Time
   1. Allow enough time for submittal review, including time for re-submittals, as follows:
      a. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including re-submittals.
      b. In accordance with the Schedule for Submission of Shop Drawings, Product Data and Samples. Review of each submittal for conformance with design concept of Project and with information given in Contract Documents. Architect's review of a separate item shall not indicate acceptance of assembly in which that item functions. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
      c. Submittals requiring Consultants' Review: Where review of submittals by Architect's consultants is required, allow minimum 21 calendar days for review of each submittal.
   2. Re-submittal Review: In accordance with the Schedule for Submission of Shop Drawings, Product Data and Samples for each re-submittal.

H. Submittal of shop drawings to Architect, shall be made by Contractor with dated transmittal form or letter, and not by subcontractors or suppliers.

I. Architect's review of shop drawings shall not relieve Contractor of responsibility for any deviation from requirements of Contract Documents unless Contractor has informed Architect in writing of such deviation at time of submission and Architect has given written acceptance to specific deviation, nor shall Architect's review relieve Contractor from responsibility for errors or omissions in shop drawings.

J. No portion of Work requiring shop drawings shall be commenced until shop drawings have been returned with review by Architect.

K. At Contractor's option, he may request and if Architect approves use Architect's computer-generated drawings in electronic format. Contractor's request must be in writing with list of drawings requested and CAD format required. Contractor assumes all liability for accuracy of shop drawings if he opts to use Architect's drawings. Software for CAD formats requested by Contractor not currently available to Architect will be provided by Contractor at his own expense. Complete CAD Drawing Request Form at the end of this Section for request.
   1. Engineers' Drawings, CAD engineers' drawings are available only at discretion of the Engineer.

1.12 PRODUCT DATA

A. Submit within time required by Shop Drawings.

B. Submit electronic copies only.

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

D. After review, distribute and provide copies for Record Documents.

1.13 SAMPLES

A. Submit within time required by Shop Drawings.

B. Submit samples to illustrate functional and aesthetic characteristics of product with integral parts and attachment devices. Coordinate sample submittals for interfacing Work.

C. Submit samples of finishes from the full range of manufacturers' standard colors, textures and patterns for Architect selections, or in custom colors selected.

D. Include identification on each sample with full Project information.

E. Submit minimum of three (3) samples or as specified in individual Sections of Specifications, two (2) of which will be retained by Architect.

F. Reviewed samples which may be used in the Work are indicated Sections of the Specifications, two (2) of which will be retained by the Architect.

G. Selection or rejection of samples will be determined by Architect in writing.

H. Colors: Materials that are visually related to other finishes require that subcontractors submit their samples before normally scheduled in order that color selection can be made for other items that are scheduled to be ordered earlier in construction schedule. Complete submittal of color charts and color samples shall be made before related colors will be selected Architect. Contractor shall be responsible to coordinate submittal schedules so as not to delay Work.

1.14 FINISHES MATERIALS SCHEDULE

A. Submit in accordance with Submittal Procedures.

B. Submit Schedule verifying lead times of materials.

1.15 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual Specification Sections, submit manufacturer's printed instruction for delivery, storage, assembly, installation, start-up, adjusting and finishing in quantities specified for product data.

B. Identify conflicts between manufacturer's instructions and contract documents.

1.16 MANUFACTURER'S CERTIFICATIONS

A. When specified in individual Specification Sections, submit manufacturers' certificate to Architect for review in quantities specified for product data.

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

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

1.17 SPECIAL PROCEDURES – ACCELERATION OF THE WORK

A. If, in judgment of Architect or Owner, it becomes necessary at any time to accelerate Work or portion thereof, Contractor, when ordered or directed by Architect or Owner, shall deploy workers in such portions of Project where directed to enable others to properly engage and carry on their work.

1. If circumstances require that entire Work or portion thereof be completed at date earlier than Contract Completion Date as adjusted by change orders, Contractor, when ordered or directed by Owner or Architect, shall increase his forces, equipment, hours of work, and/or number of shifts and shall expedite delivery of materials to meet the altered completion date or dates ordered or directed. Any increase in cost to Contractor in compliance with such orders or directives will be adjusted in accordance with Contact Documents.

B. If, in judgment of Architect or Owner, Work is behind schedule and rate of placement of work is inadequate to regain scheduled progress so as to ensure timely completion of Work or separable portion thereof, Contractor, when so informed by Architect or Owner, shall immediately take action to increase rate of Work placement.

1. This shall be accomplished by any one or combination of following or other suitable measures:
   a. An increase in working forces,
   b. An increase in equipment or tools,
   c. An increase in hours of work or number of shifts,
   d. Expediting delivery of materials.
2. Contractor shall, within ten (10) calendar days after being so informed, notify Architect of specific measures taken and/or planned to increase rate of progress together with estimate of when scheduled progress will be regained. Should plan of action be deemed inadequate by Architect or Owner, Contractor will take additional steps or make adjustments as necessary to his plan of action until it meets with Architect's or Owner's approval.
3. Acceleration of Work will continue until scheduled progress is regained. Scheduled progress shall be established from latest revised approved progress schedule for Project.
4. Timely completion will be understood as Contract Completion Date as revised by all time extensions granted at time acceleration is undertaken.
5. Contractor shall not be entitled to additional compensation for additional effort he applies to Work under terms of this sub-paragraph.

C. Any directive or order to accelerate Work will be in writing. Any directive or order terminating accelerated Work will be in writing.

1.18 DEFERRED APPROVAL ITEMS

A. In accordance with 2016 California Code of Regulations Title 24, Part 1, California Administrative Code, Section 4-229 where certain items, equipment or portions of their installation cannot be fully detailed or structurally calculated before selection of specific manufacturer, items or portions thereof may be indicated in Documents or herein as "Deferred Approval Items.
   1. Elevator guide rails and support brackets.
   2. Fire pumps and water tanks.
   3. Gymnasium bleachers
   4. Exterior pre-engineered fixed bleachers
   5. Storefronts
   6. Curtain Wall Systems more
   7. Exterior wall systems - precast concrete, glass fiber reinforced concrete (GFRC).

B. Items noted or listed in Contract Documents as "Deferred Approval" shall not be fabricated or installed until they have been approved by Division of the State Architect (DSA).

C. Submittals for approval shall be submitted within 30 days after Notice to Proceed to Architect for his review and signature before submitting to DSA.

D. For Deferred Approval Items provided by the Contractor, Contractor shall be responsible for providing details, structural calculations, stamps and signatures by Structural Engineer licensed in California, and other necessary data or material as required in the affected section and herein, and complete installation of items and equipment without extra cost to Owner. Provide to A/E of Record for approval.

1. **Storefront or Curtain Wall Submittals: Architect will submit Deferred-Approval items as follows in accordance with DSA procedures**:
   a. **Architect will identify the number of types of Storefront and Curtain Wall panels assemblies and the number of types of connections applicable to the project. Will submit only the particular details or elevations that reflect the various types of assemblies and connections used in the project and their associated calculations. 10 feet high and over, DSA deferred approval required**.
   b. **Architect will stamp and sign the appropriate details for submittal to DSA. If not stamped and signed, include statement (when they utilize plans prepared by other licensed professionals) acceptable to DSA. A table of contents of plans submitted will follow the above statement. In the latter case, the plans and details shall be stamped by the design professional for the deferred approval items**.
   c. **Submit plans numbered in sequence. Two sets of plans and one set of calculations will be submitted to DSA for review**.

E. Detailed performance specifications and/or loading criteria for the deferred approval components must be included on the drawings or in the specifications. The drawings must include a list of the deferred approval components on the title sheet and clearly state that no work may proceed on the components until DSA stamped approved drawings are provided to the contractor and inspector for the components.

F. A/E of Record shall accept responsibility for verifying that all components (including those granted deferred approval) of the project are properly designed by appropriately licensed design professionals. The A/E of Record is also responsible for coordination of all components of the project. The A/E of Record is responsible for designing connections to the structure for all deferred approval components and verifying that all interactions (deflection compatibility, drift compatibility, vertical and lateral loads, etc.) are adequately addressed and in conformance with good engineering practices and the California Building Standards Code.

G. It should be noted no fixed time frame can be established for agency's approval. However, Contractor shall be responsible for time delays caused by his own late scheduling or incomplete drawings for deferred items.

1.19 PRECEDENCE

A. The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

B. In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities:
   1. The Agreement.
   2. Addenda, with those of later date having precedence over those of earlier date.
   3. The Supplementary Conditions.
   4. The General Conditions of the Contract for Construction.

5. Drawings and Technical Specifications.
6. In the case of an inconsistency between Drawings and Specifications or within either Document not clarified by addendum, the better quality or greater quantity of Work shall be provided in accordance with the Architect's interpretation.
7. Any work called for in the Drawings and not mentioned in the Specifications, or vice versa, shall be performed as though fully set forth in both.
8. Contractor shall secure written permission from, Architect before proceeding with work affected by omission or discrepancies in the Contract.

C. Separate sections of this Specification are arranged only for convenience of Contractor, and nothing stated herein should be misconstrued as suggesting jurisdiction over items of work by any different building trades.

PART 2 - PRODUCTS

2.01 PRODUCTS FOR PATCHING AND EXTENDING WORK

A. Refer to Section 01 70 00 Execution Requirements.

B. New Materials: As specified in product sections; match existing products and Work for patching and extending Work.

C. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing Work as standard.

PART 3 - EXECUTION

3.01 NOT USED.

END SECTION

SECTION 01 30 00.A

CAD DRAWING REQUEST FORM

Date: _____ **Job Number:** _____

Project: _____ **Project Architect:** _____

We _____
Contractor

Request the following listed CAD file Sheet Numbers for use in the execution of our Work under the Contract Documents of the subject project, and hereby assume all and sole responsibility of field verification and coordination with the Work of associated trades.

The Contractor further agrees, to the fullest extent permitted by law, to indemnify and hold harmless the Architect, its officers, directors, employees and subconsultants (collectively, Architect) against any damages, liabilities or costs, including reasonable attorneys' fees and defense costs, arising from or allegedly arising from or in any way connected with the unauthorized reuse or modification of the electronic files by the Contractor or any person or entity that acquires or obtains the electronic files from or through the Contractor without the written authorization of the Architect.

Sheet No.	Dated	Sheet Title
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Requested File Format
DWG (AutoCAD, 2012, 2015)

Requested File Deliverable
CD Rom
E-MAIL (Zipped Files)

_____
Contractor's E-mail address

Contractors are not required to pay for the first 5 drawings (maximum). Additional drawings available at a rate of $50.00 per drawing.

Total payment enclosed $_____, (checks made payable to HMC Architects).

Signed: _____

Title: _____

Company: _____

Address: _____

Telephone: _____

Contact: *HMC Architects, Project Manager*

END OF SECTION

SECTION 01 32 16.13

NETWORK ANALYSIS SCHEDULES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. References

B. Quality Assurance.

C. Format

D. Schedule

E. Submittals

F. Review and Evaluation.

G. Updating Schedule.

H. Distribution

1.02 REFERENCES

A. "Construction Planning and Scheduling", The Associated General Contractors of America (AGC), Washington, D.C., Latest Edition.

1.03 QUALITY ASSURANCE

A. Scheduler: Contractor's Personnel specializing in CPM scheduling with one year minimum experience in scheduling construction Work of complexity comparable to this Project, and having use of computer facilities capable of delivering detailed graphic printout within 48 hours of request.

B. Contractor's Administrative Personnel: One year minimum experience in using and monitoring CPM schedule on comparable projects.

1.04 FORMAT

A. Scheduling may utilize programs (Latest Editions) including Microsoft Project, Primavera Project Planner for Windows (P3), Primavera SureTrack Project Manager, Meridian Project Systems or similar programs addressing the requirements.

B. Listings: Reading from left to right, in ascending order for each activity. Identify each activity with applicable Specification section number.

C. Diagram Sheet Size: 30 inches high by width required.

D. Scale and Spacing: To allow for notations and revisions.

1.05 SCHEDULE

A. Prepare Network Analysis Schedule and supporting mathematical analyses using Critical Path Method, under concepts and methods outlines in AGC's "Construction Planning and Scheduling".

B. Diagrams to illustrate order and interdependence of activities and sequence of Work, how start of given activity depends on completion of preceding activities, and how completion of activity may restrain start of subsequent activities.

C. Illustrate complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate early and late start, early and late finish, float dates and duration. Provide dates for procurement and delivery of critical products and dates for installation and provision for testing. Provide legend for symbols and abbreviations used. Indicate fabrication, delivery and installation activities.

D. Incorporate Schedule for Submission of Shop Drawings and Samples. Submittal dates required for shop drawings, product data, samples and product delivery dates, including those furnished by Owner. Provide time in schedule for review of submittals.

E. Mathematical Analysis: Tabulate each activity of detailed network diagrams, using calendar dates and identifying for each activity:
   1. Preceding and following event number.
   2. Activity description.
   3. Estimated duration of activity, in maximum 15 day intervals.
   4. Earliest start date.
   5. Earliest finish date.
   6. Actual start date.
   7. Actual finish date.
   8. Latest start date.
   9. Latest finish date.
   10. Lag time, total and free float for each activity and critical path.
   11. Monetary value of activity, keyed to Schedule of Values.
   12. Manpower and cost loading of scheduled activities.
   13. Percentage of activity completed.
   14. Responsibility

F. Analysis Program: Capable of compiling monetary value of completed and partially completed activities of accepting revised completion dates and re-computation of all dates and float.

G. Required Sorts: List activities in sorts or groups:
   1. By preceding Work item or event number from lowest to highest.
   2. By amount of float, then in order of early start.
   3. By responsibility in order of earliest possible start date.
   4. In order of latest allowable start dates.
   5. In order of latest allowable finish dates.
   6. Contractor's periodic payment request sorted by Schedule of Values.
   7. Listing of basic input data that generates report.

8. Listing of activities on critical path.

H. Coordinate contents with Schedule of Values.

I. Contractor shall not sequester float through strategies including extending activity duration estimates to consume available float, using preferential logic, using extensive or insufficient crew or resource loading, use of float suppression techniques, special lead or lag logic restraints or imposed dates.

1.06 SUBMITTALS

A. PRELIMINARY Network Analysis Schedule: Within 15 days after date established in the Notice to Proceed, submit proposed PRELIMINARY Network Analysis Schedule defining planned operations for first 30 days of Work, with general outline for remainder of Work.

B. COMPLETE Network Analysis Schedule: Within 15 days after Notice to Proceed, submit Draft of proposed COMPLETE Network Analysis Schedule for review. Include written certification that major mechanical and electrical Subcontractors have reviewed and accepted proposed schedule. Make submittals in sufficient time for Architect's review.

C. PRELIMINARY Network Analysis Schedule: Within 20 days after joint review of proposed PRELIMINARY Network Analysis Schedule, submit proposed COMPLETE Network Analysis Schedule for review consisting of network diagrams and mathematical analysis. Include written certification that major, mechanical, and electrical subcontractors have reviewed and accepted proposed schedule.

D. COMPLETE Network Analysis Schedule: Within 10 days after joint review of Draft of proposed COMPLETE Network Analysis Schedule, submit COMPLETE Network Analysis Schedule consisting of network diagrams and mathematical analysis. Include written certification that major, mechanical and electrical subcontractors have reviewed and accepted proposed schedule.

E. Participate in review of Preliminary and Complete Network Analysis Schedule jointly with Architect.

F. Number of opaque reproductions Contractor requires, plus three copies which will be retained by Architect.

G. One reproducible transparency and one opaque reproduction.

H. All schedule submittals, including progress updates for duration of Work, shall include electronic submittal in original file format, by e-mail or delivered on storage media agreed to.

I. Updated network schedule with each Application for Payment.

1.07 REVIEW AND EVALUATION

A. Participate in joint review and evaluation of network diagrams and analysis with Architect at each submittal.

B. Evaluate project status to determine Work behind schedule and Work ahead of schedule.

C. After review, revise as necessary as result of review and resubmit within 10 days.

1.08 UPDATING SCHEDULE

A. Maintain schedule to record actual start and finish dates of completed activities.
   1. Submit updated schedule at each scheduled project meeting or monthly, whichever is more frequent.

B. Indicate progress of each activity to date of revision with project completion date of each activity. Update diagrams to graphically depict current status of Work.

C. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.

D. Indicate changes required to maintain Date of Certified Completion.

E. Submit sorts required to support recommended changes.

F. Provide narrative report to define problem areas, anticipated delays and impact on Schedule. Report corrective action taken, or proposed and its effect including effect of change on schedule of separate contractors.

1.09 DISTRIBUTION

A. Following joint review, distribute copies of updated schedule to Contractor's project site file, to Subcontractors, Suppliers, Architect, Owner and other concerned parties.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedule.

PART 2 - PRODUCTS

2.01 NOT USED.

PART 3 - EXECUTION

3.01 NOT USED.

END OF SECTION

SECTION 01 35 16

ALTERATION PROJECT PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Products and installation for patching and extending Work.

B. Transition and adjustments.

C. Repair of damaged surfaces, finishes and cleaning.

PART 2 - PRODUCTS

2.01 PRODUCTS FOR PATCHING AND EXTENDING WORK

A. New Materials: As specified in products Sections, match existing products and work for patching and extending Work. Maintain fire-rated construction.

B. Type and Quality of Existing Products: Determine by inspection and testing of products where necessary, referring to existing Work as standard.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that demolition is complete and areas are ready for installation of new Work.

B. Beginning of restoration Work means acceptance of existing conditions.

3.02 PREPARATION

A. Cut, move or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion.

B. Remove unsuitable material not marked for salvage, such as rotted wood, corroded metals and deteriorated masonry and concrete. Replace materials as specified for finished Work.

C. Remove debris and abandoned items from work area and from concealed spaces.

D. Prepare surface and remove surface finishes to provide for proper installation of new Work and finishes.

E. Close openings in exterior surfaces to protect existing Work and salvage items from weather and extremes of temperature and humidity. Insulate ductwork and piping to prevent condensation in exposed areas.

3.03 INSTALLATION

A. Coordinate Work of alterations and renovations to expedite completion sequentially and to accommodate Owner occupancy.

B. Remove, cut and patch Work in manner to minimize damage and to provide means of restoring products and finishes to original or specified condition.

C. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified conditions for each material with neat transition to adjacent finishes.

D. Restore existing systems including fire alarm systems to their full operating condition(s) at no additional cost that were damaged and/or removed during the scope of this contractor's work. Advise Architect of any deficiencies and/or pre-existing deficient conditions prior to starting work.

E. Install products as specified in individual Sections and Drawings.

3.04 TRANSITIONS

A. Where new Work abuts or aligns with existing, perform smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.

B. When finished surfaces are cut so that smooth transition with new Work is not possible, terminate existing surface along straight line at natural line of division and make recommendation to Architect.

3.05 ADJUSTMENTS

A. Where change of plane of 1/4 inch or more occurs, request instructions from Architect.

B. Trim existing doors as necessary to clear new floor finish. Refinish trim as required.

C. Work at penetrations in fire-rated assemblies to maintain required fire rating assembly.

3.06 REPAIR OF DAMAGED SURFACES

A. Patch or replace portions of existing surfaces that are damaged, lifted, discolored or showing other imperfections. Maintain fire-rated construction.

B. Repair substrate prior to patching finish.

3.07 FINISHES

A. Finish surfaces to match existing.

B. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest Intersections.

3.08 CLEANING

A. Conform to Division 01, General Requirements and Section 01 70 00, Execution Requirements.

END OF SECTION

SECTION 01 35 42

CALGREEN REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section includes general requirements and procedures for compliance with 2016 CALGreen nonresidential mandatory requirements.

B. Related Sections:
1. Divisions 01 through 48 Sections, as applicable, for CALGreen requirements specific to the work of each of those Sections.

1.02 SUBMITTALS

A. CALGreen submittals are in addition to other submittals. If submitted item is identical to that submitted to comply with other requirements, submit duplicate copies as a separate submittal to verify compliance with indicated CALGreen requirements.

B. Contractor shall develop a spreadsheet or use one furnished by the Architect [**Owner**] building department to track submittals required by CALGreen.

C. CALGreen Submittals:
1. Furnish documentation showing verification of CALGreen compliance as required by enforcing agency.
2. Section 5.106.1 – Storm Water Loss Prevention Plan: Newly constructed projects and additions which disturb less than one acre of land shall prevent the pollution of stormwater runoff from the construction activities through one or more of the following measures:
   a. Local ordinance, 5.106.1.2.
   b. Best management practices (BMP) complying with Section 5.106.1.2.
3. Section 5.106.10 – Grading and Paving: Furnish drawing showing grading and paving designed to keep surface water from entering buildings.
4. Section 5.408.2 – Construction Waste Management Plan: Furnish a construction waste management plan complying with specified requirements.
5. Section 5.504.4.5 – Composite Wood Products: Furnish documentation showing compliance with Section 5.504.4.5.
6. Section 5.504.5.6 – Resilient Flooring: Furnish documentation showing resilient flooring materials meet the pollutant emission limits.

PART 2 - PRODUCTS

2.01 NOT USED.

PART 3 - EXECUTION

3.01 NOT USED.

END OF SECTION

SECTION 01 35 43

SPECIAL ENVIRONMENTAL REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Special environmental, sustainable, and "green" building practices related to energy conservation and efficiency, indoor air quality, and resource efficiency.

B. Owner Requirements: The Owner is committed to sustainable design as defined by the US Green Building Council's LEED Rating System and seeks to achieve the following:
   1. Maximize recycled content in materials, products, and systems.
   2. Maximize use of materials that are harvested, extracted, salvaged, and/or manufactured locally.
   3. Maximize use of wood that is certified sustainably harvested by the Forest Stewardship Council (FSC).
   4. Require practices and materials that ensure healthy indoor air quality in final Project.

C. Compliance: Fulfillment of LEED prerequisite and credit requirements identified in this section is a requirement of the Project. Other LEED prerequisites and credits needed to obtain LEED certification are dependent on material selections and may not be specifically identified as LEED requirements. Compliance with requirements needed to obtain LEED prerequisites and credits may be used as one criterion to evaluate substitution requests. Additional LEED prerequisites and credits needed to obtain the indicated LEED certification are dependent on the Architect's design, and other aspects of the Project that are not part of the Work of the Contract. Construction team is required to comply with sustainable building practices described in this Section and subsequent sections, during construction and when considering materials for substitutions. Insure that all sub-contractors are familiar with all of the project's special environmental goals. The General Contractor is responsible for gathering documentation required for the points identified in this section and for submitted templates and supporting documentation on the LEED online account for the project; individual subcontractors are responsible for documenting products and processes as identified in this section and relevant specific sections. Contractor shall follow LEED requirements in conjunction with requirements specified in all other Sections and refer any discrepancies to the Architect for clarification. Contractor will obtain access to LEED Online through Architect and complete templates assigned to them for credit verification and signature. Access for sub-contractor for LEED online is not required but may be obtained on a case by case basis.

D. Related Sections
   1. Section 01 30 00, Administrative Requirements
   2. Section 01 74 19, Construction Waste Management
   3. Section 01 81 19, Construction Indoor Air Quality
   4. Section 01 91 00, General Commissioning Requirements
   5. Section 01 91 14, O&M Training Review
   6. Section 01 91 15, Electrical Commissioning Requirements

7. Section 01 91 17, Mechanical Commissioning Requirements
8. Section 02 41 16 Building Demolition
9. Section 02 41 19, Selective Demolition

E. LEED Objective. This Project is registered under LEED 2009 or Version 4 for New Construction and Major Renovation. It is the intent of these Documents to provide the Owner with a Project that when complete will qualify for LEED NC 2009 of version 4 with a target Gold rating (60-79 points). Failure of contractors, sub-contractors, and material suppliers, at any tier, and employees or agents of these to cooperate in the implementation of this Objective may jeopardize the Owner's ability to certify the Project.

1.02 REFERENCE STANDARDS

A. ANSI/BIFMA M7.1-2007 and ANSI/BIFMA X7.1-2007 testing protocol

B. California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

C. Carpet and Rug Institute Green Label Plus program

D. FloorScore standard

E. Greenguard Indoor Air Quality certification

F. Green Seal Standard GC-03, Anti-Corrosive Paints, 2nd Edition, January 7, 1997

G. Green Seal Standard GS-11, Paints, 1st Edition, May 20, 1993

H. Green Seal Standard GS-36, Commercial Adhesives, October 19, 2000

I. South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings, rules in effect on January 1, 2004

J. South Coast Air Quality Management District (SCAQMD) Rule 1168, Adhesive and Sealant Application, effective July 1, 2005 and rule amendment January 7, 2005

K. SMACNA IAQ Guideline for Occupied Buildings Under Construction, 1995, Chapter 3.

1.03 DEFINITIONS

A. Agrifiber Product: Products consisting of fibrous material derived from the agricultural industry and typically characterized by rapidly renewable characteristics. Such products may consist of wheat straw, sugar cane, and other agricultural crops.

B. Certified Wood: wood-based building products that are certified as "sustainably harvested" under the Forest Stewardship Council's (FSC) Principles and Criteria.

C. The following Specification sections contain Certified Wood submittal requirements:

D. Chain-of-Custody: Process whereby a product or material is maintained under the physical possession or control during its entire life cycle.

E. Construction Waste Diversion: Waste generated during the construction and demolition process that is diverted from a landfill. 50% is required per CALGreen Code, 75% and 95% are targeted in the LEED rating system.

F. LEED: Leadership in Energy & Environmental Design.

G. Low-Emitting Materials: building materials that comply with specified Indoor Air Quality requirements.
   1. 03 30 00 Cast-In-Place Concrete
   2. 05 12 00 Structural Steel
   3. 05 31 00 Steel Decking
   4. 06 20 10 Finish Carpentry
   5. 06 41 16 Plam Cabinets
   6. 06 61 16 Solid Polymer Fabrications
   7. 07 13 26 Self-Adhering Sheet Waterproofing
   8. 07 21 00 Insulation
   9. 07 54 23 Membrane Roofing – Thermoplastic
   10. 07 81 16 Cementitious Fireproofing
   11. 07 84 00 Firestopping
   12. 07 92 00 Joint Sealants
   13. 08 14 16 Flush Wood Doors
   14. 08 84 10 Acoustical Ceiling Treatment
   15. 09 51 00 Acoustical Ceilings - Lay-In
   16. 09 29 00 Gypsum Board
   17. 09 30 13 Ceramic Tiling
   18. 09 53 23 Acoustical Suspension Systems
   19. 09 65 13 Resilient Base
   20. 09 66 16 Precast Terrazzo
   21. 09 90 00 Painting
   22. 09 96 46 Intumescent Painting
   23. 09 65 15 Cove Caps, Reducers and Transitional Mouldings
   24. 09 65 19 Resilient Tile Flooring
   25. 09 68 13 Carpet Tile
   26. 09 81 16 Sound Control Insulation
   27. 10 22 19 Demountable Partitions
   28. 10 22 26 Operable Partitions - Folding Panels
   29. 10 26 17 Wall Protection
   30. 22 07 00 Plumbing Insulation
   31. 22 11 16 Domestic Water Piping
   32. 22 13 16 Sanitary Waste and Vent Piping
   33. 22 14 13 Facility Storm Drainage Piping
       a. Refer to Appendix A - Special Environmental Requirements Product Submittal Form

H. Recycled Content: feedstock materials that have been recovered from consumer or industrial waste streams. Recycled content is classified into two types:

1. Pre-Consumer (also known as Post-Industrial): material diverted from the waste stream during the manufacturing process. Excluded is reutilization of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it.
2. Post-Consumer: waste material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product, which can no longer be used for its intended purpose.
3. The following Specification Sections contain Recycled Content submittal requirements:
    a. 03 10 00 Concrete Formwork
    b. 03 30 00 Cast-In-Place Concrete
    c. 03 49 13 Glass Fiber Reinforced Concrete Column Covers
    d. 03 53 20 Designer Concrete Topping
    e. 04 22 00 Concrete Unit Masonry
    f. 05 12 00 Structural Steel
    g. 05 31 00 Steel Decking
    h. 05 40 00 Cold-Formed Metal Framing
    i. 05 50 10 Metal Pipe Bollards
    j. 05 51 00 Metal Stairs
    k. 05 51 33 Metal Ladders
    l. 05 52 00 Handrails and Railings
    m. 06 61 16 Solid Polymer Fabrications
    n. 07 13 26 Self-Adhering Sheet Waterproofing
    o. 07 21 00 Insulation
    p. 07 25 00 Weather Barriers
    q. 07 42 13 Metal Wall Panels
    r. 07 46 21 Equipment Screens
    s. 07 54 23 Membrane Roofing - Thermoplastic
    t. 07 62 00 Sheet Metal Flashing and Trim
    u. 07 72 00 Roof Accessories
    v. 07 81 16 Cementitious Fireproofing
    w. 08 12 14 Hollow Metal Frames - Knock Down
    x. 08 13 13 Hollow Metal Doors
    y. 08 33 23 Overhead Coiling Doors
    z. 08 33 26 Overhead Coiling Grilles
    aa. 08 41 13 Aluminum Entrances and Storefronts
    bb. 08 42 32 Automatic Door Entrances
    cc. 08 44 14 Glazed Aluminum Curtain Wall
    dd. 08 71 00 Door Hardware
    ee. 08 80 00 Glazing
    ff. 09 21 16 Shaft Walls
    gg. 09 22 16 Non-Structural Metal Framing
    hh. 09 24 00 Portland Cement Plastering
    ii. 09 29 00 Gypsum Board
    jj. 09 30 13 Ceramic Tiling
    kk. 09 51 00 Acoustical Ceilings - Lay-In
    ll. 09 53 23 Acoustical Suspension Systems
    mm. 09 65 13 Resilient Base
    nn. 09 65 15 Cove Caps, Reducers and Transitional Mouldings
    oo. 09 65 19 Resilient Tile Flooring
    pp. 09 66 16 Precast Terrazzo

qq. 09 68 13 Carpet Tile
rr. 09 81 16 Sound Control Insulation
ss. 10 11 23 Tackboards
tt. 10 14 00 Interior Signage
uu. 10 14 00 Exterior Signage
vv. 10 21 00 Toilet Compartments
ww. 10 22 19 Demountable Partitions
xx. 10 22 26 Operable Partitions - Folding Panels
yy. 10 26 17 Wall Protection
zz. 10 28 00 Toilet and Bath Accessories
aaa. 12 93 00 Site Furnishings
bbb. 32 13 13 Sitework Concrete
ccc. 32 31 13 Fences And Gates
ddd. 32 31 22 Screen Panels
eee. 32 93 00 Landscape Planting

4. Refer to Appendix A - Special Environmental Requirements Product Submittal Form

I. Regional Materials: Building materials that are both manufactured and extracted, harvested, or recovered within a 500 mile radius of the job site. Manufacturing refers to the final assembly of components into a product that is furnished and installed by tradesmen.
   1. The following Specification sections contain Regional Materials submittal requirements:
      a. 03 10 00 Concrete Formwork
      b. 03 30 00 Cast-In-Place Concrete
      c. 03 49 13 Glass Fiber Reinforced Concrete Column Covers
      d. 03 53 20 Designer Concrete Topping
      e. 04 22 00 Concrete Unit Masonry
      f. 05 12 00 Structural Steel
      g. 05 31 00 Steel Decking
      h. 05 40 00 Cold-Formed Metal Framing
      i. 05 50 10 Metal Pipe Bollards
      j. 05 51 00 Metal Stairs
      k. 05 51 33 Metal Ladders
      l. 05 52 00 Handrails and Railings
      m. 06 61 16 Solid Polymer Fabrications
      n. 07 13 26 Self-Adhering Sheet Waterproofing
      o. 07 21 00 Insulation
      p. 07 25 00 Weather Barriers
      q. 07 46 21 Equipment Screens
      r. 07 54 23 Membrane Roofing - Thermoplastic
      s. 07 62 00 Sheet Metal Flashing and Trim
      t. 07 72 00 Roof Accessories
      u. 07 81 16 Cementitious Fireproofing
      v. 08 12 14 Hollow Metal Frames - Knock Down
      w. 08 13 13 Hollow Metal Doors
      x. 08 33 23 Overhead Coiling Doors
      y. 08 33 26 Overhead Coiling Grilles
      z. 08 41 13 Aluminum Entrances and Storefronts

aa. 08 42 32 Automatic Door Entrances
bb. 08 44 14 Glazed Aluminum Curtain Wall
cc. 08 71 00 Door Hardware
dd. 08 80 00 Glazing
ee. 08 84 00.10 Plastic Glazing
ff. 09 21 16 Shaft Walls
gg. 09 22 16 Non-Structural Metal Framing
hh. 09 24 00 Portland Cement Plastering
ii. 09 29 00 Gypsum Board
jj. 09 30 13 Ceramic Tiling
kk. 09 51 00 Acoustical Ceilings - Lay-In
ll. 09 53 23 Acoustical Suspension Systems
mm. 09 65 13 Resilient Base
nn. 09 65 15 Cove Caps, Reducers and Transitional Mouldings
oo. 09 65 19 Resilient Tile Flooring
pp. 09 68 13 Carpet Tile
qq. 10 11 23 Tackboards
rr. 10 14 00 Interior Signage
ss. 10 14 00 Exterior Signage
tt. 10 21 00 Toilet Compartments
uu. 10 21 23 Cubicle Curtains and Track Assembly
vv. 10 22 19 Demountable Partitions
ww. 10 22 26 Operable Partitions - Folding Panels
xx. 10 26 17 Wall Protection
yy. 10 28 00 Toilet and Bath Accessories
zz. 12 93 00 Site Furnishings
aaa. 32 13 13 Sitework Concrete
bbb. 32 31 13 Fences And Gates
ccc. 32 93 00 Landscape Planting

2. Refer to Appendix A - Special Environmental Requirements Product Submittal Form

J. SRI: Solar Reflectance Index. A measure of a materials ability to reject solar hear, as shown by a small temperature rise. Materials with the highest SRI values are the coolest choices for roofing.

K. Systems Furniture: Includes panel-based workstations comprising modular interconnecting panels, hang-on components, and drawer and filing components or a free-standing grouping of furniture items designed to work in concert. Lobby and conference room furnishings are excluded from this category.

L. Volatile Organic Compounds (VOC's): Carbon compounds emitted by materials that participate in atmospheric photochemical reactions. VOC's are common in building products and are emitted over time through offgassing. Sources of VOC's may include solvents in paints and other coatings; wood preservatives; strippers and household cleaners; adhesives in particleboard, fiberboard, and some plywoods; and foam insulation.

1.04 SUBMITTALS

A. General Requirements

1. Contractor shall designate a LEED Representative. LEED Representative shall be an individual responsible for implementation, coordination, and documentation of LEED Credit Requirements specified herein. LEED Representative shall be present at all LEED related meetings.
2. The Contractor shall keep at least one copy of the LEED NC 2009 Reference at the project site at all times. Copy can be obtained through www.usgbc.org website.
3. All LEED submittal information shall be in electronic format only unless requested otherwise, including digital photographs.

B. Submit the following information, including manufacturer's certifications and/or verifying information where Specifications sections require submittals relating to environmental issues. All of the following products are identified in their respective specification sections. Use the LEED Materials and Resources Reporting form and LEED VOC Reporting form attached in Appendix A of this Section, for all submittals below. Provide the submittal form, along with all supporting documentation.
   1. Recycled Content: Submit information regarding product pre-consumer and post-consumer recycled content.
      a. Identify the percentage by weight of virgin content, post-industrial recycled content, and post-consumer recycled content. Attach either a third-party certification or a letter signed by a corporate officer of the product manufacturer attesting to the recycled content.
      b. For recycled content values of assemblies (a product formulated from multiple materials or a product made up of subcomponents) submit percentage of postconsumer and pre-consumer recycled content, vales and weights for each of the component parts.
      c. Contractor is to submit recycled content and cost of cementious materials separate from the cost and recycled content of other concrete materials. Fly ash, slag, silica fume, rice hull ash and other SCMs (supplementary cementious materials) recycled from other operations are pre-consumer recycled-content cementious materials.
      d. Demonstrate that post-industrial and post-consumer recycled content of materials installed meet or exceeds that required by product specifications.
      e. For steel products, where specific recycled content information is not available, simply indicate percentages of the steel produced using Basic Oxygen Furnace and Electric Arc Furnace methods. Recycled content will be determined by industry averages for the corresponding production method.
   2. Regional Materials: Submit information regarding the site of manufacturing and extraction, harvesting, or recovering of materials.
      a. Indicate distances in miles from the job site to both the harvest location and the manufacturing location. Submit location names for both harvesting and manufacturing of materials.
      b. For assemblies or products manufactured within the 500-mile radius that contain some components extracted farther away, use multiple lines when listing purchases. Provide separate weight, cost, and distance between job site and point of extraction for each component part.
   3. Certified Wood: For all products designated in their respective sections as containing "FSC certified" wood content, quantify and provide evidence of compliance with FSC standards as follows.
      a. Identify the percentage by weight of FSC certified wood content.

b. Demonstrate that products are FSC certified by providing an FSC chain-of-custody number. This number is typically contained on vendor's invoices. A "vendor" is defined as the company that furnishes wood products to project contractors and/or sub-contractors for on-site installation.
c. Non-FSC certifications (such as Sustainable Forestry Initiative [SFI]) will not be accepted.

4. Indoor Air Quality (IAQ): Submit verification that the following products comply with respective IAQ requirements.
   a. Adhesives and Sealants used on the interior of the building (inside the weather proofing system and applied on site):
      1) All adhesives, sealants and sealant primers must conform to maximum VOC content limits set by South Coast Air Quality Management District (SCAQMD) Rule #1168. and conform to Bay Area Air Quality Management District Regulation 8, Rule 51.
      2) Aerosol Adhesives must comply with Green Seal Standard for Commercial Adhesives GS-36 requirements in effect on October 19, 2000.
      3) Attach MSDS sheet or attestation letter from the manufacturer for all adhesives and sealants used.
   b. Paints and Coatings used on the interior of the building (inside the weatherproofing system and applied on site):
      1) Architectural paints and coatings applied to interior walls and ceilings must not exceed the volatile organic compound (VOC) content limits set by Green Seal Standard GS-11, Paints, 1st Edition, May 20, 1993.
      2) Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates must not exceed the VOC content limit of 250 g/L (2 lb/gal) established in Green Seal Standard GC-03, Anti-Corrosive Paints, 2nd Edition, January 7, 1997.
      3) Clear wood finishes, floor coatings, stains, primers, sealers, and shellacs applied to interior elements must not exceed the VOC content limits established in South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings, rules in effect on January 1, 2004.
      4) Attach a copy of Green Seal certification, MSDS sheet, or attestation letter from the manufacturer for all opaque topcoat interior paints and coatings used.
   c. Flooring Systems: All flooring elements installed in the building interior must meet one of the two compliance options below. Contractor must attach a copy of certification or compliance data from the manufacturer for all flooring adhesives and sealants and flooring materials and finishes used. Contractor must identify the referenced standard of compliance used on the LEED VOC Reporting form.
      1) Option 1 – Carpet and Rug Institute, South Coast Air Quality Management District, and FloorScore referenced standards:
         a) Carpet: Meet the testing and product requirements of the Carpet and Rug Institute Green Label Plus program.
         b) Carpet cushion: Meet the requirements of the Carpet and Rug Institute Green Label program.
         c) Carpet adhesives: Meet VOC limit of 50 g/L.

d) Hard surface flooring (except tile, masonry, terrazzo, cut stone, and solid-wood flooring without coatings or sealants): Meet the testing and product requirements of FloorScore certification.

e) Floor finishes: Meet the requirements of South Coast Air Quality Management District (SCAWMD) Rule 1113, Architectural Coatings, rules in effect on January 1, 2004.

f) Tile setting adhesives and grout: Meet the South Coast Air Quality Management District (SCAQMD) Rule 1186. VOC limits correspond to an effective date of July 1, 2005 and a rule amendment date of January 7, 2005.

2) Option 2 – California Department of Health Services standard:

a) Meet the testing and product requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

d. Composite Wood and Agrifiber Products: Composite products and laminating adhesives must be free of added urea-formaldehyde resins. Attach MSDS sheet or attestation letter from the manufacturer for all composite wood and agrifiber products used.

PART 2 - PRODUCTS

2.01 NOT USED.

PART 3 - EXECUTION

3.01 NOT USED.

END OF SECTION

The General Contractor must return this form, along with required attachments, completed for each special environmental product as required by specific specification sections. Attach additional sheets if necessary. Check specific product requirements below as required by specification sections.

SHEET 1: LEED MATERIALS AND RESOURCES REPORTING

(provide cut sheets for the data below)

PROJECT NAME: _____ CONTRACTOR_____ SPEC SECTIO

CONTACT NAME: _____ TEL. NO: _____ SUBMITTAL

Product Name	Vendor or Manufacturer	Required for all products identified in Specs: CSI Divisions 3-10, 31.60 Foundations, 32.10 Paving, 32.30 Site Improvements, and 32.90 Planting. (MEP excluded)	(MRc4) Recycled Content [1] (% by weight)		(MRc5) Locat distances f manufacturin to project AND raw m harvesting to project site
		Total Material Cost (exclude labor & equipment)	% pre-consu mer	% post-cons umer	

					Harvest locatior Manufacture location
					Harvest location & di Manufacture location
					Harvest location & di Manufacture location
					Harvest location & di Manufacture location

1. (MRc4) Recycled Content: All percentages by weight. Attach attestation letter signed by a corporate officer of the product manufacturer or third party certification documentation.
2. (MRc5) Regional Materials: Attach an area map showing distance from site of extraction, harvesting or salvaging to job site. Provide invoices and any additional supporting documentation.

CONTRACTOR CERTIFICATION: I, _____ a duly authorized representative of_____ hereby certify that the material information contained herein is an accurate representation of the material qualifications to be provided by us, as components of the final building construction. Furthermore, I understand that any change in such qualifications during the purchasing period will require prior written approval from the Construction Manager, Architect and Owner.

SIGNATURE OF AUTHORIZED REPRESENTATIVE: _____
DATE: _____

The General Contractor must return this form, along with required attachments, completed for each special environmental product as required by specific specification sections. Attach additional sheets if necessary. Check specific product requirements below as required by specification sections.

SHEET 2: LEED VOC REPORTING

PROJECT NAME: _____ CONTRACTOR _____ SPEC SECTIO

CONTACT NAME: _____ TEL. NO: _____ SUBMITTAL

Product name and type	Vendor or Manufacturer	Type of Backup Documentation provided (e.g. MSDS, Product Data Sheet)	(IEQc4.1, 4.2, 4.3) Indoor field-applied adhesives, sealants, paints & coatings (including MEP work): [a, b, c]		
			Actual VOC content (g/L)	Corresponding LEED VOC limit (g/L)	C St G
1.					
2.					
3.					
4.					
5.					
6.					

Submit documentation (i.e. MSDS; Product Data Sheet, or attest letter from manufacturer) indicating VOC content in grams per liter, or other compliance methods as required for flooring systems, composite wood products and systems furniture and seating:

PART 4 - (IEQc4.1) Low Emitting Adhesives and Sealants: conform to maximum VOC limits set by South Coast Air Quality Management District Rule #1168. Aerosol adhesives must comply with Green Seal Standard for Commercial Adhesives GS-36 (effective 10/19/2000).

PART 5 - (IEQc4.2) Low Emitting Paints and Coatings: Architectural paints and coatings must conform to VOC limits set by Green Seal Standard GS-11. Anti-corrosive and anti-rust paints applied to ferrous metal substrates must not exceed VOC limit of 250 g/L. Clear wood finishes, floor coatings, stains, primers, sealers, and shellacs must not exceed VOC limits in SCAQMD Rule 111.

PART 6 - (IEQc4.3) Low Emitting Flooring Systems: Carpet systems (carpet, cushion) must conform to VOC limits set by the Carpet and Rug Institute Green Label Testing Program. Carpet adhesive VOC content must not exceed 50 g/L. Floor finishes must comply with SCAQMD Rule 113. Tile setting adhesives and grouts must comply with SCAQMD Rule 1168. Or comply with California Dept. of Health Services standard for any flooring type.

PART 7 - (IEQc4.4) Low Emitting Composite Wood and Agrifiber Products: products must be free of added urea-formaldehyde resins. Attach MSDS sheet or attestation letter from the manufacturer for all composite wood and agrifiber products used.

CONTRACTOR CERTIFICATION: I, _____ a duly authorized representative of _____ hereby certify that the material information contained herein is an accurate representation of the material qualifications to be provided by us, as components of the final building construction. Furthermore, I understand that any change in such qualifications during the purchasing period will require prior written approval from the Construction Manager, Architect and Owner.

SIGNATURE OF AUTHORIZED REPRESENTATIVE: _____

DATE: _____

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Reference Standards.

B. Quality Assurance and Control of Installation.

C. Field Samples.

D. Mock-up

E. Project Inspector and Inspections.

F. Permits and Fees.

G. Verified Reports.

H. Manufacturers' Field Services and Reports.

I. Laboratory Testing Services.

1.02 REFERENCE STANDARDS

A. Conform to reference standards by date of issue current on date of Contract Documents.

B. For products or workmanship specified by Association, Trade or Federal Standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.

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

D. Maintain copy of standards at jobsite during submittals, planning and progress of the specified Work until Certified Completion.

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

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

1.03 QUALITY ASSURANCE/CONTROL OF INSTALLATION

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

B. Comply fully with manufacturers' instructions including each step in sequence.

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

D. Perform Work by persons qualified to produce workmanship of specified quality.

E. Where experience minimums for workmen, applicators, companies or manufacturers are required in individual Sections, written certification and documentation substantiating such minimums shall be submitted and approved by the Architect, when requested.

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

G. Field Samples
1. Obtain field samples for review by Architect.

H. Mock-Up
1. Test will be performed under provisions identified in this Section.
2. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals and finishes.
3. Where mock-ups are specified in individual Sections, shall be removed after approval per this Section unless are to remain as part of the Work.

1.04 PROJECT INSPECTOR

A. An Inspector, herein referred to as the "Project Inspector", "Job Inspector", or "Inspector of Record" (IOR) will be employed by the Owner approved by the Architect, Structural Engineer, and the Division of State Architect (DSA) in accordance with 2016 California Code of Regulations, Title 24, Part 1, California Administrative Code, Section 4-333(b). The Inspector of Record's duties are described in CAC Section .

B. Class of Inspector required for this project in accordance with Title 24, Part I, Section 4-333.1:
1. Class 1 Inspector - all projects.
2. Class 2 Inspector - any project, except a project containing one or more new structures or additions with a primary lateral force resisting system of steel, masonry, or concrete.
3. Class 3 Inspector - projects containing alterations to approved buildings, site place of relocatable buildings and construction of minor structures.
4. Class 4 Inspector - projects containing site placement of relocatable buildings and associated site work.

C. The Work of construction in all stages of progress shall be subject to the personal continuous observation of the Project Inspector. He shall have free access to any or all part of the Work at any time. The Contractor shall furnish the Inspector reasonable facilities for obtaining such information as may be necessary to keep him fully informed respecting the progress and manner of the Work and the character of the materials. Inspection of the Work shall not relieve the Contractor from any obligation to fulfill this Contract.

1.05 PERMITS AND FEES

A. Where required by the provisions of individual sections of the Specifications, and where required to carry out construction operations, Contractor shall obtain and pay for permits and fees, including, but not limited to, Demolition, Grading, Disposals, requirements of Water, Gas, Sewer, Flood and Sanitary Districts, Municipal and County Building Departments having jurisdiction.
   1. Fees for final utility connections shall be paid by the Contractor and reimbursed to the Contractor by the Owner at direct cost.
   2. Building Permits or approvals issued by DSA requiring fees will be obtained and paid by the Owner.

1.06 VERIFIED REPORTS

A. Contractor shall comply with CAC Sections 4-336 and 4-343 and issue verified reports through the Architect as required.

1.07 MANUFACTURERS' FIELD SERVICES AND REPORTS

A. When specified in individual Specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment and as applicable and to initiate instructions when necessary.

B. Manufacturers' representatives shall report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

C. Submit report of observation to Architect for review.

1.08 CODES AND REGULATIONS

A. All work pertaining to and all materials supplied for executing and completing this Contract shall comply with provisions specified in the Contract Documents and with all applicable laws, regulations and ordinances governing Work including, but not necessarily limited to, those of:
   1. California Code of Regulations (CCR), Title 24, California Building Standards Code
      a. CAC - 2016 California Administrative Code, 24 CCR Part 1
      b. CBC - 2016 California Building Code, 24 CCR Part 2, Volumes 1 and 2 ('15 IBC w/CA Amendments)
      c. CEC - 2016 California Electrical Code, 24 CCR Part 3 ('11 NEC w/CA Amendments)
      d. CMC - 2016 California Mechanical Code, 24 CCR Part 4 ('12 UMC w/CA Amendments)
      e. CPC - 2016 California Plumbing Code, 24 CCR Part 5 ('12 UPC w/CA Amendments)
      f. 2016 California Energy Code, 24 CCR Part 6
      g. CFC - 2016 California Fire Code, 24 CCR Part 9 ('12 IFC w/CA Amendments)

h. CALGreen - 2016 California Green Building Standards Code, 24 CCR Part 11
i. CRSC - 2016 California Reference Standards Code, 24 CCR Part 12

2. California Code of Regulations (CCR), Title 19, Public Safety, Division 1, State Fire Marshal.
3. Addenda Compliance per CBC Section 4-338(b), Part 1.

B. Administrative Regulations, CCR Title 24, Part 1, California Administrative Code, Chapters 1, 4, 5 :
1. DSA not subject to Arbitration.
2. Copy of Part 1 and Part 2, Volume 1 and 2 (CBC), and Parts 3 through 5 of Title 24 CCR, shall be kept and made available at the construction site office during construction.

C. ADA – Americans with Disabilities Act of 1990, as amended
1. Standards – ADA Title III Regulations and the 2010 ADA Standards for Accessible Design.

D. Enforcement includes all other codes, regulations, or standards referenced in the above listed codes.

E. The preceding listed codes, regulations and ordinances of the regulatory agencies are hereby made a part of this Contract. Nothing in the Contract shall be construed as allowing any violation of any provision of any of above listed documents. Maintain copies of Codes listed above at the construction site.

F. Threaded Steel Anchor Bolts and Anchor Rods requirements: DSA Interpretation of Regulation IR 17-11 requirements for identification, sampling and testing of threaded steel anchor bolts and anchor rods used for anchor structural elements to foundations.
1. Anchor bolt and anchor rod materials identifications, sampling and testing shall be performed in accordance with IR 17-11 and the applicable standards. Anchor bolts and anchor rods not readily identifiable by physical markings, nor traceable by documentation accompanying the material's shipment, shall be treated according:
a. Sampled and tested to established conformity to the project documents.
b. Remove from the jobsite and replaced with identifiable material.
2. Copy of IR 17-11 may be obtained at: www.dgs.ca.gov/dsa/Resources/IRManual.aspx

G. The intent of these drawings and specifications is that the work of the alteration, rehabilitation or reconstruction is to be in accordance with Title 24, California Code of Regulations. Should any existing conditions such as deterioration or non-complying construction be discovered which is not covered by the contract documents wherein the finished work will not comply with Title 24, California Code of Regulations, a construction change document, or a separate set of plans and specifications, detailing and specifying the required work shall be submitted to and approved by DSA before proceeding with the work.

H. Should any existing conditions such as deterioration or noncomplying construction be discovered which is not covered by the DSA approved documents wherein the finished work will not comply with Title 24, California Code of Regulations, a construction change document, or a separate set of plans and specifications, detailing and specifying the required repair work shall be submitted to and approved by DSA before proceeding with the repair work.

1.09 VARIATIONS WITH LAWS

A. If Contractor, his subcontractors or suppliers, or any of their employees ascertain at any time that requirements of this Contract conflict with or are in violation of applicable laws, codes, regulations and ordinances he shall not proceed with Work in question, except at his own risk. Contractor shall be required to remove that Work from site and replace such Work with all complying Work at no additional cost to Owner.

1.10 SELECTION AND PAYMENT - TESTING LABORATORY AND SPECIAL INSPECTORS

A. Owner will employ and pay for services of independent Testing Laboratory and Special Inspectors approved by Architect and DSA to perform inspection and testing in accordance with Part 1, Title 24, Section 7-144 and 7-149, California Code of Regulations and this Section.

B. Offsite fabrication requiring Inspection and Testing: submit the qualifications of Inspectors and laboratory, including proposals for services, to the Owner and Architect for approval of qualifications and costs. Inspectors and laboratories shall conform to the requirements of Part 1 Title 24 Section 7-149.

C. Inspector of Record (IOR) / Testing Laboratory Travel Expenses
   1. Initial Testing. For initial testing required by this Manual, Owner shall pay IOR, Testing Laboratory or both, for travel expenses, including mileage, room and board, when travel for inspection and testing of products purchased by the Contractor exceeds 50 miles or 2 hours from the project site.
   2. Additional Testing. When initial testing fails, IOR and Testing Laboratory travel expenses, as described above, attributable to required retesting shall be borne by the Contractor and will be deducted by Change Order from funds due and payable, or that become due and payable to Contractor.
   3. IOR, Testing Laboratory or both, as applicable, shall forward billings and records of such expenses to the Owner.

D. When tests and inspections are required on an overtime basis, initial payment will be made by Owner. At termination of Work or completion of Project, all costs for overtime testing and inspections will be deducted from Contractor's final payment (or any funds due and payable) by Change Order.

E. Before the Testing Laboratory files testing and inspection billings with Owner, they shall be billed indicating segregated straight time from overtime costs. All overtime costs shall be substantiated with detailed explanation for necessity of such work costs.

F. When materials tested fail to meet requirements herein specified, they shall be promptly corrected or removed and replaced, re-inspected and retested in a manner required by the Architect. Costs involved in re-inspection and retesting will be paid by the Owner and deducted from Contractor's final payment (or any funds due and payable) by Change Order.

G. Employment of testing laboratory shall in no way relieve Contractor of obligation to perform work in accordance with requirements of Contract Documents.

1.11 LABORATORY RESPONSIBILITIES

A. Laboratory shall be licensed to conduct testing and inspection operations in California and shall be approved by DSA. It shall be supervised by a State Licensed Civil Engineer who shall certify and sign all reports.

B. Provide qualified personnel at site. Cooperate with Architect, Project Inspector and Contractor in performance of services.

C. Perform specified inspection, sampling and testing of products in accordance with standards specified herein.

D. Ascertain compliance of materials and mixes with requirements of Contract Documents.

E. Promptly notify Architect, Project Inspector and Contractor by letter of observed irregularities or non-conformance of Work or products.

F. Perform additional inspections and test required by Architect or governing agencies.

G. Immediately upon Testing Laboratory determination of a test failure, the laboratory shall telephone the results of test to Architect. On the same day, laboratory shall send written test results to those named on the distribution list below.

1.12 LABORATORY REPORTS

A. After each inspection and test, promptly submit one copy of laboratory report to the following:
   1. Owner
   2. Contractor
   3. Inspector of Record (IOR)
   4. Special Inspectors: Special Inspector's Verified Reports as required by Section 4-336 and shall be submitted in a timely manner.
   5. Architect
   6. Structural Engineer
   7. Mechanical and Electrical Engineers (Related Tests and Inspections).
   8. Division of the State Architect (DSA)

B. Include:
   1. Date issued.
   2. Project title, Architect's number, DSA Application and File number.
   3. Name of inspector.

4. Date and time of sampling and Specifications Section.
5. Identification of product and Specifications Section.
6. Location in the Project.
7. Type of inspection or tests.
8. Date of test and ambient conditions at time of test.
9. Results of tests.
10. Conformance with Contract Documents.
11. Signature by Registered Professional Engineer licensed in California.
12. Statement that tests were conducted in accordance with Parts 1 and 2, Title 24, California Code of Regulations.

C. Test reports shall include tests made, whether such tests indicate that the material performed satisfactorily or not. Samples taken but not tested shall be reported. Reports shall show that the materials were sampled and tested in accordance with the requirements of the approved Specifications. Reports shall show the specified design strength and shall state whether or not the materials tested comply with requirements. Report special sampling operations where required.

D. Submit a report verifying that tests and inspections herein specified and otherwise required have been completed and material and workmanship complies with the Contract Documents. Such verification reports shall be submitted at the completion of the Project and at any time the Project is suspended. Parties to receive such reports are the same as listed above.

E. When requested by Architect, provide interpretation of test results.

1.13 LIMITS ON TESTING LABORATORY AUTHORITY

A. Laboratory may not release, revoke, alter or enlarge on requirements of Contract Documents.

B. Laboratory may not approve or accept any portion of the Work.

C. Laboratory may not assume any duties of Contractor.

D. Laboratory has no authority to stop the Work.

E. Laboratory shall not interpret code in relation to the design of the building.

1.14 CONTRACTOR RESPONSIBILITIES

A. Administration of construction by Contractor per CAC Sections 4-330 and 4-343.

B. Deliver to laboratory at designated location, adequate samples of materials proposed to be used which require testing. Selection of materials required to be tested shall be by the Lab or Owner's Representative and not by the Contractor.

C. Cooperate with laboratory personnel, Owner's Representative, Project Inspector and the Architect, and provide access to the Work including weekends and after work hours and to manufacturer's facilities.

D. Provide incidental labor materials and facilities to provide at all times, safe access to Work to be tested, to obtain and handle samples at the site or at source of products to be tested, to facilitate tests and inspections, storage and curing of test samples.

E. Notify Architect, Project Inspector and laboratory 24 hours prior to expected time for operations requiring inspection and testing services. Contractor shall pay for costs incurred if testing or inspections are cancelled and are required to be rescheduled due to the Contractor's failure to notify the Project Inspector in advance as required. Also, notify Owner in advance of manufacturer of materials to allow testing at source of supply.

F. In accordance with CBC-17A, Section 1706A, Contractor shall execute and submit a Statement of Responsibility regarding special inspections and testing required for principal wind- and seismic-load bearing systems to the Inspector of Record and the Owner.

G. The Owner, Project Inspector, or the Architect shall have the right to reject materials and workmanship that are defective or to require their correction. Rejected workmanship shall be satisfactorily corrected and rejected materials shall be removed from the premises without cost to the Owner. If the Contractor fails to correct such rejected Work within a reasonable time, fixed by written notice, the Owner will correct same and charge the expense to the Contractor by Change Order.

H. Should it be considered necessary or advisable by the Owner at any time before date of completion of the entire Work to make an examination of Work already completed by removing or tearing out the same, the Contractor shall on request promptly furnish all necessary facilities, labor and materials. If such Work is found to be defective in any respect due to fault of the Contractor or his subcontractor, all extra expenses shall be charged to the Contractor by Change Order. If however such Work is found to meet the requirements of the Contract Documents, the additional cost of labor and materials involved in the examination and for replacement costs shall be allowed to the Contractor by Change Order.

I. When changes of construction schedule are necessary during construction, coordinate such changes with the Testing Laboratory as required.

J. When the Testing Laboratory is ready to test according to the established schedule, but is prevented from testing or taking specimens due to incompleteness of the Work, extra charges for testing attributable to the delay shall be charged to the Contractor by Change Order.

K. Inspecting and testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

L. Selection of materials to be tested shall be made by the Testing Laboratory or the Project Inspector and not by the Contractor.

M. Any material shipped by the contractor from the source of supply prior to having satisfactorily passed such testing and inspection or prior to the receipt of notice from said representative that such testing and inspection will not be required, shall not be incorporated in the Work.

1.15 SCHEDULE OF STRUCTURAL TESTS AND INSPECTIONS

A. Refer to Form DSA-103, Statement of Structural Tests and Inspections, attached hereto.

1.16 MOISTURE AND ALKALINITY, AND RELATIVE HUMIDITY TESTING

A. Field Testing of concrete slabs, moisture testing per ASTM F1869 -2009. The test area should be at the same temperature and humidity expected during normal use, minimum testing conditions shall be 75± 10 degrees F. and 50± 10% relative humidity. Maintain these conditions 48 hours prior to, and during testing.

B. Field Testing of concrete slabs, relative humidity per ASTM F2170.

C. Field Testing of concrete slabs, resilient flooring per ASTM F710.

D. Alkalinity testing: per ASTM F710, ranges shall not exceed those recommended by the flooring manufacturer.

1.17 EXPANSION BOLTS OR EPOXY-TYPE ANCHORS - APPROVED ANCHORS

A. Basis of Design Capacities: Design capacities for expansion type and epoxy (adhesive) type anchors should reflect the tested capacity of the anchors including the degree of scatter in the recorded peak loads and the load-displacement response, the type and mechanical properties of the concrete or masonry in which the anchor is installed, anchor edge distance and spacing, and whether the anchors are installed through metal decking into concrete fill. In addition, the potential for concrete cracking in the vicinity of the anchor during its service life and the effect of such cracking on the capacity of the anchor to resist loads shall be considered. The effects of temperature variations on epoxy (adhesive) type anchors shall also be taken into account where applicable. The age, composition and mechanical properties of the materials in which the anchor will be installed shall be evaluated.

B. The relevant mechanical properties include unit weight, compressive strength, and aggregate size and type. Evaluation of compressive strength on the basis of cores taken at or near the anchor locations shall be permitted. The compressive strength of the material in which the anchor will be installed shall meet or exceed the compressive strength of the material in which the anchor was tested.

C. Expansion-type anchors: Concrete
   1. Kwik Bolt TZ (KB-TZ) Concrete Anchor, 3/8 to 3/4 inch diameter, ICC ESR-1917, by Hilti Inc., Tulsa, OK.
   2. Simpson Strong-Bolt 2 concrete anchor, 1/2, 5/8, 3/4 and 1 inch diameter, ICC ESR-3037, by Simpson Strong-Tie, Pleasanton, CA ,
   3. Or equal with ICC Report Number.

D. Expansion-type anchors: Concrete filled CMU Masonry
   1. Kwik Bolt 3 (KB3) Masonry Anchors, 1/4 to 3/4 inch diameter, ICC ESR-1385, by Hilti.
   2. Wedge-All grout-filled CMU anchor, 3/8, 1/2, 5/8, and 3/4 inch diameter, ICC ESR-1396, by Simpson Strong-Tie.

3. Or equal with ICC Report Number.

E. Epoxy-Type Adhesive Anchors:
   1. For fully grouted CMU, lightweight concrete construction
      a. HIT HY-70 by Hilti, ICC ER-2682.
      b. Or equal with ICC Report Number.
   2. For Normal Weight concrete with min. compressive of 2500 psi or 4000 psi.
      a. HIT RE 500-SD Adhesive Anchor System by Hilti, ICC ESR-2322.
      b. SET-XP adhesive by Simpson Strong-Tie, ICC ESR-2508
      c. Or equal with ICC Report Number.

F. Expansion-type anchors. Expansive type anchors may be used, provided the allowable shear and tension loads are determined in accordance with following:
   1. CBC 1913A.7.2.
   2. The allowable values listed in an ICC-ES Evaluation Service Report, with special inspection, may be used for allowable stress design, provided the report states that the anchors were tested in accordance with AC 01, latest revision, including the seismic qualification tests of AC 01 Section 5.6. Strength design values may be used provided the anchors have been tested in accordance with AC193, latest revision, including the seismic qualification tests of ACI 355.2 Sections 9.6 and 9.7 and Annex 1 of AC-193.
   3. For anchors installed in the underside of a beam/slab, the allowable tension load design values should be based on the tabulated value of the anchors installed without special inspection (special inspection is still required), unless allowable load values for anchors installed in cracked concrete are provided in the ICC-ES Report, or the anchors have been tested in accordance with ACI 355.2, latest revision, Table 5.2 and Annex 1 of AC-193, or ACI-318-11 Appendix D. Shear values are based on the tabulated values in the ICC-ES Report. Once an ICC-ES Report complying with AC-193 has been issued, it shall take precedence over any previous report.
   4. If anchors have not been tested in accordance with the requirements for seismic qualification tests of AC 01, Section 5.6, the allowable load values listed in the ICC-ES Report may be used with the following modifications:
      a. Allowable shear and tension loads shall be limited to 80% of the tabulated allowable values for anchors installed with special inspection.
      b. For anchors installed in the underside of a beam/slab, the allowable tension load should be based on 80% of the tabulated allowable value for anchors installed without special inspection (special inspection is still required). Allowable shear values should be based on "a." above.
   5. Underside of Beam/Slab Installations: except as noted in Section, all expansion type anchors installed in the underside of a beam/slab should use the reduced allowable design load values determined in F.1 and F3.b above.
      a. The allowable design loads in F.1, F3.a above may be used for expansion-type anchors installed in the underside of a beam/slab, provided the installation meets one of the following criteria:
      b. The design engineer provides information that indicates the anchor installation will occur in the negative moment (-M) region of the beam/slab, considering unbalanced loading, or
      c. Data is submitted to indicate that specific anchor is suitable for use in cracked concrete (testing per ACI 355.2, Table 5.2, including Annex 1 of ACI 193), or

d. The anchor is installed in the high flute (rib) of the metal deck in a concrete on metal deck assembly, or
e. The anchor is installed with sufficient embedment that the load transfer zone is above the neutral axis of the beam/slab.
f. When installing expansion-type anchors through the low flutes of metal deck into concrete, the anchors should be placed as close to the center of the flute width as practicable. The deck shall be 20-gage minimum thickness per CBC Section 2210A.1.1.2 and the flute width shall meet or exceed the value set forth in the ICC-ES Report for the anchor. The minimum effective depth of embedment shall be as noted in the ICC-ES Report for the anchor.

G. Epoxy-type anchors. Epoxy-type (adhesive) anchors include anchors that rely on organic and inorganic compounds (including) epoxies, polyurethanes, methacrylates and vinyl esters) to develop the bond to the concrete.
1. The use of shallow epoxy-type (adhesive) anchors to resist direct tension loads where concrete cracking may occur is not permitted. Shallow epoxy-type (adhesive) anchors are those with an embedment to diameter ratio less than 8.
2. Epoxy-type (adhesive) anchors should only be installed in conditioned, interior spaces. Where epoxy type anchors are used as shear dowels at the perimeter of an existing opening (slab or wall) to be filled with concrete, or are being used to connect new concrete elements to existing concrete elements (e.g. gunite), they may be installed in exterior locations with prior approval by DSA.
3. If epoxy-type (adhesive) anchors are exposed to fire, all anchors in the affected area shall be inspected and evaluated by a qualified person to ensure their load carrying capability has not been compromised.
4. The design shear and tension capacities of epoxy-type anchors must be determined in accordance with the following:
   a. The allowable loads may be based on the values listed in an ICC ES Report that complies with requirements of AC 58 for a specific anchor in the same configuration as tested. Supporting data shall include the Seismic Qualification test performed in accordance with procedures of Section 5.3.7 of AC 58.
   b. Where epoxy-type (adhesive) anchors are used for structural applications, such as dowels between new and existing concrete the anchors shall be installed in a manner such as that the ultimate tensile capacity is controlled by the ultimate strength of the steel element.

H. When epoxy-type (adhesive) anchors are used to resist tensile forces in structural applications, the minimum depth of embedment shall be greater than or equal to the development length, ld, determined in ACI 318-11 for a cast-in-place reinforcing bar of the same diameter and grade when considering a tensile splitting failure mode. Where tensile splitting need not be considered, the depth of embedment, may be determined in accordance with Appendix D of ACI 318-11 as amended by Section 3.3 of AC 308.

I. Embedment, Spacing, and Edge Distance: All anchors shall meet the minimum embedment, spacing, edge distance, and slab thickness criteria established by the relevant ICC-ES Report.

1. Unless otherwise noted in the Report, the edge distance should be a minimum of ten (10) bolt diameters from the free edge of the slab and center-to-center spacing should be a minimum of twelve (12) bolt diameters. If the edge distance is less than ten (10) diameters, and the load is directed toward the free edge.

J. Holes shall be clean and free from dust immediately prior to installation of the anchor.

K. Installation of expansion anchors in Metal Deck:
1. When expansion anchors are installed into concrete supported by metal deck, the anchors shall be centered on the "low" flute of the decking where practicable. The deck should have a minimum thickness of 20 gauge, CBC Section 2210A.1.1.2 and the flute width shall meet or exceed the value set forth in the ICC-ES Report for the anchor.
2. When installed from the bottom, embedment shall be 1-1/2" above the top of the decking flute (except 1/4" diameter and 5/16" diameter anchors for ceilings). The effective depth of embedment should be considered to be 1/3 of the metal deck height plus the 1-1/2" noted above. There shall be a one inch minimum clearance distance from the top of concrete to end of bolt.
3. When installed from the top of the concrete, the depth of embedment shall be the depth of concrete above the top of the flute plus one third the flute height. A minimum one inch clear distance form the steel deck to the bottom of the anchor must be maintained.

1.18 TESTING AND INSPECTION REQUIREMENTS FOR EXPANSION AND EPOXY ANCHORS

A. Post-installed anchors shall be tested in accordance with the provisions of CBC Section 1913A.7 by an accepted testing facility or Special Inspector. If any anchor fails testing, test all anchors of the same type, not previously tested until twenty (20) consecutive anchors pass, then resume the initial test frequency. If the anchors are used for the support and bracing of non-structural components (pipe, duct or conduit), the twenty (20) shall be only those anchors installed by the same trade. Refer to 1.19G.8 on the Test Values Table (this Section) for acceptance/failure criteria.

B. Structural Applications: Tension test all expansion-type anchors. Expansion-type anchors shall not be used as hold-down bolts. When used for sill plate bolting application 10% of the anchors shall be tension tested.

C. Non-Structural Applications: Tension test 50% or alternate bolts including at least one-half the anchors in each group, shall be tension tested. in a group. Nonstructural may include such applications as equipment anchorage.

D. Tension testing shall be done in the presence of the project inspector and a report of the test results shall be submitted to Architect If any anchors fail the tension-testing requirements, the additional testing requirements shall be acceptable to Architect. The requirements shall also apply to bolts or anchors set in concrete with chemical (adhesives) if the long-term curability and stability of the chemical material and its resistance to loss of strength and chemical change at elevated temperatures are established to the satisfaction of the DSA.

E. Expansion Type Anchors Setting Verification:

1. Torque-Controlled Anchors: Following attainment of 10% of the required torque, torque-controlled anchors shall not require more than six (6) additional complete turns of the nut during installation to achieve the manufacturer's specified installation torque. The extent of bolt projection after installation shall be measured to confirm that this requirement has been meet.
2. Displacement-Controlled Anchors: The position of the plug in the anchor shell shall be checked with the manufacturer-supplied installation tool or other appropriate device. The position of the plug shall conform to the manufacturer's specifications.

F. Testing for Expansion-Type Anchors: The test load may be applied by any method that will effectively measure the tension in the anchor, such as direct pull with a hydraulic jack, calibrated spring loaded devices, or a calibrated torque wrench. Displacement-Controlled anchors such as drop-in shall not be tested using a torque wrench. Required test loads may be determined by either of the following methods:
1. Twice the allowance tension load as determined in Article 1.18., or;
2. Tension or torque test values from the table and procedures below.
3. Anchors tested with a hydraulic jack should exhibit no discernable movement during the tension test, e.g., as evidenced by loosening of the washer under the nut. Anchors tested with a calibrated torque wrench must attain the specified torque within 1/2 turn of the nut.

G. Test Values: Conform to the following table for either Hardrock or Lightweight Concrete and Masonry:
1. All anchor bolts of the expansion type installed in concrete shall be one of the following or equal:
   a. ITW Red Head-Wedge Anchor-ICC/ES ESR-2427
   b. Hilti, Inc. - Qwik Bolt TZ - Wedge Anchor-ICC/ES ESR-1917
   c. Simpson - Strong Bolt - Wedge Bolt - Wedge Anchor-ICC/ES ESR-3037

Minimum Test Values - Normal Weight or Lightweight Concrete

ANCHOR		WEDGE	
Dia(in)	Tension Load(lbs)	Torque(ft-lbs)	Embedment(in)
-	-	-	-
3/8	1105	25	2
1/2	2420	40	3-1/4
5/8	4015	60	4
3/4	4690	110	4-3/4

2. All anchor bolts of expansion type installed in grout filled masonry shall be one of the following or equal:
   a. Hilti, Inc - Kwik Bolt III-Wedge Anchor-ICC/ES NO.1385
   b. Simpson-Wedge All-Wedge Anchor-ICC/ES NO. 1396

Minimum Test Values - Grout Filled Concrete Masonry

ANCHOR		WEDGE	
Dia(in)	Tension Load(lbs)	Torque(ft-lbs)	Embedment(in)
1/4	432	4	2
3/8	626	15	2-1/2
1/2	724	25	3-1/2

5/8	1035	65	4
3/4	1368	120	4-3/8

3. Anchor diameter refers to the thread size for the WEDGE ANCHORS.
4. Reaction loads from test fixtures may be applied close to the anchor being tested, provided the anchor is not restrained from withdrawing by the fixture(s).
5. Test equipment (including torque wrenches) shall be calibrated by an approved testing laboratory in accordance with standard recognized procedures.
6. The following criteria apply for the acceptance of installed anchors:
   a. Hydraulic Ram Method: The anchor shall have no observable movement at the applicable test load. For wedge and sleeve anchors, a practical way to determine observable movement is that the washer under the nut becomes loose
   b. Torque Wrench Method: The applicable test torque must be reached within the following limit for wedge type:
      1) Wedge or Sleeve type: One-half (1/2) turn of the nut.
      2) One-quarter (1/4) turn of the nut for the 3/8 inch sleeve anchor only.
7. Testing shall occur within 24 hours after installation.
8. If the manufacturer's recommendation installation torque is less than the test torque listed in the table above, the manufacturer's installation torque shall be used in lieu of the tabulated values.

1.19 EPOXY-TYPE (ADHESIVE) ANCHORS AND SCREW-TYPE ANCHORS

A. Epoxy-type (adhesive) anchors shall be tension tested per Section 1913A.7 . The tension test load shall equal twice the allowable load for the specific location of the anchor to be tested (i.e., accounting for edge distance) or 80% of the yield strength of the bolt (0.8AbFy), whichever is less. The test procedures for expansion-type anchors in the attached table shall also be used for epoxy-type (adhesive) anchors. Torque testing of epoxy-type (adhesive) anchors is not permitted.

B. Where epoxy-type (adhesive) anchors are used as shear dowels across cold joints in slabs on grade and the slab is not part of the structural system, testing of those dowels is not required.

C. Anchors shall exhibit no discernible movement during the tension test.

D. Screw Anchors: The fastener is produced from hardened steel with threads, similar in appearance to a lag bolt. Screw anchors may be used, provided the allowable shear and tension loads are determined in accordance with ACI 318 Appendix D.
   1. Welding to these anchors is not permitted.
   2. Screw anchors may be used to attach components, such as equipment, mechanical vibration isolators or snubbers, to structural (reinforced) concrete, or for sill bolting applications. All screw anchors installed through a wood sill plate requires a plate washer in conformance with Section 2308.6.
   3. The use of screw anchors is not permitted in overhead applications or for discrete hold down forces, such as shear walls.
   4. Masonry Anchors: 1/4" diameter, Tapcon with Advance Threadform Technology, heat-treated steel, by Illinois Tool Works/Buildex, ICC-ESR-1671. Slotted Hex Washer Head.

E. Screw-type anchors shall be torque tested in accordance with the testing procedures in Test Values Table and procedures herein.

F. Screw-type anchors: Simpson Strong-Tie Titen-HD concrete anchor, 3/8, 1/2 and 3/4 inch diameter, ICC ESR-2713, by Simpson Strong-Tie, Pleasanton, CA or equal with ICC report number.

G. Screw-type anchors: Simpson Strong-Tie Titen-HD grout-filled CMU anchor, 3/8, 1/2, 5/8, and 3/4 inch diameter, ICC ESR-1056, by Simpson Strong-Tie, Pleasanton, CA or equal with ICC report number.

1.20 POWDER ACTUATED FASTENERS

A. Powder-Actuated Fasteners: Powder-actuated fasteners (shot pins) are not addressed by Chapter 1908A1.1 of CBC. Powder-actuated fasteners may be used for limited application provided the allowable shear and tension loads are determined in accordance with the following:
   1. The allowable values listed in an ICC ES Evaluation Services Report, with special inspection, may be used for allowable stress design, provided the report states that the anchors were tested in accordance with AC 70, latest revision. Powder-actuated fasteners may be used for hanging metal suspension systems for lay-in panel ceilings and for the attachment of metal track in conjunction with non-bearing partitions. The use of powder-actuated fasteners for other applications shall be subject to review and approval of DSA.

B. Powder actuated fasteners (Shot Pins): Installer shall utilize tools recommended by the manufacture in compliance with the ICC code reports. Pins shall have a minimum diameter of 0.145 inch and be installed to conform to the load requirements of this Section and:
   1. Tables 1 (driven into steel), 2 (driven into concrete), and 4 (driven into Structural. lightweight concrete) of ICC ESR-1663, Hilti or
   2. Table 1 or 3 (driven into concrete), 2 (driven into steel), 5 (driven into structural lightweight concrete), and 6 (driven in hollow concrete masonry units) of ICC ESR-2138, Simpson Strong-Tie powder-actuated fasteners or
   3. Table 1 and 2 (driven into concrete), 3 (driven into structural lightweight concrete), 4 (driven into hollow concrete masonry units), 5 (driven into steel) of ICC ESR-2811, Simpson Strong-Tie gas-actuated fasteners or equal with ICC report.

C. Allowable Loads: Limited to 90 lbs. maximum or 80% of ICC approved values whichever is less. Testing required.

D. Use of Powder actuated fasteners for tension loads is limited to support of minor loads such as suspended acoustical ceilings, ductwork and conduit. Permissible Loads for Ceiling Clip Assembly:
   1. Normal-Weight Concrete: Ceiling Clip Assembly Hilti X-CW, minimum 0.138" diameter, minimum penetration 1-1/8". Allowable Loads: 210 lbs. tension listed in ICC Report: ICC ESR 2184: 4000 psi Concrete Compressive Strength.
      a. Type X-CW X-C 32 KWIK, by Hilti, Inc., Tulsa, OK, or equal.

2. Lightweight Concrete: Ceiling Clip Assembly, minimum 0.138" diameter, minimum penetration 1-1/8". Required Allowable Loads: 150 lbs tension values listed in ICC ESR 2184: 3000 psi Concrete Compressive Strength.
   a. Type X-CW C-C 32, by Hilti, Inc., Tulsa, OK, or equal.
3. Use manufacture's drill bits and recommended tools.

E. Permissible Loads for Sills. Light gage steel and Interior Wood Plate Anchorages:
1. Low Velocity Power-Driven Fasteners: normal-weight concrete: Hilti DS and X-CR (stainless steel for exterior applications), 0.177", 0.145 for X-CR, shank diameter with washers, ICC-ESR Report ER-1663, Table 2. Exterior or Perimeter Sill and Interior Plate Anchorages.
2. Low Velocity Power-Driven Fasteners: normal-weight concrete: Simpson PDPWL-300, 3 inches long, 0.300 inch head diameter and 0.145 inch shank diameter with washer, ICC ESR-2138, Table 1 or 4. Exterior or Perimeter Sill and Interior Plate Anchorages.

1.21 REQUIRED TESTING FOR POWDER ACTUATED FASTENERS

A. Testing: Operator, tool and fastener shall be pre-qualified by the Project Inspector.
1. Tools shall conform to ANSI A10.3 safety requirements for Powder Actuated Fastening Systems and to all OSHA requirements.
2. Manufacturer's representative shall provide safety training for all installation personnel and provide powder actuated tool operator certification in accordance with OSHA requirements.

B. The Project Inspector shall observe the testing of the first 10 fastener installations.

C. A test pullout load of not less than twice the design load or 200 lbs., whichever is greater, shall be applied to the fastener in such a manner as not to resist the spalling tendency of concrete in which the fastener is imbedded. Thereafter, random tests under the Project Inspector's supervision shall be made of approximately 1 in 10 fasteners.

D. Should failure occur on any fastener tested, all installations shall be tested until twenty consecutive fasteners pass, then resume the initial testing frequency.

1.22 INSTALLATION

A. When installing drilled-in anchors or powder driven pins in reinforced concrete, use care and caution to avoid cutting or damaging reinforcing bars. When required by the Architect, locate the reinforcing by using a non-destructive method prior to installation. Exercise extreme care and caution to avoid cutting or damaging reinforcing during installation. Maintain a minimum clearance of one inch between the reinforcing and the anchor and/or pin.

PART 2 - PRODUCTS

2.01 NOT USED.

PART 3 - EXECUTION

3.01 ATTACHMENTS

A. Form DSA-103, Statement of Structural Tests and Inspections.

END OF SECTION

DSA DIVISION OF THE STATE ARCHITECT
DEPARTMENT OF GENERAL SERVICES

DSA-103 rev 12/20/13

Statement of Structural Tests & Special Inspections - 2013 CBC

INCREMENT # | DSA File No.: | Application No.: | Date Submitted: | Revised: | Revised:

School Name		District	

IMPORTANT: This form is only a summary list of structural tests and special inspections required for the project. The actual tests and inspections must be performed as detailed on the DSA approved documents. The project inspector is responsible for providing inspection of all facets of construction, including but not limited to, special inspections not listed on this form such as structural wood framing, high-load wood diaphragms, cold-formed steel framing, anchorage of non-structural components, etc., per Title 24, Part 2, Chapter 17A.
NOTE: This form is also available for projects submitted for review under the 2007 and 2010 CBC.

INSTRUCTIONS: Click a plus sign (+) before any category or subcategory to reveal additional tests and special inspections. An "X" before a listed test or inspection indicates it is a mandatory requirement. A shaded box indicates a test or special inspection that may be required, depending on the scope of the construction and other issues. A shaded box can be clicked indicating your selection of that test. **Note:** A minus (-) on a category or subcategory heading indicates that it can be collapsed. However, any selections you may have made will be cleared. Click on the "COMPILE" button to show only the tests finally selected. **For more information on use of this form, see DSA-103.INSTR.**

Note: References are to the 2013 edition of the California Building Code (CBC) unless otherwise noted.

REQUIRED	TEST OR SPECIAL INSPECTION	TYPE [1]	PERFORMED BY [2]	CODE REFERENCE AND NOTES
-	**SOILS**			
	1. GENERAL:	Table 1705A.6		
X	a. Verify that: • site has been prepared properly prior to placement of controlled fill and/or excavations for foundations, • foundation excavations are extended to proper depth and have reached proper material, and • materials below footings are adequate to achieve the design bearing capacity.	Periodic	GE*	* By geotechnical engineer or his or her qualified representative.
+	2. COMPACTED FILLS:	Table 1705A.6		
+	3. DRIVEN DEEP FOUNDATIONS (PILES):	Table 1705A.7		
+	4. CAST-IN-PLACE DEEP FOUNDATIONS (PIERS):	Table 1705A.7		
+	5. RETAINING WALLS:			
+	6. OTHER SOILS:			
-	**CONCRETE**	Table 1705A.3		
+	7. CAST IN PLACE CONCRETE			
+	8. PRESTRESSED CONCRETE (in addition to Cast in Place Concrete tests and inspections):			
+	9. PRECAST CONCRETE (in addition to Cast in Place Concrete tests and inspections):			
+	10. SHOTCRETE (in addition to Cast in Place Concrete tests and inspections):			
+	11. POST-INSTALLED ANCHORS:			
+	12. OTHER CONCRETE:			
-	**MASONRY**	TMS 402-11/ACI 530-11/ASCE 5-11 Table 1.19.3		
+	13. STRUCTURAL MASONRY:	Enter f'_m		
+	14. VENEER OR GLASS BLOCK PARTITIONS:	Table 1705A.4.1		
+	15. POST-INSTALLED ANCHORS IN MASONRY:			
+	16. OTHER MASONRY:			
-	**STEEL**	Table 1705A.2.1		
+	17. STRUCTURAL STEEL AND COLD-FORMED STEEL USED FOR STRUCTURAL PURPOSES			
+	18. HIGH STRENGTH BOLTS:			
+	19. WELDING:			DSA IR 17-3, AWS D1.1 and AWS D1.8 (AWS D1.3 for cold formed steel).
+	20. NONDESTRUCTIVE TESTING:			
+	21. STEEL JOISTS AND TRUSSES:			
+	22. SPRAY APPLIED FIRE-PROOFING:			
+	23. OTHER STEEL:			
-	**WOOD**			
+	24. PREFABRICATED WOOD STRUCTURAL ELEMENTS:			Section 1705A.5
+	25. OTHER WOOD:			
-	**OTHER**			
	26. SKYLIGHT LOAD TEST	Test	Lab	**1709A.2** and **1709A.3**. Testing is not required for: 1) a skylight with a valid evaluation service report per DSA IR A-5, or 2) a skylight that can be justified by structural calculation.
	27			

+ In the CODE REFERENCE AND NOTES column, it indicates DSA-SS/CC sections that may be used by community colleges, per 2013 CBC Sec. 1.9.2.2.

DSA DIVISION OF THE STATE ARCHITECT
DEPARTMENT OF GENERAL SERVICES

DSA-103 rev 12/20/13

Statement of Structural Tests & Special Inspections - 2013 CBC

INCREMENT # | DSA File No.: | Application No.: | Date Submitted: | Revised: | Revised:

	28			
	29			

KEY to Columns

1 Type -	2 Performed By -
Continuous – Indicates that a continuous special inspection is required	**GE** – Indicates that the special inspection is to be performed by a registered geotechnical engineer or his or her authorized representative
Periodic – Indicates that a periodic special inspection is required	**Lab** – Indicates that the test or inspection is to be performed by a testing laboratory accepted in the DSA laboratory Evaluation and Acceptance (LEA) Program. See section 4-335, 2013 CCR Title 24, Part 1.
Test – Indicates that a test is required	**PI** – Indicates that the special inspection is to be performed by the project inspector
	SI – Indicates that the special inspection is to be performed by a special inspector

COMPILE PRINT

Name of Architect or Engineer in general responsible charge

Name of Structural Engineer (When structural design has been delegated)

Signature of Architect or Structural Engineer date

IDENTIFICATION STAMP
DIV OF THE STATE ARCHITECT
APP. #_____

AC N/A F/LS N/A SS_____

DATE_____

+ In the CODE REFERENCE AND NOTES column, it indicates DSA-SS/CC sections that may be used by community colleges, per 2013 CBC Sec. 1.9.2.2.

SECTION 01 43 40

OFF SITE MOCK-UP ASSEMBLY

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Section includes requirements for full-size, physical assemblies that are constructed off-site.
   1. Full scale performance mock-up.
   2. Full scale visual mock-ups.
   3. The actual finish and color of products and systems are to be representative of the complete exterior façade.
   4. Construct a full scale mock-up for the purpose of testing for structural performance, water penetration and air infiltration as hereinafter specified. Visual approval will be based on finish match and uniformity, flatness, construction, joints and seals.
   5. Actual products installed by the Contract subcontractors of the Work. Each trade shall have required trade person(s) on project to complete mock-up.
   6. Testing of mock-up construction. Full-size, physical assemblies that are constructed at off-site Test Laboratory facility to verify performance characteristics. Minimum 2 stories high, 3 modular bays across.

1.02 DESCRIPTION

A. Definition: Mock-up: Physical assemblies that are constructed off-site Test Laboratory Mock-up is used to verify selections made under sample submittals, to demonstrate aesthetic effects, performance, and where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples.
   1. Mock-up assembly will become the footprint from which to construct actual and exact replica of exterior facade complete with glazed aluminum window system(s), glass and glazing, composite metal panel, and related exterior finishes.

B. Related Sections: Constructed at a testing facility used for preconstruction testing to verify performance characteristics, the following construction mock-up shall include:
   1. Section 07 21 00, Insulation
   2. Section 07 42 43, Composite Metal Panels
   3. Section 07 54 19, PVC Membrane Roofing System
   4. Section 07 62 00, Sheet Metal Flashing and Trim
   5. Section 07 92 00, Joint Sealants
   6. Section 08 44 14, Glazed Aluminum Curtain Wall
   7. Section 08 80 00, Glazing
   8. Section 09 24 00, Portland Cement Plaster
   9. Section 09 29 00, Gypsum Board
   10. Section 09 90 00, Painting

1.03 SUBMITTAL

A. Product Data: Include construction details, material descriptions, profiles of components to be incorporated in the exterior envelope assembly.

B. Shop Drawings
   1. Include plans, elevations, sections, details, and attachments to other work.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. List of Materials Used in Constructing Mock-ups: List generic product names together with manufacturers, manufacturers' product names, model numbers, source of supply, and other information as required to identify materials used.
   1. Submittal is for information only. Neither receipt of list nor approval of mock-up constitutes approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.

1.04 QUALITY ASSURANCE

A. Build mock-up assembly using required materials, and components, necessary for complete operational system in the actual exterior façade finishes.
   1. Build mock-up in location and of size indicated or as designated by Architect.
   2. Notify Architect seven days in advance of dates and times when mock-up will be constructed.
   3. Demonstrate the proposed range of aesthetic effects and workmanship.
   4. Obtain Architect's approval of mock-up before starting work, fabrication, or construction.
      a. Allow seven days for initial review and each re-review of revisions and changes to the mock-up.
      b. Architect's review of partial mock-ups, if requested by the Contractor or Owner, shall not be considered approval for any incomplete or not installed work. Review shall be considered applicable only for completed work as requested for review and not for adjacent work not included in Contractor's request.
   5. Maintain field mock-ups during construction in an undisturbed condition as standard for judging the completed Work.

B. Curtain Wall Mock-Up: Erect a segment of the proposed curtain wall on the site for the Architect's review and for testing.
   1. Locate Mock-up as directed.
   2. Mock-up shall be a full size curtain wall assembly at least 2 mullion spacings wide, and 1-1/2 stories high with one composite metal panel course and wall cap. Use materials identical to those proposed. The Mock-up shall be complete with spandrel and vision glass units, floor anchor system, and vertical control joint. Erect this mock-up in conjunction with construction of the masonry mock-up specified in Section 04 20 00; the two construction shall meet to form a vertical joint at least 8-feet high typical of the condition at Grid intersection.
   3. Do not fabricate the mock-up until mock-up Shop Drawings are reviewed and accepted.

4. Obtain materials and installation services for coordinate work specified in other Sections, including at least the following.
   a. Sealants, Section 07 92 00.
   b. Firestopping, Section 07 84 00.
   c. Glass and Glazing, Section 08 80 00.
5. Test the curtain wall mock-up for the specified Performance Requirements.
6. Test the perimeter sealant for compatibility and adhesion.
   a. Conduct peel-out tests on sealants.
7. Correct areas, modify construction details, or adjust components as directed by Architect or the testing laboratory to meet the specified requirements.
8. Document methods and materials used to obtain approvals; maintain at least one copy of this documentation in a readily accessible location at the Site while this work is in progress.
9. Protect the accepted Mock-up from damage and maintain access to the Mock-up while the related work is in progress.
10. Remove Mock-up as soon as the progress of the work permits, obtain the Architect's approval.
11. Finish or restore grounds, occupied by the Mock-up, to the indicated condition.]

PART 2 - PRODUCTS

2.01 CONSOLIDATED VISUAL FIELD OFF-SITE TEST LABORATORY MOCK-UPS

A. The consolidated field Test Laboratory mock-up consist of the entire exterior wall and window assembly including all, flashing, reveals and joint sealants. Area of exterior wall to be constructed is indicated on the exterior mock-up drawing and related details, but shall not be incorporated into the work.

B. Before installing portions of the Work requiring a mock-up, build the consolidated field Test Laboratory mock-up with each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
   1. Build consolidated mock-up in field off-site location where visual review is possible and required testing can be conducted.
   2. Notify Architect, Owner and Project Manager seven (7) days in advance of dates and times when mock-ups will be constructed.
   3. Field Mock-up are to be freestanding and self-supporting.
   4. After visual mock-ups have been approved at the off-site location:
      a.
      b. Take photographs in presence of the Owner's Inspector, Owner's Representative, and Architect from different angles, take close-up shots of details as directed by Architect to use as standard for judging of completed Work. Submit photographs to Architect.

PART 3 - EXECUTION

3.01 LABORATORY TESTING

A. Curtain Wall Mock-Up Testing
   1. Testing Laboratory: an Independent Testing Laboratory certified by Architectural Aluminum Manufacturers Association, selected by the manufacturer/fabricator and acceptable to the Owner.

2. Conduct tests according to AAMA 501, except as specified herein.
3. Sequence of Testing
   a. Conduct ASTM E283 air infiltration test at 6.24 PSF. Verify air leakage at each glazed panel of the assembly.
   b. Conduct ASTM E331 static pressure water penetration test with pressure at the design value.
   c. Conduct ASTM E330 structural performance tests, each for a period of 10 seconds, with static air pressure difference as follows.
      1) +50% of Design Load (Inward) to remove slack.
      2) +50% of Design Load (Inward).
      3) -50% of Design Load (Outward).
      4) -50% of Design Load to remove slack (Outward).
4. Witnessing the Testing. Provide notice and coordinate schedules to permit representatives from the Architect and Owner to be present during mock-up testing.
5. Test Reports. Submit certified copies of test results indicating procedures, results and any modifications needed to meet the specified criteria. Report shall comply with AAMA requirements.
6. Deficiencies: Correct deficiencies in mock-up observed during testing or indicated through test result analysis. Repeat tests as necessary to show compliance with the specified structural, differential movement, thermal, air infiltration and water penetration resistance Performance Requirements. Repair or replace mock-up members damaged during testing.
   a. Correct areas, modify method of installation, or adjust system as directed by Architect or testing laboratory to comply with requirements specified herein.
   b. Incorporate modifications and findings into Shop Drawings.
   c. Incorporate corrective measures necessary into final wall assembly to achieve specified performance.
7. Acceptance. Do not proceed with production of curtain wall materials until receipt of the final Laboratory Testing Report.

3.02 FIELD OFF-SITE TESTING

A. Complete assembly testing: Maximum allowable air infiltration and water penetration requirements shall apply to the complete mock-up assembly including the joining and connection interfaces of all materials and systems

B. Testing Agency: The Contractor shall engage and pay for a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

C. Field Testing Services: Testing and inspecting of representative areas to determine compliance of installed systems with specified requirements.
   1. Structural-Sealant Compatibility and Adhesion: Structural sealant shall be tested according to recommendations in ASTM C 1401.
      a. Destructive test method, Method A, Hand Pull Tab (Destructive) in ASTM C 1401, Appendix X2 shall be used.
         1) Structural-Sealant Glazing Inspection: After installation of glass wall systems are complete, structural-sealant glazing shall be inspected and evaluated according to ASTM C 1401 recommendations.

2. Air Infiltration: Areas shall be tested for air leakage of 0.09 cfm/sq. ft., of fixed wall area when tested according to ASTM E 783 at a minimum static-air-pressure differential of 6.24 lbf/sq. ft..
3. Water Penetration: Areas shall be tested according to ASTM E 1105 at minimum uniform static-air-pressure difference of 6.24 lbf/sq. ft.] and shall not evidence water penetration.

D. Water Spray Test shall be tested according to AAMA 501.2 and shall not evidence water penetration.

3.03 RETESTING

A. When retesting is required, additional inspections and testing shall be performed promptly by Contractor as directed by Architect, at no change in Contract Time and Contract Sum. Reasonable expenses incurred by Owner, including costs of Inspector of Record (IOR) and Testing Laboratory, as result of repeating tests, will be deducted by Owner from monies due Contractor, in accordance with provisions of the General Conditions of the Contract.
1. Inspecting and testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

END OF SECTION

SECTION 01 45 23

TESTING AND INSPECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. This Section includes CONTRACTOR's responsibilities with regard to mandatory testing and inspection services:
   1. Testing and inspection services to meet requirements of the California Code of Regulations (CCR), Title 24, California Building Code (CBC).
   2. Tests of materials required by the DISTRICT's DSA certified testing agency as set forth in Section 4-335 of the California Building Standards Administrative Code.
   3. Inspection by DSA certified inspectors, employed by the DISTRICT in accordance with the requirements of California Building Standards Administrative Code, assigned to the Work with duties specifically defined in Section 4-333(b).

1.02 TESTING AGENCY

A. DISTRICT will select an independent testing agency approved by the California Division of the State Architect to conduct tests, sampling, and testing of materials.

B. Selection of material to be tested shall be by the agency or the INSPECTOR OF RECORD (IOR) and not by CONTRACTOR.

C. 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 that such testing and inspection is not required shall not be incorporated into the Work.

D. DISTRICT 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 portions of the Contract Documents.

E. 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 testing agency shall not perform any duties of CONTRACTOR. The agency does not have authority to stop the Work.

1.03 TEST REPORTING

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. Test reports shall indicate specified design strength. They shall also definitely state whether or not material or materials tested comply with the specified requirements. When requested by DISTRICT or Architect, provide interpretation of test results.

B. After each inspection and test, testing agency will promptly submit one (1) copy of laboratory report to the following distribution list:
   1. Division of State Architect
   2. District.
   3. Project Inspector.
   4. Architect.
   5. Structural Engineer.
   6. Mechanical and Electrical Engineers (Related Tests and Inspections).
   7. Contractor

C. Each test report will include:
   1. Date issued.
   2. Project title, Architect's number, DSA application and file number.
   3. Name of agency's inspector.
   4. Date and time of sampling or inspection.
   5. Identification of product and Specifications Section.
   6. Location in the Project.
   7. Type of inspection or test.
   8. Date of test and ambient conditions at time of test.
   9. Results of tests.
   10. Statement of Conformance with Contract Documents.
   11. Signature by Registered Professional Engineer licensed in California.
   12. Statement that tests were conducted in accordance with Parts 1 and 2, Title 24, California Code of Regulations.

D. Immediately upon testing agency determination of a test failure, the agency will telephone the results of the test to the ARCHITECT. On the same day, the agency will send written test results to those on the distribution list.

1.04 TEST AND INSPECTION VERIFICATION REPORT

A. Testing agency shall submit to the Division of the State Architect a verified report in duplicate, with copy to the DISTRICT, covering each test which is 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 also prior to Final Completion of the Work, covering all tests.

1.05 INSPECTION BY DISTRICT

A. DISTRICT 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. DISTRICT 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 DISTRICT. 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, DISTRICT may correct such defective Work and proceed to recover costs in accordance with related Articles of the Contract Documents.

1.06 INSPECTOR OF RECORD

A. INSPECTOR OF RECORD (IOR) is employed by DISTRICT 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.

1.07 CONTRACTOR RESPONSIBILITIES

A. Deliver to testing agency, at designated location, adequate samples of materials proposed to be used which require testing.

B. Cooperate with testing agency personnel, DISTRICT's Representative, INSPECTOR OF RECORD (IOR), CONSTRUCTION MANAGER and the ARCHITECT, to provide access to the Work including weekends and after work hours and to manufacturer's facilities.

C. Provide incidental labor, materials and facilities to provide, at all times, safe access to Work to be tested, to obtain and handle samples at the site or at source of products to be tested, to facilitate tests and inspections, storage and curing of test samples.

D. Notify CONSTRUCTION MANAGER, IOR and testing agency 24 hours in advance of required inspections or sampling, and 48 hours in advance of special testing or inspections. Notify DISTRICT in advance of the manufacturer or fabrication of materials in time to plan and schedule required testing at the source of supply. Extra expenses resulting from a failure to notify the agency shall be borne by the CONTRACTOR. Whenever extra expenses are indicated to be borne by the CONTRACTOR, they will be charged to the CONTRACTOR by Change Order.

E. The DISTRICT, IOR, CONSTRUCTION MANAGER or the ARCHITECT shall have the right to reject materials and workmanship which are defective or to require their correction. Rejected workmanship shall be satisfactorily corrected and rejected materials shall be removed from the premises without cost to the DISTRICT. Extra expenses for retesting and re-inspection shall be borne by the CONTRACTOR. If the CONTRACTOR fails to correct such rejected work within a reasonable time, fixed by written notice, the DISTRICT will correct same and charge the expense to the CONTRACTOR by Change Order.

F. Should it be considered necessary or advisable by the DISTRICT at any time before date of substantial completion of the entire work to make an examination of work already completed by removing or tearing out the same, the CONTRACTOR shall on request promptly furnish all necessary facilities, labor and materials. If such work is found to be defective in any respect due to fault of the CONTRACTOR or his subcontractor, all extra expenses shall be borne by the CONTRACTOR. If, however, such work is found to meet the requirements of the Contract, the additional cost of labor and material necessarily involved in the examination and replacement costs shall be allowed the CONTRACTOR by Change Order.

G. When changes of construction progress schedule are necessary during construction, coordinate such changes with the testing agency as required.

H. When the testing agency is ready to test according to the established schedule, but is prevented from testing or taking specimens due to incompleteness of the Work, extra charges for testing attributable to the delay shall be borne by the CONTRACTOR.

I. CONTRACTOR shall provide an insulated curing box with the capacity for twenty (20) concrete cylinders and will relocate said box and cylinders as rapidly as required in order to provide for progress of the Work.

J. CONTRACTOR is responsible for compliance to all applicable local, state, and federal regulations regarding codes, regulations, ordinances, restrictions, and requirements, regardless of the provisions of this Section.

K. Inspecting and testing performed exclusively for the CONTRACTOR's convenience shall be the sole responsibility and expense of the CONTRACTOR.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 TESTS AND INSPECTIONS

A. Refer to Form DSA-103 "Statement of Structural Test & Special Inspections - 2016 CBC requirement attached at the end of this Section.

3.02 EARTHWORK

A. The DISTRICT's testing agency, under the direction of the Geotechnical Engineer of Record, will provide continuous inspection of fill and will field test fill and earth backfill as placed and compacted, and inspect excavations and subgrade before concrete is placed and provide periodic inspection of open excavations, embankments, and other cuts or vertical surfaces of earth. Geotechnical Engineer will sign all reports of observation and testing.

B. Unsatisfactory materials shall be removed from the site. Materials installed improperly shall be removed, replaced, moisture adjusted, re-compacted and otherwise re-worked to achieve a satisfactory installation.

C. Imported fill materials from offsite or onsite shall be inspected and tested at the source before importing and placing, and a report issue attesting to the satisfactory nature of the material.

D. The agency will perform all sampling and testing of materials and testing of work in place as required by the DSA Testing and Inspection Listing, or otherwise required. Testing will be performed in accordance with ASTM or California-required test methods.

3.03 CONCRETE

A. The DISTRICT's testing agency will conduct one-time sampling of aggregate and preparation and testing of concrete mix design for each strength and/or aggregate size specified. Testing costs for additional mix designs shall be borne by the CONTRACTOR.

B. Continuous plant inspection and other concrete installation tests will be conducted by the DISTRICT"s testing agency. However, costs for retesting of materials that do not meet specification requirements shall be borne by the CONTRACTOR.

3.04 ROOFING

A. Testing agency will conduct inspection and testing of built-up bituminous roofing in accordance with manufacturer's instructions, including:
1. Attend pre-roofing conference.
2. Check deck surfaces prior to roofing application to verify that substrate is in satisfactory condition to receive roofing.
3. Check kettle temperature control system and monitor kettle control temperatures.
4. Inspect and test materials including softening point of asphalt to ensure conformance with specifications.
5. Check for excessive moisture.
6. Observe roofing application to ensure conformance with specifications.
7. Supervise cutting and repair of cut-out tests and test and inspect cut-out samples for conformance with specifications.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 SECTION INCLUDES

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

B. Temporary Controls: Barriers, enclosures, fencing, protection of Work and security.

C. Construction Facilities: Access roads, parking, progress cleaning, and field office trailer.

D. Special Controls: Waste disposal facilities, Water Control, Dust Control, Erosion and Sediment Control, Noise Control, Pollution Control.

E. Comply with Title 24, Part 9, California Fire Code, Chapter 33 Fire Safety During Construction and Demolition, during all Phases of project.

1.02 SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

B. Phasing Plan: Submit Phasing Plan to confirm understanding of phasing work required and in coordination with Architect's Phasing Plan indicating horizontal routing of pedestrian traffic, entryways, barrier plans and signage plan. Include schedule or time of day when Owner's use of facilities will be affected by construction Work.

1.03 TEMPORARY ELECTRICITY

A. Provide temporary electrical service suitable to conduct construction operations.

B. Connect to existing power service. Power consumption shall not disrupt Owner's need for continuous service.

C. Contractor shall pay cost of energy used. Exercise measures to conserve energy.

D. Provide power outlets for construction operations with branch wiring and distribution boxes located where needed. Provide flexible power cords as required.

E. Provide feeder switch at source distribution equipment.

F. Permanent existing convenience receptacles may **[not]** be utilized during construction.

1.04 TEMPORARY LIGHTING

A. Provide and maintain adequate lighting for construction operations.

B. Maintain lighting and provide routine repairs.

C. Permanent building lighting may be utilized during construction.

1.05 TEMPORARY HEAT

A. Provide heating devices and heat as required to maintain specified conditions for construction operations.

B. Utilize Owner's existing heat plant, extend and supplement with temporary heating devices as required to maintain specified conditions for construction operations.

C. Contractor shall pay cost of energy used. Exercise measures to conserve energy.

1.06 TEMPORARY VENTILATION

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

1.07 TELEPHONE SERVICE

A. Provide, maintain and pay for two separate telephone service lines and telephone service to field office and Project Inspector's field office at time of project mobilization. Project Inspector's telephone shall be equipped with exterior, clearly audible bell.

B. Provide and pay for cellular telephone service for Project Inspector's use at time of project mobilization.

C. Provide, maintain, and pay for copy machine with 11 by 17 inch capability.

1.08 TEMPORARY WATER SERVICE

A. Provide for suitable quality water service.

B. Contractor shall pay cost of water used. Exercise measures to conserve water.

C. Extend branch piping with outlets located so water is available by hose with threaded connections.

1.09 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Existing facilities shall not be used.

1.10 TEMPORARY FIRE PROTECTION

A. Provide fire protection during construction according to CFC Chapter 33, including but not limited to fire extinguisher requirements and exit access requirements.

B. Conform to Title 24, Part 9, California Fire Code, Chapter 33, , Fire Safety During Construction/Demolition.

1.11 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Provide barricades required by governing authority for public rights-of-way and for public access to existing facilities.

C. Provide protection for plant life designated to remain. Replace damaged plant life.

D. Protect non-owned vehicular traffic, stored materials, site and structures from damage.

E. Provide steel trench plates, orange mesh fencing, construction site marker and other protective means to keep site and users, Owner's personnel, visitors and students safe, protected, and separated from ongoing construction operations. Provide temporary access at all paths of travel. Yellow warning tape is not acceptable means of separation and protection. At all open trenching operations, enclose entire trenching operation area including stockpiled backfill within orange mesh construction fencing. Provide steel trench plate "bridges" at all walkways.
   1. Notify Fire Marshall at least 48-hours prior to beginning utility work in the existing Fire Lane.
   2. Allow Fire Marshall access at reasonable times during progress of the work for inspections.

1.12 FENCING FOR CONSTRUCTION OPERATIONS

A. Construction: Commercial grade chain link fence, 1-3/4 inch mesh, 11 gauge, top and bottom knuckled selvage (closed end).
   1. Provide screen full height of fence, 1-3/4 inch mesh, 11 gauge, woven open mesh 100% polypropylene with 78 percent wind break, reinforced tape at grommets at 18 inches centers at perimeter, attach screen to chain link fence with 11 gauge hog rings by Roxford Fordell, Los Angeles, CA.

B. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

C. Submit detailed fencing and construction traffic plan for review and approval by Architect.

D. At completion of project repair concrete or A.C. substrate.

1.13 STAGING AREAS

A. Coordinate with Owner for location, extent and type of construction staging area.

1.14 EXTERIOR ENCLOSURES

A. Provide temporary weather-tight closure of exterior openings to accommodate acceptable working conditions and protection for products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual Specification Sections, and to prevent entry of unauthorized persons. Provide access doors with hardware and locks.

1.15 INTERIOR ENCLOSURES

A. Provide temporary partitions and ceilings as required to separate Work areas from Owner occupied areas, to prevent penetration of dust and moisture into Owner occupied areas and to prevent damage to existing materials and equipment.

B. Construction: Wood framing, plywood or gypsum board sheet materials with closed joints and sealed edges at intersections with existing surfaces, translucent or opaque as directed by Owner.

C. Fire-Retardant flexible Barriers: "ASFR6 Cover" anti-static Fire Retardant, 6 mil film . Passes NFPA 701-99 Test 1 or UL214, printed on sheet. Providing fire-retardant protection. By Americover Inc. San Diego, CA., www.americover.com or equal

D. Accessories Sets as required: ZipWall SLP: Springloaded Poles, Foam Rails, Side Clams, GripDisks, "Zip-Up" Self Adhesive Zippers. By Americover Inc. San Diego, CA. www.americover.com. or equal.

E. Paint surfaces exposed to view from Owner-occupied areas where required for rigid wall construction.

1.16 PROTECTION OF INSTALLED WORK

A. Protect installed Work and provide special protection where specified in individual Specification Sections.

B. Provide temporary and removable protection for installed products. Control activity in immediate work area to minimize damage.

C. Provide protective coverings at walls, projections, jambs, sills and openings. Provide protective and removal coverings for metal finishes intended to be exposed.

D. Protect finished floors and other surfaces from traffic, dirt, wear, damage or movement of heavy objects by protecting with durable sheet materials.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces.

F. Prohibit traffic from landscaped areas.

G. Provide sticky track mats at transition areas to minimize footprints and distribution of dirt from construction areas through occupied corridors, classrooms, and adjacent workspaces. At carpet floors provide "Velcro Brand Carpet" protection in lieu of sticky mats.

1.17 SECURITY

A. Provide security and facilities to protect Work, existing facilities and Owner's operations from unauthorized entry, vandalism or theft.

B. Coordinate with Owner's security program.

C. Within 48 hour period, replace or repair, to Architect's satisfaction, all surfaces or items damaged by graffiti during course of construction.

D. Where security or fire detection systems are disabled for any reason, including where Owner has given approval for such system shutdown, provide fire watch or security guard service as directed by Owner at no additional cost to Owner.

1.18 ACCESS ROADS

A. Construct and maintain temporary roads accessing public thoroughfares to serve construction area.

B. Extend and relocate as Work progress requires. Provide detours necessary for unimpeded traffic flow.

C. Provide and maintain access to fire hydrants, free of obstructions. Where required by local fire authority, provide and maintain a 26 foot wide fire apparatus access road.

D. Provide means of removing mud from vehicle wheels before entering streets.

E. Designated existing on-site roads may be used for construction traffic.

F. Where construction traffic occurs when students and staff are on campus, provide "spotter" responsible for leading construction traffic through site areas.

G. Route construction equipment, trucks, and similar vehicles via existing public streets to and from site as approved by governing authorities.

1.19 PARKING

A. Arrange for temporary parking areas to accommodate construction personnel.

B. When site space is not adequate, provide additional off-site parking.

1.20 PROGRESS CLEANING

A. Refer to Section 01 70 00 Execution Requirements and the requirements of this Section.

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

C. Remove debris and rubbish from closed or remote spaces, prior to enclosing space.

D. Broom and vacuum clean interior areas prior to start of surface finishing and continue cleaning to eliminate dust. Clean substrate; remove dirt, oil, grease, construction markings, and foreign matter that could adversely affect surface finish appearance or performance.

E. Remove waste materials, debris and rubbish from site weekly and dispose off-site.

F. Maintain public streets free of mud, dust and debris and as required by jurisdictional authority.

1.21 FIELD OFFICE TRAILER(S)

A. Owner will provide space for office and project meetings.

B. Field Office Trailer: Provide field office trailer, weather tight with lighting, electrical outlets, communications capabilities, heating, cooling and ventilating equipment and equipped to adequately conduct meetings for construction operations, minimum size; 480 sq. ft. Provide restroom: facilities within trailer.
   1. In SAME Field Office trailer provide separate private office similarly equipped and furnished with desk, 2 drawer file cabinet, a table and two chairs for use by Project Inspector, Owner and Architect including plan rack suitable for 30 by 42 inch drawings, minimum size 120 square feet. Inspector's office must be lockable and have direct access to outside, provide private telephone line and access to the Internet to inspector's office.
   2. Provide a SECOND separate Field Office Trailer similarly equipped as Contractor's office trailer and furnished desk, 2 drawer file cabinet, table, chairs and lockable for use by Project Inspector, Architect and Owner, provide private telephone line and access to the Internet to inspector's office, minimum size 480 sq. ft. (For Project Inspector's office trailer only, size 240 sq. ft.)

C. Cost of use permits, occupancy permits and related fees, if any required by Governing Authorities for temporary construction facilities, shall be paid by Contractor.

D. Provide 4 by 8 feet conference table, 6 conference chairs and 3 by 6 feet white markerboard at conference room.

E. Install no closer than 45 feet from project buildings in accordance with NFPA 241.

F. Maintain facility until Substantial Completion of entire project. Remove within 1 week of Substantial Completion.

G. Provide property insurance and protection.

1.22 REMOVAL OF UTILITIES, FACILITIES AND CONTROLS

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

B. Remove temporary underground or overhead installations.

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

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

1.23 RELOCATION OF UTILITIES

A. Contractor shall not have responsibility of timely removal, relocation or protection of public utility facilities that are not identified by Owner in Drawings and Specifications, in accordance with California Government Code 4215. Owner shall compensate Contractor for costs of locating and repairing damage not due to failure of Contractor to exercise reasonable care in removing and relocating such public utility facilities. If Contractor, while performing Contract, discovers public utility facilities not identified by Owner in Contract Drawings or Specifications, he shall immediately notify Owner and utility in writing. Contractor shall not be assessed liquidated damages for delay when delay was caused by failure of Owner to provide for relocation for utility facilities.

1.24 WATER CONTROL

A. Do not permit surface, rainwater or subsurface water or other liquids to accumulate in or about premises and vicinity thereof. Should such conditions be encountered or develop, control water or other liquid shall be suitably disposed of by means of temporary pumps, piping, drainage lines, troughs, ditches, dams or other methods as reviewed by Architect and approved by authority having jurisdiction.

B. Reference Section 01 57 23 for Storm Water Pollution Prevention Plan Requirements.

C. Dewatering Facilities and drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations and construction free of water.
1. Refer to Section 31 23 19, Dewatering for additional water control requirements.

D. Dispose of rainwater in lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.

E. Pools: Provide all necessary measures to remove all ground water and rain water from pool excavation.

1.25 DUST CONTROL

A. Conduct earthwork operations in a manner to prevent windblown dust and dirt from interfering with progress of Work, Owner's activities and existing occupied structures in areas immediately adjacent as well as adjacent properties.

B. Periodically water construction areas as required minimizing accumulation of dust and dirt.

C. Water spray or cover with tarpaulins truck loads of soil to additionally minimize generation of dust and dirt from construction operations.

D. Prevent dust and dirt from accumulating on walks, roadways, parking areas and from washing into sewer and storm drain lines.

1.26 EROSION AND SEDIMENT CONTROL

A. Plan and execute construction by methods to control surface drainage from cuts and fills from borrow and waste disposal areas. Prevent erosion and sedimentation.

B. Minimize amount of bare soil exposed at one time.

C. Provide temporary measures such as berms, dikes and drains to prevent water flow over adjacent properties or City rights-of-way.

D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.

E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

F. Reference Section 01 57 23 for Storm Water Pollution Prevention Plan Requirements.

1.27 NOISE CONTROL

A. Avoid excessive noise where adjacent Owner's functions may be detrimentally affected.

B. Refer to requirements in Section 01 57 20, Control of Construction Noise.Noise Control Plan: Submit Noise Control Plan after the Contract is awarded, prior to the commencement of the work, Contractor shall meet with the Owner to discuss the proposed Noise Control Plan and to develop mutual understanding relative to details of the Plan.
   1. The Noise Control Plan shall comply with the constraints set forth by the Owner, and be in compliance with the noise control laws of the City of _____.
   2. Submit a description of the instruments to be used in monitoring noise.
   3. Show the areas and boundaries where noisy work will occur.
   4. Approval of the Contractor's Noise Control Plan will not relieve the Contractor of responsibility for proper and continuing control of noise throughout the project site.

1.28 POLLUTION CONTROL

A. Provide methods, means and facilities to prevent contamination of soil, water and atmosphere from discharge of noxious, toxic substances and pollutants produced by construction operations.

B. Burning of refuse, debris or other materials will not be permitted on Site.

C. Comply with regulatory requirements and anti-pollution ordinances during course of construction and disposal operations.

1.29 WASTE DISPOSAL FACILITIES

A. Comply with requirements of Authorities Having Jurisdiction. Remove loose refuse and dispose off site legally.

B. Provide waste-collection containers in sizes adequate to handle waste from construction operations.

C. Provide and maintain trash bins on the Project site. Trash bins shall be serviced on an as needed basis.

D. Free Fall Maximum: 8 ft. Provide enclosed waste CHUTES for higher fall.
1. Provide disposals sufficiently sized to prevent debris from scattering around areas.
2. Use support systems, intake hoppers, protective liners and durable non-breakable chutes. Max-Access Inc., Houston, TX, Chutes International, White Plains, MD or equal.
3. When using demolition chutes, chute opening must be sealed when not in use. Chute and dumpster shall be sprayed with water to maintain dust control.
4. Do not use Owner's disposal system.

1.30 PROTECTION OF EXISTING FACILITIES AND SITEWORK

A. Provide site plan of proposed route of construction equipment for approval by Owner.

B. Use caution to minimize disturbance and damage to existing landscaped areas and sitework.

C. Protect sidewalks, curbs, entry areas and utilities.

D. The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) and irrigation on or adjacent to the work site, which are not to be removed and which do not unreasonably interfere with the work required under this contract. The Contractor shall only remove trees when specifically authorized to do so, and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during contract performance, or by the careless operation of equipment, or by workmen, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the Contracting Officer.

E. Protect from damage all existing improvements and utilities at or near the work site and on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. Repair any damage to those facilities, including those that are the property of a third party, resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work.

F. Repair landscaped areas, irrigation and sidewalks and any other damaged facilities where trucks, erection equipment or other construction equipment was used in removal and replacement of the HVAC units during construction. Repair damaged areas to match existing construction to satisfaction of the Owner, and at no additional cost to the Owner.

1.31 CONTRACTOR CONDUCT AND DRESS CODE

A. Contractor's and subcontractors' personnel shall observe and abide by Owner requirements concerning appropriate conduct, loud noise (unrelated to construction activities) and dress requirements for a safe and un-disturbing work place. Conduct work activities in a professional manner at all times.

B. Dress Code requirements: contractor's personnel shall wear traditional work attire or uniforms without logos, graphics or wording detrimental to work or school environment; unless logos, graphics or wording are for business identification purposes.

C. Contractors and subcontractors shall wear orange safety vests along with other required safety attire including hard hats and safety glasses.

D. Identification badges issued by the Owner shall be worn at all times, worn on the left side shirt-pocket area, displayed in full view and not concealed.

E. No radios or music permitted on the job site.

F. Owner reserves the right to remove any person(s) not observing conduct and dress requirements specified herein.

G. Animals: Contractors' and worker's pets or animals of any kind are not permitted on the Campus, including being retained in a vehicle.

1.32 MOBILIZATION AND DEMOBILIZATION

A. The work consists of the mobilization and demobilization of the contractor's forces and equipment necessary for performing the work required under the contract. It does not include mobilization and demobilization for specific items of work for which payment is provided elsewhere in the contract. Mobilization will not be considered as work in fulfilling the contract requirements for commencement of work.

B. Mobilization: Equipment and Material: Mobilization shall include all activities and associated costs for transportation of contractor's personnel, equipment, and operating supplies to the site; establishment of offices, buildings, and other necessary general facilities for the contractor's operations at the site; premiums paid for performance and payment bonds including coinsurance and reinsurance agreements as applicable.

C. Demobilization shall include all activities and costs for transportation of personnel, equipment, and supplies not required or included in the contract from the site; including the disassembly, removal, and site cleanup of offices, buildings, and other facilities assembled on the site specifically for this contract.

D. This work includes mobilization and demobilization required by the contract at the time of award. If additional mobilization and demobilization activities and costs are required during the performance of the contract as a result of changed, deleted, or added items of work for which the contractor is entitled to an adjustment in contract price, compensation for such costs will be included in the price adjustment for the item or items of work changed or added.

E. Payment: Payment will be made as the work proceeds, after presentation of paid invoices or documentation of direct costs by the contractor showing specific mobilization and demobilization costs and supporting evidence of the charges of suppliers, subcontractors, and others. When the total of such payments is less than the lump sum contract price, the balance remaining will be included in the final contract payment. Payment of the lump sum contract price for mobilization and demobilization will constitute full compensation for completion of the work.

F. Payment will not be made under this item for the purchase costs of materials having a residual value, the purchase costs of materials to be incorporated in the project, or the purchase costs of operating supplies.

1.33 INTERIM LIFE SAFETY MEASURES (ILSM)

A. The Interim Life Safety Measures (ILSM) itemized below are a series of administrative actions that must be taken to compensate for the hazards posed by NFPA 101 - 2003 Life Safety Code (LSC) deficiencies temporarily caused by construction activities. In addition, the ILSM shall include all applicable sections of NFPA 241, Safeguarding Construction, Alteration, and Demolition Operations, a copy of which shall be maintained at the site by the Contractor for reference.

B. ILSM must be implemented in, or adjacent to, all construction areas within the scope of work of this contract. ILSM apply to all construction personnel, including personnel of the General Contractor, Sub-contractors, Vendors, Suppliers, and any other personnel under the supervision and coordination of the General Contractor. ILSM shall be continuously enforced by the Contractor throughout the duration of the Contract.

C. The Contractor shall ensure that exits provide free and un-obstructive egress.
   1. Unless provided elsewhere, the Contractor shall provide a Construction Egress Plan, showing temporary barricades, egress paths, and exits from, around, and (if necessary through) the construction area. Temporary exits shown on the Plan must be identified with exit signs approved by the local authority having jurisdiction.
   2. The Contractor shall present the Plan to and obtain approval from the Owner and the local authority having jurisdiction prior to implementation.
   3. The Contractor, in conjunction with the Owner, shall conduct an ILSM meeting prior to the commencement of the work. The purpose of the meeting will be to present the Construction Egress Plan and to review the ILSM. The meeting shall be attended by the Owner's and the Contractor's designated personnel. The Contractor is responsible to present the ILSM to all personnel under his supervision and coordination, whether or not they attend the ILSM meeting.
   4. The Contractor shall update and revise as required by construction progress and phasing.

5. The paths of egress and exits shown on the Plan must be inspected daily and maintained at all times.
6. Where temporary alternate exits cannot be provided, the Contractor shall provide a continuous, 24 hour per day Fire Watch, consisting of one designated person per floor assigned solely to observing and reporting fire and life safety conditions and hazards to the General Contractor and the Owner, as well as initiating any required code red alarms.

D. The Contractor shall ensure free and unobstructed access to emergency departments and services for emergency forces.

E. The Contractor shall ensure that fire alarm, detection, and suppression systems, as well as structural and compartmentation features of fire safety outside the construction area are not impaired or compromised.
1. When the existing fire systems or fire safety features outside the construction area must be impaired or compromised a temporary but equivalent system or feature shall be provided. All temporary systems must be tested and inspected monthly.
2. In lieu of temporary systems or features, the Contractor may provide a Fire Watch as described in Item C.6 above and other measures as required by the authority having jurisdiction.

F. The Contractor shall ensure that temporary construction barricades and barricade doors are smoke tight and made of non-combustible or limited combustible materials that will not contribute to the development of smoke or fire.

G. The Contractor shall provide additional fire-fighting equipment and user-training for his personnel.

H. The Contractor shall ensure the prohibition of smoking by his personnel in accordance with MA.1.3.15 of the "Management and Administrative Service" manual, Volume 1, a copy of which shall be provided to the Contractor by the Owner.

I. The Contractor shall develop and enforce storage and debris-removal practices that reduce the flammable and combustible fire load of the construction area to the lowest level necessary for daily operations.

J. The Contractor shall conduct a minimum of one fire drill every month throughout the duration of the project.

K. The Contractor shall provide daily hazard surveillance of the construction area with special attention to excavations, construction storage, and field offices.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Materials for temporary work may be new or used.
1. Use materials that are adequate in capacity for the required use and loads.
2. Do not use materials that would create unsafe conditions.
3. Do not violate requirements of authorities having jurisdiction.

4. Sticky Track Mats: Trim-Tack Adhesive mats by Markell Industries, Manchester, CT or equal. At carpet floors provide Velcro Brand Carpet protection in lieu of sticky mats.

B. Electrical Materials
1. Power Receptacles: 15 ampere, 120 volt, duplex grounding type with ground fault circuit interrupters. Furnish in suitable boxes with hinged cover plates.
2. Light Fixtures and Lamps: Medium-base, rubber pigtail, type lamp sockets or porcelain lampholders furnish with boxes, and lamps.
3. Conductors: insulated copper or aluminum, with phase conductor insulation rated for the circuit voltage, and insulation or jacketing suitable for the conditions, and branch circuit conductors - No. 12 AWG minimum size, except No. 10 AWG where length of branch circuit exceeds 100 feet.

C. Mechanical Materials
1. Portable Equipment may be new or used, temporary units that will not damage construction materials or processes, that will not create unhealthy conditions for workers, and that can be operated with approval from the authorities having jurisdiction.
2. Fixed Equipment may be new or used, temporary or permanent, devices including any heat generating or cooling equipment that can be operated in a safe manner and with approval from the authorities having jurisdiction.

PART 3 - EXECUTION

3.01 REMOVAL

A. Remove all temporary control measures in accordance with regulatory requirements at completion of construction.

END OF SECTION

SECTION 01 55 00

VEHICULAR ACCESS AND PARKING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Signs, Signals and devices.

B. Construction Parking Control.

C. Flagmen

D. Flares and Lights.

E. Haul Routes.

F. Traffic Signs and Signals.

G. Removal

1.02 SIGNS, SIGNALS AND DEVICES

A. Post-Mounted and Wall-Mounted Traffic Control and Informational Signs as required to maintain adequate standards of safety and control of vehicular movement on and off construction site.

B. Traffic Control Signals: As approved by local jurisdictions.

C. Traffic Cones and Drums, Flares and Lights: As approved by local jurisdictions.

D. Flagmen Equipment: As approved by local jurisdictions.

1.03 CONSTRUCTION PARKING CONTROL

A. Control vehicular parking to prevent interference with public traffic and parking, access by emergency vehicles and Owner's operations.

B. Monitor parking of construction personnel's vehicles. Maintain vehicular access to and through parking areas.

C. Prevent parking on or adjacent to access roads or in non-designated areas.

1.04 FLAGMEN

A. Provide trained and equipped flagmen to regulate traffic when construction operations or traffic encroach on public traffic lanes.

1.05 FLARES AND LIGHTS

A. Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

1.06 HAUL ROUTES

A. Consult with authority having jurisdiction in establishing public thoroughfares to be used for haul routes and site access.

B. Confine construction traffic to designated haul routes.

C. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.

D. Consult with Owner to establish construction traffic haul route.

1.07 TRAFFIC SIGNS AND SIGNALS

A. At approaches to site and on site, install at crossroads, detours, parking areas and elsewhere as needed to direct construction and affected public traffic.

B. Install and operate traffic control devices as are necessary to direct and maintain orderly flow of traffic in areas under Contractor's control and areas affected by Contractor's operations.

C. Relocate as Work progresses to maintain effective traffic control.

1.08 REMOVAL

A. Remove equipment and devices when no longer required.

B. Repair damage caused by installation.

C. Remove post settings to full depth.

PART 2 - PRODUCTS

2.01 NOT USED.

PART 3 - EXECUTION

3.01 NOT USED.

END OF SECTION

SECTION 01 56 39

TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.

B. Related Sections:
1. Division 1 Section "Temporary Facilities and Controls" for temporary site fencing.
2. Division 2 Section "Site Clearing" for removing existing trees and shrubs.

1.03 DEFINITIONS

A. Caliper: Diameter of a trunk measured by a diameter tape at 6 inches above the ground for trees up to, and including, 4-inch size; and 12 inches above the ground for trees larger than 4-inch size.

B. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.

C. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and indicated on Drawings (defined by a circle concentric with each tree with a radius 1.5 times the diameter of the drip line unless otherwise indicated).

D. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.04 PROJECT CONDITIONS

A. The following practices are prohibited within protection zones:
1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

B. Do not direct vehicle or equipment exhaust toward protection zones.

C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.01 EXAMINATION

A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

B. Field verification: Where in the opinion of the Contractor and Inspector of Record, the excavation and/or adjacent site preparation work necessary to provide for the Contract Scope will cause damage to the tree or plant (roots), stop work in the area and contact the Arborist immediately for consultation and determination of procedure. In the event that the tree or plant is deemed necessary to be removed, the Owner shall issue a change order as required.

C. For the record, prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

3.02 PREPARATION

A. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated. Tie a 1-inch blue-vinyl tape around each tree trunk at 54 inches above the ground.

B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

C. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated.
   1. Apply 4-inch average thickness of organic mulch. Do not place mulch within 6 inchesof tree trunks.

3.03 TREE- AND PLANT-PROTECTION ZONES

A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people and animals from easily entering protected area except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.
   1. Chain-Link Fencing: Install to comply with ASTM F 567 and with manufacturer's written instructions.

2. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Architect.
3. Access Gates: Install as required; adjust to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Architect. Install one sign spaced approximately every 20 feeton protection-zone fencing, but no less than one sign facing a different direction.

C. Maintain protection zones free of weeds and trash.

D. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.

E. Maintain protection-zone fencing and signage in good condition as acceptable to Architect and remove when construction operations are complete and equipment has been removed from the site.
1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
2. Temporary access is permitted subject to pre-approval in writing by Arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

3.04 EXCAVATION

A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Division 2 Section "Earthwork."

B. Trenching near Trees: Where utility trenches are required within protection zones, hand excavate under or around tree roots or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning.

C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches back from new construction and as required for root pruning.

D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

3.05 ROOT PRUNING

A. Prune roots that are affected by temporary and permanent construction. Review pruning procedure and requirements with Arborist prior to the commencement of the work. Prune roots as follows:
   1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
   2. Cut Ends: Coat cut ends of roots more than 1-1/2 inchesin diameter with emulsified asphalt or other coating formulated for use on damaged plant tissues and that is acceptable to arborist.
   3. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
   4. Cover exposed roots with burlap and water regularly.
   5. Backfill as soon as possible according to requirements in Division 2 Section "Earthwork."

B. Root Pruning at Edge of Protection Zone: Prune roots 12 inchesof the protection zone, by cleanly cutting all roots to the depth of the required excavation.

C. Root Pruning within Protection Zone: Clear and excavate by hand to the depth of the required excavation to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

3.06 CROWN PRUNING

A. Prune branches that are affected by temporary and permanent construction. Prune branches as follows:
   1. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by Arborist.
   2. Pruning Standards: Prune trees according to ANSI A300 (Part 1)[and the following:
      a. Type of Pruning: Cleaning, Thinning, Raising, Reduction per Arborist's recommendation(s).
      b. Specialty Pruning: Restoration, Vista, Palm, Utility per Arborist's recommendation(s).
   3. Cut branches with sharp pruning instruments; do not break or chop.
   4. Do not apply pruning paint to wounds.

B. Chip removed branches and incorporate into the on-site planting improvements as approved by Architect.

3.07 REGRADING

A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.
   1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.

C. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

D. Minor Fill within Protection Zone: Where existing grade is 2 inchesor less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.

3.08 FIELD QUALITY CONTROL

A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.09 REPAIR AND REPLACEMENT

A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.
   1. Submit details of proposed root cutting and tree and shrub repairs.
   2. Have arborist perform the root cutting, branch pruning, and damage repair of trees and shrubs.
   3. Treat damaged trunks, limbs, and roots according to arborist's written instructions.
   4. Perform repairs within 24 hours.
   5. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by Architect.

B. Trees: Remove and replace trees indicated to remain that are more than 66 percent dead or in an unhealthy condition or are damaged during construction operations that Arborist determines are incapable of restoring to normal growth pattern.
   1. Provide new trees of same size and species as those being replaced for each tree that measures 6 inchesor smaller in caliper size.
   2. Provide one new tree of 6-inch caliper size for each tree being replaced that measure more than 6 inches in caliper size.
      a. Species: Optional species as selected by Architect.
   3. Plant and maintain new trees as specified in Division 2 Section "Exterior Plants."

C. Soil Aeration: Where directed by Arborist, aerate surface soil compacted during construction. Aerate 5 feetbeyond drip line and no closer than 36 inchesto tree trunk. Drill 1-inch-diameter holes a minimum of 12 inches deep at 24 inches o.c. Backfill holes with an equal mix of augered soil and sand.

3.10 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove excess excavated material, displaced trees, trash and debris, and legally dispose of them off Owner's property.

END OF SECTION

SECTION 01 57 20

CONTROL OF CONSTRUCTION NOISE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification sections, apply to work of this section.

1.02 DESCRIPTION

A. This section specifies the control of noise arising from construction operations and associated activities. Noise control measures specified are an obligation of the Contractor with the costs included within the various contract items of work.

1.03 QUALITY ASSURANCE

A. Establish and maintain quality assurance program for the control of noise.

1.04 SUBMITTALS

A. Noise Control Plan: After the contract is awarded, prior to the commencement of the Work, the Contractor shall meet with the Owner to discuss the proposed Noise Control Plan and to develop mutual understanding relative to details of the Plan.
   1. The Noise Control shall comply with the constraints set forth by the Owner, and be in compliance with the noise control regulations of the Owner and the City of Fallbrook.
   2. Submit a description of the instruments to be used in monitoring noise.
   3. Show the areas and boundaries where noisy work will occur.
   4. Approval of the Contractor's Noise Control Plan will not relieve the Contractor of responsibility for proper and continuing control of noise throughout the project site.

1.05 NOISE CONTROL

A. General: Take every practicable precaution and action to eliminate or minimize noise emanating from the construction operations.

B. Timing: Perform noise-producing work in less-sensitive hours of the day or week as directed by the Owner.

C. Constraints: Control and abate noise produced by the Work at or below the decibel levels and within the time periods specified.
   1. Repetitive, high level impact noise will be permitted only between 7:00 a.m. and 4:00 p.m. unless otherwise permitted by the Owner. Repetitive impact noise on the property shall not exceed the following dB limitations:

Time Duration of Impact Noise	Sound Level in dB

More than 12 minutes in any hour	70
Less than 30 seconds of any hour	85
Less than three minutes of any hour	80
Less than 12 minutes of any hour	75

2. Provide equipment, sound-deadening devices, and take noise abatement measures that are necessary to comply with the requirements specified, and comply with the following:
   a. Maximum permissible construction equipment noise levels within 50 feet of any building on the premises shall be 75 decibels.
   b. Provide shields or other physical barriers to restrict the transmission of noise.
   c. Provide soundproof housings or enclosures for noise-producing machinery.
   d. Use intake and exhaust mufflers on internal combustion engines that are maintained to have equipment perform below noise levels specified.
   e. Line hoppers and bins with sound deadening material.
   f. Conduct truck loading, unloading and hauling operations so that noise is kept to a minimum.

3. At least once every five successive working days while work is being performed, above 55 dBA noise level, measure sound level for noise exposure due to the construction. Measure noise exposure at the property line or 50 feet from the noise source, whichever is greater. Measure the sound levels on the A weighing network of a General Purpose sound level meter at slow response. To minimize the effect of reflective sound waves at buildings, measurements may be taken three to six feet in front of any building face. Submit the recorded information to the Architect noting any problems and the alternatives for mitigating actions.

PART 2 - PRODUCTS

2.01 NOT USED.

PART 3 - EXECUTION

3.01 NOT USED.

END OF SECTION

SECTION 01 57 23

TEMPORARY STORM WATER POLLUTION CONTROL

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes development and implementation of Storm Water Pollution Prevention Plan (SWPPP) written specifically for this Project

B. Related Sections
1. Section 31 10 00 - Site Clearing
2. Section 31 22 00 - Grading
3. Section 31 23 16 - Excavation
4. Section 31 23 16.13 - Trenching
5. Section 31 23 23.13 - Backfill
6. Section 32 12 16 - Asphalt Paving
7. Section 32 13 13 - Concrete Paving

1.02 ADMINISTRATIVE REQUIREMENTS

A. SWPPP Compliance. Each contractor, sub-contractor, and material supplier, at any tier, and their employees or agents must follow the procedures in the SWPPP.
1. Personnel or agents that handle or use materials or equipment, that in such handling or use could cause storm-water pollution or soil contamination, shall take precautions to prevent that contamination.
2. Personnel or agents that conduct any activity that may disturb or damage barriers of any nature that are in place to protect stormwater drainage systems from pollution shall protect such barriers during and repair any damage to such barriers promptly upon completion of the activity.
3. Complete SWPPP Compliance Activity Log upon completion of each activity.

B. Sustainability Objective. The intent of these Documents is to provide the Owner with a Project that when complete will earn sufficient Credit Points to qualify for CHPS funding. Failure of contractors, sub-contractors, and material suppliers, at any tier, and employees or agents of these to cooperate in the implementation of this objective may jeopardize the Owner's ability to the Project.

	Credit	LEED
1.	_____.	#

C. Construction Waste Management. Each contractor, sub-contractor and material supplier, at any tier, shall participate in Project'¢s Construction Waste Management Plan to foster material recovery and re-use and to minimize disposal in landfills.
1. Each contractor, sub-contractor and material supplier shall take measures to minimize the production of construction debris on Site, by minimizing packaging, and production of surplus and waste materials.
2. Personnel that handle, unpack or use materials shall collect and separate waste materials for distribution to recycling, reuse and disposal facilities.

3. Waste Management objective for this Project is to divert at least 50-percent of non-hazardous construction debris from landfill disposal to recycling, reuse and salvage facilities.
4. Complete a Waste Management Report (Section 01 74 19, Attachment B) upon completion of each activity.

1.03 SUBMITTALS

A. Action Submittals
1. Notice of Intent

B. Information Submittal
1. Certification of timely Notification of Authorities Having Jurisdiction
2. Copy of Storm-Water Pollution Prevention Plan, accompanied, upon request of Owner, with contractor's certification of compliance with the relevant rules, regulations, and laws
3. SWPPP Compliance Activity Logs
4. Waste Management Logs

C. Closeout Submittals
1. Certificates of Compliance with the SWPPP
2. Certified Copy of notification of Agencies of completion of operations

1.04 QUALITY ASSURANCE

A. SWPPP shall satisfy the mandates of Federal Clean Water Act as enforced by State of California Water Resources Control Board and its Regional Water Quality Boards.
1. The plan shall identify potential sources of pollutants which may enter the storm water system, and describe steps that will be taken during construction to minimize the risk of storm water contamination.
2. The plan shall address management procedures that will be used during construction to prevent pollution discharges such as spills, leaking, and dumping.
3. Additional information regarding SWPPP requirements can be obtained from State Water Resources Control Board

B. If Owner is cited for violation of Clean Water Act due to failure of SWPPP to address requirement, Contractor shall be liable for any fines or penalties that might be imposed by regulatory agency, he shall be obligated to perform mandated corrective measures at his own expense.
1. If Owner, Architect, or Owner's Inspector becomes aware of violations of SWPPP, they will immediately inform Contractor in writing. Contractor shall immediately cease violation and shall restore site, at his own expense, to same conditions it was in before violation, to approval of Owner.
2. Should Contractor continue to violate requirements of SWPPP, or refuse to comply, or refuse to repair results of violation to Owner's approval, for purposes of this Contract it shall be considered as any other violation of Contract. Owner will take necessary measures as set forth in General Conditions.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Provide temporary and permanent storm water pollution prevention equipment, material, and facilities as required by or as necessary to comply with SWPPP.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify Site conditions are ready for the work of this Section.

B. Do not begin until unsatisfactory conditions are corrected. Beginning SWPPP installations means acceptance of existing conditions including preparatory work of others, if any.

3.02 IMPLEMENTATION

A. Execute measures required by SWPPP as directed by SWPPP itself.

B. Prepare and submit Notice of Intent in accordance with terms of the General Permit prior to commencement of construction activity. Copies of General Permit and Notice of Intent form may be obtained from California Regional Water Control Board.

1. Send Notice of Intent accompanied by fee to

State Water Resources Control Board (SWRCB)
Division of Water Quality
Attention: Storm Water Section, Permit Unit
P.O. Box 1977
Sacramento, CA 95812-1977

C. During construction, make changes as necessary for proper functioning of SWPPP measures.

D. At completion of work, Contractor shall remove temporary SWPPP measures and dispose of any pollutants in legal manner offsite, or as otherwise required by SWPPP.

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Products

B. Transportation and handling.

C. Storage and protection.

D. Product options.

E. Substitutions

1.02 PRODUCTS

A. Product: means new material, machinery, components, equipment, fixtures and systems forming Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of Work. Products may also include existing materials or components required for reuse.

B. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.

C. Provide interchangeable components from the same manufacturer.

1.03 TRANSPORTATION AND HANDLING

A. Transport and handle products in accordance with manufacturer's instructions.

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

C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement or damage.

1.04 STORAGE AND PROTECTION

A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate controlled enclosures.

B. For exterior storage of fabricated products, place on sloped supports, above ground and protect as necessary to prevent deterioration or damage to the product.

C. When approved by the Owner, provide off-site storage and protection in a bonded warehouse approved by Owner when site does not permit on-site storage or protection at no cost to Owner.

D. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.

E. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.

F. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement or damage.

G. Arrange storage of products to permit access for inspection. Periodically inspect to ensure products are undamaged and are maintained under specified conditions.

1.05 PRODUCT OPTIONS

A. Where products are specified by reference standards or by description only, provide products meeting those standards or that description, made by a manufacturer acceptable to Architect.

B. Where products are specified by naming one or more manufacturers, provide products of one of the named manufacturers that meets or exceeds specifications.

C. Where any specific article, device, equipment, product, material, fixture, patented process, form, method, or type of construction is indicated or specified by name, make, trade name, or catalog number, whether with or without the phrase "or equal," such specification shall be deemed to establish the minimum qualities of function, dimension, appearance, and performance (collectively the Basis of Design) for that material, process, or article. Such specification shall be deemed to be followed by the phrase "or equal."

D. If a named product, or named manufacturer's equivalent product does not fully meet the specification, that manufacturer shall provide a custom or modified product to meet the specification.

E. Where expressly noted "no substitutions" in individual Sections, no product options are permitted.

F. When the phrase "or equal" is used or implied, it shall mean "an equivalent product, approved by the Architect in accordance with the requirements of this Section."

G. Products, proposed as substitutions, shall conform to requirements listed in the respective Section of this Manual and have at least 10 successful installations in commercial projects similar in scale and complexity to those required for this Project that have been in service for minimum of 5 years and remain in satisfactory condition.

1.06 SUBSTITUTIONS

A. Manufacturers and products listed in Specifications form basis for design and quality intended. Bidders may propose substitutions of equal design and quality and must be accompanied by completed Request Form included at end of this Section, other forms not permitted. Submit separate form for each proposed substitution.
   1. Substitution requests, if any, shall be submitted to Architect 10 calendar days prior to Bid Opening Date. Architect will issue Addenda if accepted.

B. Substitutions must clearly be in Owner's best interest because of quality, cost, performance, conformity to code requirements or availability. Architect will make decision as to acceptance of proposed substitution.
   1. Submittal of proposed substitutions shall be made only by Prime Contractor(s). Architect will not review direct submittal by manufacturers, suppliers or subcontractors.
   2. Burden of proof as to equality of any material, process or article shall rest with Contractor. Provision authorizing submissions of "or equal" justification data shall not in any way authorize an extension of time for performance of this Contract.
   3. Substitutions shall, without exception, be manufactured of same basic materials and comply with or exceed all Specification requirements of dimension, function, structure and appearance, without deviation. Provide itemized comparison of quality and performance.
   4. Use of approved substitutions shall in no way relieve Contractor from responsibility for compliance with Contract Documents after installation. Contractor shall assume all extra costs caused by use of approved substitute materials.
   5. Statement indicating why specified material or product cannot be provided.
   6. Coordination information, including list of changes or modifications needed to other parts of Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
   7. Detailed side by side comparison of significant qualities of proposed substitution with those of the Work specified. Mark clearly affected specification Section for any differences from item specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect and specific features and requirements indicated.
   8. Product Data Samples, including drawings and descriptions of products and fabrication and installation procedures.
   9. List of similar installations for completed projects with project names and addresses and names and addresses of Architects and Owners.
   10. Material test reports from qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
   11. Cost information, including a proposal of change, if any, in the Contract Sum.
   12. Substitutions for specified product, brand or manufacture that have been submitted and disapproved by Architect shall not be resubmitted in any modified form.
   13. In case materials are substituted and installed without proper authorization, Contractor shall remove such materials and install those specified at his own expense.
   14. Contractor shall determine effect approved substitutions will have on other portions of Work and so inform his subcontractors and employees of these effects.

15. Acceptance of proposed substitution shall be determined solely by specifying Architect. The final decision shall be the Architect's in accordance with the General Conditions.

C. Substitutions may be considered when product becomes unavailable through no fault of Contractor. Provide letter from manufacturer, on manufacturer's letterhead, stating lack of availability.

D. Unacceptable Substitutions: substitution requests initiated by late submittals that have caused materials to become unavailable due to delay in ordering and procurement will not be acceptable reason for substitutions.

E. Provide same warranty for substitution as for specified product.

F. Contractor shall pay costs for time required by Architect for review and for any redesign services associated with substitutions and for costs of re-approval by Regulatory Agencies.

G. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request.

H. Each subcontractor is responsible for providing products and construction methods compatible with products and construction methods of other subcontractors. If dispute arises between subcontractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

I. Substitution Submittal Procedure: In accordance with Division 01, General Requirements for Administrative Requirements and this Section.

J. All Substitutions for any material, system or product that would otherwise be regulated by DSA shall be included in an Addendum or Form DSA-140, and shall be approved by DSA prior to fabrication or use. (CAC Section 4-338(c) and IR A-6)

1.07 OWNER-FURNISHED, OWNER-INSTALLED WORK (OFOI)

A. Indicate in construction progress schedule owner-furnish owner-installed items and schedule time for installation.

B. Items indicated on Drawings as OFOI will be furnished by Owner and installed by Owner. Work indicated as OFOI will be performed under separate contract employees by Owner at its discretion. Where work of this Contract adjoins or conflicts with OFOI, work, Contractor shall cooperate with Owner and its employees in manner that will provide for reasonable and accurate completion of this Contract and work under separate contact.

C. Coordinate with OFOI work affecting this contract. Including verification and interfacing of this contract with OFOI work.

1.08 OWNER-FURNISHED, CONTRACTOR-INSTALLED WORK (OFCI)

A. Indicate in the construction progress Schedule Owner-Furnish Contractor-Installed items and schedule time for their installation.

B. Contractor shall verify exact sizes and services required for each item of equipment indicated on Drawings or in Project Manual as OFCI and shall obtain from Owner rough-in drawings, diagrams, setting templates and other necessary information to ensure proper mating of assemblies.

C. Contractor shall receive at project site each item of equipment from Owner and from that time on shall assume full responsibility for items and equipment until one year from date of Certified Completion.

D. Contractor shall give Owner 15 days prior notice of requirements for delivery to site of all OFCI equipment.

E. Contractor shall be responsible for receiving OFCI items and equipment and shall uncrate, inspect and notify Owner in writing within 7 days of receiving said items or equipment of acceptance or rejection of items or equipment. Owner, after receiving notice, will take appropriate action to have items or equipment made acceptable for Contractor's use. Rejected items shall be carefully stored and protected from damage by Contractor until Owner takes appropriate action.

F. Contractor shall be responsible for final placing, installation, connection, start-up, checking, testing and demonstrated satisfactory operation. Owner will provide names of manufacturer's representatives, who shall assist the Contractor in checking, testing and demonstrating equipment.

PART 2 - PRODUCTS

2.01 NOT USED

PART 3 - EXECUTION

3.01 NOT USED

END OF SECTION

SECTION 01 70 00

EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Field engineering and surveying.

B. Requirements and limitations for cutting and patching of Work.

C. Cleaning throughout construction period.

D. Project Record Documents.

E. Closeout procedures.

F. Adjusting

G. Operation and maintenance data.

H. Warranty and Guarantee.

I. Spare parts and maintenance materials.

J. Instruction to Owner's personnel.

1.02 FIELD ENGINEERING QUALITY CONTROL

A. Employ Land Surveyor registered in the State of California and acceptable to Architect.

B. Submit name, address and telephone number of Surveyor before starting survey work.

C. Maintain complete and accurate log of control and survey Work as it progresses.

D. On completion of foundation walls, floor slabs and major site improvements, prepare a certified survey illustrating dimensions, locations, angles and elevations of construction.

1.03 SURVEY REFERENCE POINTS

A. Contractor to locate and protect survey control and reference points.

B. Control datum for survey is that established by Owner provided survey.

C. Protect survey control points prior to starting site Work; preserve permanent reference points during construction.

D. Promptly report to the Architect loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to the Architect.

1.04 SURVEY REQUIREMENTS

A. Provide field engineering services. Use recognized engineering survey practices.

B. Establish a minimum of two permanent 3-inch diameter brass plate benchmarks on site, referenced to established control points. Record locations, with horizontal and vertical data on Project Record Documents. Establish additional temporary bench marks at all floor levels.

C. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means, make use of laser instrumentation. Contractor shall arrange and pay for Field Engineering and Staking.
1. Site improvements including pavements; stakes for grading, fill placement; utility locations, slopes, invert elevations and batter boards.
2. Grid or axis for structures.
3. Building foundation, column locations, ground floor elevations.
4. Floor elevations of existing structures that relate to project.
5. Partition layouts on rough floor as a guide to all trades.

D. Periodically verify layouts by same means.

1.05 layout markings

A. Layout markings shall not be made with xylene-based inks, paint, or dyes, or with other solvent-based products that may bleed through finishes.

1.06 EXISTING CONDITIONS

A. Before beginning Work, investigate and verify existence and location of mechanical, drainage, and electrical systems and other construction affecting Work, including underground utilities.
1. Before construction, survey and record points of connection of utility services.
2. Locate invert elevation at points of connection to existing sanitary and storm drain, water-service piping, and underground electrical services.
3. Employ a utility service locator company to locate underground utilities.
4. Verify Owner's Record Drawings.
5. Furnish survey of existing utilities.

1.07 CUTTING AND PATCHING

A. Where Work requires that particular existing building element such as partition, wall, paving, window, or similar element of existing building construction be removed, it is the intention of this Specification that such Work be part of the Demolition Section and not part of Cutting and Patching.

B. New Work required to replace such removals is considered as part of separate sections of Specifications covering similar new construction.

C. Where incidental cutting and patching is required for installation of a specific item or piece of equipment (including piping, ductwork, conduit, etc.), such cutting and patching is considered to be specified as part of that Section.

D. Contractor shall verify and check areas to be cut and patched and shall coordinate Work of various trades involved.

E. Where doubt exists as to size, location, or method of cutting concrete or any other structural element, including metal stud framing, Contractor shall contact Architect before proceeding.

F. Where doubt exists, Contractor shall distinguish between "cutting" and "demolition".

G. Unless specifically indicated otherwise, existing Work cut, altered, or revised to accommodate new Work shall be patched to duplicate undisturbed adjacent finishes, colors, textures, and profiles. New Work in existing portions shall also be finished to match adjacent existing Work unless noted otherwise.

H. Submit written request in advance of cutting or alteration which affects any of the following.
1. Structural integrity of any element of Project
2. Integrity of weather-exposed or moisture-resistant element
3. Efficiency, maintenance or safety of any operational element
4. Visual qualities of sight exposed elements
5. Work of Owner or separate Contractor`

I. Include in request:
1. Identification of Project.
2. Location and description of affected Work.
3. Necessity for cutting or alteration.
4. Description of proposed Work and products to be used.
5. Alternatives to cutting and patching.
6. Effect on Work of Owner or separate Contractor.
7. Written permission of affected separate Contractor.
8. Date and time Work will be executed.

1.08 QUALITY ASSURANCE - CLEANING

A. Inspection: Conduct daily inspection, and more often if necessary, to verify that requirements of cleanliness are being met.

B. Codes and Standards: In addition to requirements specified herein, comply with pertinent requirements of authorities having jurisdiction.

C. For final cleaning, use only professional cleaning company experienced in commercial cleaning.

1.09 PAYMENT WITHHELD - CLEANING

A. Architect reserves right to withhold certification of payment requests for failure on part of Contractor to regularly clean Project in conformance with Requirements of this Section.

1.10 CLOSEOUT PROCEDURES

A. Owner Occupancy:
   1. Conform to Part 1, Title 24, Section 4-336 7-151 CCR Requirements for Verified Reports and Closeout Procedures.
   2. In conjunction with Project Inspector, Contractor shall prepare list of items (Punchlist) to be completed or corrected. List may be developed by areas when approved by Architect.
   3. Within time specified in the Certificate for Substantial completion after receipt of list, Architect will inspect to determine status of completion.
   4. Should Architect determine that Work is not complete:
      a. Architect will promptly notify Contractor in writing, giving reasons for his determination.
      b. Contractor shall remedy deficiencies and notify Architect when Work is ready for re-inspection.
      c. Architect will re-inspect Work.
   5. When Architect concurs that Work is substantially complete and ready for occupancy.
      a. Architect will prepare a Certificate of Substantial Completion accompanied by Contractor's list (Punchlist) of items to be completed or corrected as verified by Architect.
      b. Contractor shall provide consent by insurer for Partial or Beneficial Occupancy.

B. Final Completion:
   1. Prepare and submit notice that Work is ready for final inspection and acceptance.
   2. Verify Work is complete.
   3. Clarify that:
      a. Work has been inspected by all governing agencies and is in compliance with Contract Documents.
      b. Work has been completed in accordance with Contract Documents.
      c. Equipment and systems have been tested as required and are operational.
      d. Work is completed and ready for final inspection.
   4. Architect will make an inspection to verify status of completion.
   5. Should Architect determine Work is incomplete or defective:
      a. Architect will promptly notify Contractor in writing, listing incomplete or defective Work.
      b. Contractor shall remedy deficiencies promptly and notify Architect when ready for re-inspection.
   6. When Architect determines Work is acceptable under the Contract Documents, he will request Contractor to make closeout submittals.

C. Closeout Submittals include, but are not necessarily limited to:
   1. Project Record Documents.

2. Operation and maintenance data for items so listed in pertinent Sections of these Specifications and for other items when so approved by Architect.
3. Warranties and Guarantees.
4. Keys and keying schedule.
5. Spare parts, materials, extra stock to be turned over to Owner.
6. Evidence of payment and release of Stop Notices , when requested by Owner.
7. List of subcontractors, service organizations and principal vendors, including names, addresses and telephone numbers, where they may be contacted for emergency service at all times, including nights, weekends and holidays.
8. Final Site Survey.
9. Notification of insurer for completion of Project.
10.

D. Final Payment:
1. Submit Final Payment Request, showing all adjustments to Contract Sum.
2. Retention will be released no sooner than 35 days after Notice of Completion has been recorded with County Recorders Office.

1.11 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

1.12 PROJECT RECORD DOCUMENTS

A. Record Documents: As-Built Drawings, Project Manual with Specifications including but not limited to the documents required herein.

B. Owner will provide one set of drawings and one copy of Project Manual for use during construction to record changes made during construction.

C. Record Documents: As-Built drawings and Project Manual, record in concise manner using industry-standard drafting techniques on drawings, on weekly basis all actual revisions to Work and transfer as built information to Auto CAD drawings at the completion of the project.
1. Changes made on Drawings, including Clarification Drawings.
2. Changes made to Specifications.
3. Changes made by Addenda.
4. Changes made by Construction Change Directives/Instruction Bulletins, Architect's Supplemental Instructions, minor changes.
5. Change Orders or other authorized Modifications to Contract.
6. Revisions made to shop drawings, product data and samples.

D. Store Record Documents separate from documents used for construction. Replace soiled or illegible documents.

E. Record information concurrent with construction progress.

F. Specifications: Legibly mark and record at each product Section description of actual products installed, including following:
1. Manufacturer's name, trade name, product model and number and supplier.
2. Authorized product substitutions or alternates utilized.

3. Changes made by Addenda and Modifications.

G. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:
   1. Measured depths of foundations in relation to finish first floor datum.
   2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements. Identify drains and sewers by invert elevation.
   3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of Work. Identify ducts, dampers, valves, access doors and control equipment wiring.
   4. Field changes of dimension and detail.
   5. Details not on original drawings.

H. Obtain Architect's signed certification that Record Documents have been fully updated prior to submitting monthly payment requests. Compliance is mandatory before payment will be made.

I. Submit Record Documents certified by Inspector to Architect with claim for final Application for Payment. Fully completed Record Documents are a prerequisite to final payment.

J.

K.

1.13 OPERATION AND MAINTENANCE DATA

A. Submit six (6) sets prior to final inspection, bound in 8-1/2 by 11 inch text pages, in binders with durable covers. Include operation and maintenance data for all items for which submittals are requested in individual Sections of Specifications.

1.14 WARRANTY AND GUARANTEE

A. Contractor, manufacturer's warranties and guarantees not withstanding, warrants entire Work against defects in materials and workmanship for twelve (12) months from date of Certified Substantial Completion. Warranties and guarantees between Contractor and manufacturers and Contractor and suppliers shall not affect warranties or guarantees between Contractor and Owner. Refer to General and Supplementary Conditions for additional requirements.

B. Execute and assemble documents from subcontractors, suppliers and manufacturers.

C. Submit prior to final Application for Payment.

D. For items of Work delayed beyond date of Notice of Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of Guarantee Period.

1.15 WARRANTIES - FORM OF SUBMITTALS

A. Bind in commercial quality, 8-1/2 by 11 inch, three-ring side binders with hardback, cleanable, plastic covers.

B. Label cover of each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible principal.

C. Table of Contents: Neatly typed, in sequence of Table of Contents of Project Manual, with each item identified with number and title of Specification Section in which specified, and name of product or Work item.

D. Separate each warranty or bond with index tab sheets keyed to Table of Contents listing. Provide full information, using separate typed sheets as necessary. List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

1.16 WARRANTIES – PREPARATION OF SUBMITTALS

A. Obtain warranties and bonds, executed in duplicate by responsible subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item or Work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until date of Certified Substantial Completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

1.17 WARRANTIES – TIME OF SUBMITTALS

A. For equipment or component parts of equipment put into service during construction with Owner's permission submit documents within ten days after acceptance.

B. Make other submittals within ten days after date of Certified Substantial Completion, prior to final Application for Payment.

C. For items of Work when acceptance is delayed beyond date of Notice of Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty period.

1.18 SPARE PARTS AND MAINTENANCE MATERIALS

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

B. Deliver to project site location as directed by Owner.

1.19 INSTRUCTIONS TO OWNER'S PERSONNEL

A. Instruct Owner's personnel in proper operation and maintenance of all systems, equipment and similar items which were provided as part of Work. Provide maintenance and inspection schedules that conform to manufacturer's recommendations.

B. Contractor shall provide schedule to Owner for approval for each of instruction periods required.
1.

C. Instruction sessions will be held in Owner designated area on project site and at Owner's convenience.

D. Prepare and submit to Architect a sign-in sheet with subject, date and time, signed by all participants for each session.

E. Instructors shall be qualified by product manufacturer in subject matter presented at each session.

PART 2 - PRODUCTS

2.01 MATERIALS - CUTTING AND PATCHING

A. Primary Products: Those required for original installation.

2.02 PRODUCTS FOR PATCHING AND EXTENDING WORK

A. New Materials: As specified in product sections; match existing products and Work for patching and extending Work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing Work as standard.

2.03 CLEANING MATERIALS AND EQUIPMENT

A. Provide required personnel, equipment and materials needed to maintain specified standard of cleanliness.

2.04 COMPATIBILITY

A. Use cleaning materials and equipment that are compatible with surfaces being cleaned, as recommended by manufacturer of material to be cleaned.

PART 3 - EXECUTION

3.01 EXAMINATION – CUTTING AND PATCHING

A. Inspect existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching. Confirm status and current warranties and guarantees.

B. Indicate proposed routing of utilities in Coordinated Drawings and submit to Architect. Do not commence coring cutting operations prior to approval of Coordinated Drawings.

C. After uncovering existing Work, inspect conditions affecting performance of Work.
   1. Prior to cutting, boring or drilling through new or existing structural members or elements including reinforcing bars not specifically detailed, Contractor shall prepare detailed drawings for review and approval by Architect, Structural Engineer of Record and DSA Field Engineer. Approval by DSA is required prior to commencement of Work. Agency approvals will be obtained by Architect not Contractor.

D. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION - CUTTING AND PATCHING

A. Provide temporary support to ensure structural integrity of Work. Provide devices and methods to protect other portions of Project from damage.

B. Provide protection from elements for areas that may be exposed by uncovering Work.

C. Maintain excavations free of water.

3.03 CUTTING AND PATCHING

A. Execute cutting, fitting, and patching to complete Work.

B. Fit products together, to integrate with other Work.

C. Uncover Work to install ill-timed Work.

D. Remove and replace defective non-conforming Work.

E. Provide openings in Work for penetration of mechanical and electrical Work.

3.04 PERFORMANCE - CUTTING AND PATCHING

A. Execute Work by methods to avoid damage to other Work and which will provide appropriate surfaces to receive patching and finish.

B. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval. Torches or other flame cutting equipment shall not be used to cut metal studs without prior approval of the Architect.

C. Restore Work with new products in accordance with requirements of Contract Documents.

D. Fit Work air tight to pipes, sleeves, ducts, conduits and other penetrations through surfaces.

E. At penetrations of fire-rated walls, partitions, ceiling or floor construction, completely seal voids with UL-approved fire-rated devices to full thickness of penetrated element.

F. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

G. Extend patching to point where patching is not evident unless directed otherwise by Architect.

3.05 SLEEVES AND HANGERS

A. Provide conduit, outlets, piping sleeves, boxes, inserts or other materials or equipment necessary to be built into Work. Promptly furnish same and set such sleeves or other materials as construction program required.

B. In event delays occur in delivery of sleeves or other materials, arrange to have boxes or other forms set at locations where piping or other material is to pass through or into slabs or other Work.

C. Upon subsequent installation of sleeves or other material, install fill materials as required. Necessary expenditures incurred for boxing out or filling shall be without extra cost to Owner.

3.06 PROGRESS CLEANING

A. General:
1. Comply with all requirements of Owner's Storm Water Pollution Prevention Plan, Section 01 57 23.
2. Retain stored items in orderly arrangement allowing maximum access, not impeding drainage or traffic, and providing required protection of materials.
3. Do not allow accumulation of scrap, debris, waste material, and other items not required for construction of this Work.
4. At least twice each month, and more often if necessary, remove scrap, debris, and waste material from jobsite.
5. Provide adequate storage for items waiting removal from jobsite, observing requirements for fire protection and protection of ecology.

B. Site:
1. Daily, and more often if necessary, inspect site and pick up all scrap, debris, and waste material. Remove items to place designated for their storage. Combustible waste shall be removed from site. Flammable waste shall be kept in sealed metal containers until removed from site.
2. Weekly, and more often if necessary, inspect, arrangements of materials stored on site, re-stack, tidy, or otherwise service arrangements to meet requirements specified above.
3. Maintain site in neat and orderly condition.

C. Structures:
1. Weekly, and more often if necessary, inspect structures and pick up scrap, debris, and waste material. Remove items to place designated for their storage.
2. Weekly, and more often if necessary, sweep interior spaces clean.
   a. "Clean", for purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and handheld broom, i.e., "broom-clean".

3. As required preparatory to installation of succeeding materials, clean structures of pertinent portions thereof to degree of cleanliness recommended by manufacturer of succeeding material, using equipment and materials required to achieve required cleanliness.
4. Clean substrate; remove dirt, oil, grease, construction markings, and foreign matter that could adversely affect surface finish appearance or performance.
5. Following installation of finish floor materials, clean finish floor daily, and more often if necessary, and while Work is being performed in space in which finish materials have been installed.
    a. "Clean", for purpose of this subparagraph, shall be interpreted as meaning free from foreign materials which, in opinion of Architect, may be injurious to finish floor material, i.e., "vacuum clean".

3.07 FINAL CLEANING

A. Definition: Except as otherwise specifically provided, "clean", for purpose of Article, shall be interpreted as meaning level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials, i.e., "scrub and polish clean".

B. General: Complete following cleaning operations before requesting inspection for certification of Substantial Completion.
1. Prior to completion of Work, remove from jobsite all tools, surplus materials, equipment, scrap, debris, and waste, conduct final progress cleaning as described above.
2. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    a. Unless otherwise specifically directed by Architect, water and broom clean paved areas on site and public paved areas directly adjacent to site. Remove resultant debris.
3. Rake grounds that are neither planted nor paved to smooth, even-textured surface.
4. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.

C. Structures:
1. Exterior: In areas affected by Work under this Contract, visually inspect exterior surfaces and remove traces of soils, waste material, smudges and other foreign matter. Remove traces of splashed material from adjacent surfaces. If necessary to achieve uniform degree of exterior cleanliness, hose down exterior of structure. In event of stubborn stains not removable with water, Architect may require light sandblasting or other cleaning at no additional cost to Owner.
2. Interior: In areas affected by Work under this Contract, visually inspect interior surfaces and remove traces of soil waste material, smudges, and other foreign matter. Remove traces of splashed materials from adjacent surfaces. Remove paint drippings, spots, stains, and dirt from finished surfaces. Use only cleaning materials and equipment instructed by manufacturer of surface material.

3. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
4. Polished Surfaces: On surfaces requiring routine application of buffed polish, apply polish recommended by manufacturer of material being polished. Glossy surfaces shall be cleaned and shined as intended by manufacturer.
5. Carpet: Use only dry-chemical method of cleaning. Steam cleaning or water based cleaning shall not be used on carpet. Use only dry-chemical materials and methods fully approved by carpet manufacturer, as instructed in manufacturer's published literature.
6. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
   a. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

D. Mechanical and Electrical Systems
1. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
2. Replace parts subject to unusual operating conditions.
3. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
4. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
5. Clean ducts, blowers, and coils if units were operated without filters during construction.
6. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

E. Timing: Schedule final cleaning acceptable to the Architect to enable Owner to accept completely clean project.

3.08 CLEANING DURING OWNER'S OCCUPANCY

A. Should Owner occupy Work or any portion thereof prior to its completion by Contractor and acceptance by Owner, responsibilities for interim and final cleaning of occupied spaces shall be determined by Architect in accordance with General Conditions of the Contract.

END OF SECTION

SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: 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 01 30 00 Administrative Requirements

1.02 REFERENCES

A. California Integrated Waste management Act of 1989 (AB 939)

B. California Code of Regulations Title 14, Section 18700

1.03 ACTION SUBMITTALS

A. Waste Management Plan (Appendix A): Within 10 calendar days after the Notice to Proceed and prior to any waste removal, submit the following to the Architect for review and approval. Update quarterly. Include:
   1. Materials to be recycled, reused, or salvaged, either onsite or offsite.
   2. Estimates of construction 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.
   5. Site plan for placement of waste containers.

B. Waste Management Monthly Progress Report (Appendix B): 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. Waste Management Final Compliance Report: Final update of Waste Management Plan to provide summary of total waste generated by Project.

PART 2 - PRODUCTS

2.01 SYSTEM DESCRIPTION

A. Collection and separation of all construction 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 construction waste generated.

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. Appendix A: Waste Management Plan

B. Appendix B: Waste Management Monthly Progress Report

END OF SECTION

APPENDIX A

WASTE MANAGEMENT PLAN

Date: _____

Within 10 calendar days after the Notice to Proceed and prior to any waste removal, the Contractor [Construction Manager] shall submit the following to the Architect for review and approval. Update quarterly.

PROJECT:

OWNER:

_____

CONTRACTOR [CONSTRUCTION MANAGER]
Name:
Address:
Telephone, fax, email:

Material Type (1)	Estimated Tons Recycled (2)	Estimated Tons Reused (3)	Estimated Tons Salvaged (4)	Estimated Tons Landfilled (5)	Proposed Disposal or Recycling Facility (6)
Total					
Diversion Rate: Columns [(2)+(3)+(4)] / [(2)+(3)+(4)+(5)]					

Provide type of material targeted for recycling, reuse, and/or salvage, either on or off site, and include a category for general waste materials requiring landfill disposal.

(2) through (4) Provide estimated quantities (in tons) of recyclable, reusable, or salvageable waste materials anticipated to be generated.

Provide estimated quantities (in tons) of material to be disposed in landfill.

Provide destination of recycled, salvaged, and disposed materials (i.e. onsite, recycling facility, etc.)

General: Attach proposed Recycling & Waste Bin Location Plan.

Attach name and contact data for each recycling or disposal destination to be used.

APPENDIX B

WASTE MANAGEMENT MONTHLY PROGRESS REPORT

Starting Date_____

Ending Date _____

Contractor [Construction Manager] shall submit this report monthly along with Application for Payment.
PROJECT:
OWNER:

CONTRACTOR [CONSTRUCTION MANAGER]
Name:
Address:
Telephone, fax, email:

Material Type (1)	Actual Tons Recycled (2)	Actual Tons Reused (3)	Actual Tons Salvaged (4)	Actual Tons Landfilled (5)	Disposal or Recycling Facility (6)
Total					
Diversion Rate: Columns [(2)+(3)+(4)] / [(2)+(3)+(4)+(5)]					

Provide type of materials recycled, reused, and/or salvaged, either on or off site, and include a category for general waste materials disposed in a landfill.

(2) through (4) Provide quantities (in tons) of recyclable, reusable, or salvageable waste materials generated.

Provide quantities (in tons) of material disposed in landfill.

Provide destination of recycled, salvaged, and disposed materials (i.e. onsite, recycling facility, etc.)

General: Attach name and contact data for each recycling or disposal destination to be used.

SECTION 01 80 00

FACILITY OPERATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Starting systems.

B. Demonstration and instructions.

C. Testing, adjusting and balancing.

1.02 STARTING SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Architect and Owner 7 days prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper control sequence or other conditions that may cause damage.

D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.

E. Verify wiring and support components for each equipment are complete and tested.

F. Execute start-up under supervision of responsible manufacturer's representative or approved Contractors' personnel in accordance with manufacturers' instructions.

G. When specified in individual Specification Sections, require manufacturer to provide authorized representative to be present as site to inspect, check and approved equipment or system installation prior to start-up and to supervise placing equipment or system in operation.

H. Submit written report that equipment or system has been properly installed and is functioning correctly.

1.03 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of Product to Owner's personnel two weeks prior to date of Notice of Completion.

B. Demonstrate Project equipment and provide instruction by qualified manufacturer's representative who is knowledgeable about Project.

C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.

E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance and shutdown of each item of equipment at agreed-upon times at equipment location.

F. Prepare and submit to Architect a sign-in sheet with subject, date and time, signed by all participants for each session.

G. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

H. Amount of time required for instruction on each item of equipment and system is that specified in individual Sections.

1.04 TESTING, ADJUSTING AND BALANCING OF EQUIPMENT

A. Refer to Division 23 Heating, Ventilating, and Air Conditioning.

B. Owner will appoint, employ, and initially pay for services of independent firm to perform testing, adjusting and balancing. Amounts paid will be deducted by Change Order from the Contractor's final payment or from any funds due and payable.

PART 2 - PRODUCTS

2.01 NOT USED.

PART 3 - EXECUTION

3.01 NOT USED.

END OF SECTION

SECTION 01 81 19

CONSTRUCTION INDOOR AIR QUALITY

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes
   1. Temporary construction ventilation, dust protection, preconditioning of materials, protection of materials, sequencing, duct protection, and duct cleaning to insure good indoor air quality after occupancy to be performed by the CONTRACTOR.

B. Related Sections
   1. Section 01 30 00, Administrative Requirements
   2. Section 01 35 43, Special Environmental Requirements
   3. Section 01 60 00, Product Requirements

1.02 REFERENCES

A. SMACNA – IAQ Guidelines for Occupied Buildings Under Construction, 1995, Chapter 3.

B. ASHRAE Standard 52.2-1999 – Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size (ANSI approved)

1.03 CLASSIFICATION OF RELEVANT MATERIALS

A. VOC-Emitting Materials
   1. Section 06 10 00 Rough Carpentry
      a. Composite wood products containing added urea-formaldehyde
   2. Section 06 17 13 Structural Panel Web Joists
      a. Composite wood products containing added urea-formaldehyde
   3. Section 06 18 13 Glue Laminated Beams
      a. Composite wood products containing added urea-formaldehyde
   4. Section 06 41 16 Casework
      a. Adhesives applied on-site
      b. Composite wood products containing added urea-formaldehyde
   5. Section 06 61 16 Solid Polymer Fabrications
      a. Adhesives and sealants applied on-site
   6. Section 07 21 00 Insulation
      a. Batt insulation, unless formaldehyde-free
      b. Adhesives applied on-site
   7. Section 07 21 13 Rigid Thermal Insulation
      a. Adhesives applied on-site, only when exposed to the interior side of the building envelope
   8. Section 07 84 00 Firestopping
      a. All sealants, caulking, or spray materials.

9. Section 07 92 00 Joint Sealants
    a. All joint sealants applied on-site on the interior side of the building envelope.
10. Section 09 30 13 Ceramic Tile
    a. Adhesives and joint sealers applied on the interior side of the building envelope.
11. Section 09 65 19 Resilient Tile Flooring
    a. Adhesives
12. Section 09 65 13 Resilient Base
    a. Adhesives
13. Section 09 68 16 Sheet Carpeting
    a. Carpet
    b. Adhesives
14. Section 09 68 13 Carpet Tile
    a. Carpet
    b. Adhesives
15. Section 09 72 17 Fiberglass Reinforced Plastic Panels
    a. Adhesives
    b. Sealants
16. Section 09 90 00 Painting

B. Porous and Fibrous Materials
1. Section 07 21 00 Insulation
    a. Batt insulation (exposed to interior only)
2. Section 09 51 00 Acoustical Ceilings – Lay-In
3. Section 09 68 13 Carpet Tile

1.04 SUBMITTALS

A. Submit eighteen (18) photographs documenting compliance with this Section. Provide six (6) photographs each at three (3) different phases of construction.

B. Contractor shall develop and submit to the Architect for review the Construction Indoor Air Quality (IAQ) Plan as required in this Section. A template form is provided as Appendix A of this Specification. The plan shall be submitted along with the first submittal for any of the products listed above.

1.05 SUBSTITUTIONS

A. Construction Indoor Air Quality (IAQ) requirements described below are based upon practices described in SMACNA *IAQ Guidelines for Occupied Buildings Under Construction,* 1995. Any modifications to or substitutions of requirements described in this Section must comply with the abovementioned SMACNA guideline.

PART 2 - PRODUCTS

2.01 NOT USED.

PART 3 - EXECUTION

3.01 QUALITY ASSURANCE

A. Inspection: Contractor shall conduct inspections to confirm that construction IAQ measures proposed in the Construction IAQ Plan are being followed, and be prepared to report compliance with the Plan at progress meetings.

3.02 PROJECT CONDITIONS

A. Air Filtration:
   1. Systems designed with particle filters shall not be operated without filters in place. Temporary construction filters shall have a minimum MERV rating of 8.
   2. Replace all air filtration media immediately prior to occupancy. Post-construction air filters shall have a minimum MERV rating of 13.

B. Construction Ventilation: Following building enclosure, maintain continuous temporary ventilation of areas during installation of VOC-Emitting Materials identified in paragraph 1.04 of this Section. Construction Ventilation shall be provided for post-occupancy touch-up work involving VOC-Emitting materials. It is not required during Building Flush-Out.
   1. Ventilation shall be supplied via open windows and doors, temporary ducts, and temporary fans, sufficient to provide no less than three (3) air changes per hour.
   2. When continuous ventilation is not practical via temporary fans and exhaust to outside, then ventilation shall be supplied via the building's HVAC system and shall comply with the following requirements:
      a. Provide temporary air filters at return air grilles.
      b. Provide 100% outside air. Relative humidity not to exceed 60%.
      c. Provide a minimum of three (3) air changes per hour.
   3. Maintain continuous ventilation for a minimum period of 72 hours after installation of VOC-Emitting Materials, unless otherwise indicated elsewhere in these Specifications.
   4. Ventilate areas directly to outside; ventilation to other enclosed areas is not acceptable.

C. Preconditioning: Prior to installation, allow contractor-furnished contractor-installed VOC-Emitting Furnishings and Equipment as identified in paragraph 1.04 of this Section to off-gas in dry, well-ventilated space for 14 calendar days to allow for reasonable dissipation of odors and emissions.
   1. Remove containers and packaging to maximize off-gassing of VOCs.
   2. Precondition products in ventilated warehouse or other ventilated building. Preconditioning at the project site is acceptable, provided that Temporary Construction Ventilation and Sequencing measures are taken as described elsewhere in this Specification.

3. Products requiring preconditioning include, at minimum, contractor-furnished and contractor-installed VOC-Emitting Furnishings and Equipment that contain vinyl or other flexible plastics, resins, adhesives, foam rubber, and fiberboards with urea-formaldehyde binders. Products bearing Greenguard certification (www.greenguard.org) shall be excluded from the preconditioning requirement.

3.03 SEQUENCING

A. On-Site Application: Where VOC-Emitting Materials as identified in paragraph 1.03 of this Specification are applied on-site, apply prior to installation of Porous and Fibrous Materials as identified in paragraph 1.04 of this Specification. Maintain continuous ventilation for a period of 72 hours before installation of porous and fibrous materials.
1. Where this sequencing requirement is not possible, protect porous materials with polyethylene vapor retarders. Tape all polyethylene edges to insure a complete seal. Maintain continuous ventilation per temporary construction ventilation requirements described above for a period of 72 hours before removing polyethylene.

B. Completion: Complete interior finish material installation prior to Building Flush-Out as described in paragraph 3.06 of this Section.

3.04 PROTECTION

A. Moisture Protection: Protect interior materials from water intrusion or penetration as described in Section 01 60 00 Product Requirements.
1. Porous or fibrous materials with visible microbial growth shall not be installed.
2. Non-porous materials with visible microbial growth shall be decontaminated.

B. Duct Protection: during dust-producing activities (e.g. sanding, cutting, or grinding), or when VOC-Emitting Materials (as described in paragraph 1.04 above) are being installed, implement the following measures:
1. If possible, damper off the return (negative pressure) side of HVAC air distribution system and seal return system openings with polyethylene sheet.
2. If HVAC system must be operated during dust-producing activities, provide temporary construction air filters with a minimum MERV rating of 8 at all return air grilles.
3. If HVAC supply air is off, protect diffusers and openings with polyethylene sheet.

3.05 CLEANING

A. Provide the following cleaning in addition to requirements described in Section 01 70 00 Execution Requirements:
1. Clean all coils, air filters, and fans prior to Testing and Balancing.
2. If significant dust collection is observed at diffusers, return air grilles, or in ducts, clean prior to system start-up.

3.06 BUILDING FLUSH-OUT

A. Just prior to Substantial Completion, but following Testing and Balancing, flush out building using the building HVAC system, maintaining a minimum temperature of 60° F and maximum 60% relative humidity as follows:

1. Provide continuous 24 hour ventilation with all air handling unit dampers at their maximum outdoor air position and all supply fans at their maximum position and maximum rate for at least 14 days.
2. Following building occupancy, it touch up work involving products with chemical emissions is required, provide temporary construction ventilation during application and following flush out requirements above for a minimum of 4 days after touch up application.
3. During occupancy, in the event that the schedule does not permit a 14 day flush-out prior to occupancy, the contractor must conduct the flush-out while the building is occupied. Prior to occupancy, the contractor must comply with all measures to protect building occupants outlined in CHPS, 2009 Credit EQ2.0A.P2.

B. Insure that MERV 13 air filters are in place during Building Flush-Out.

C. Installation of furniture and equipment may occur during Building Flush-Out.

D. Return ventilation system to normal operation following Building Flush-Out period to minimize energy consumption.

E. Immediately following Building Flush-Out, replace air filters with new MERV 13 air filters. Air filters that handle solely outside air need not be replaced.

END OF SECTION

APPENDIX A

CONSTRUCTION INDOOR AIR QUALITY (IAQ) PLAN

CONTRACTOR [CONSTRUCTION MANAGER]:

Name: _____ Title: _____

Telephone: _____ Fax: _____

Email: _____

I have read and understood and will implement the following Construction IAQ Plan:

Signature: Date:

CONSTRUCTION VENTILATION

List all project materials requiring Construction Ventilation per Specification Section 01 81 19. Attach additional sheet if necessary.	
Y / N	Ventilation will be supplied via open windows, temporary ducts, and temporary fans. If "Y", then supply air diffusers, return air grilles, and/or open ducts will be sealed.
Y / N	Ventilation will be supplied via area exhaust fans. If "Y", check applicable: ☐ Supply air diffusers, return air grilles, and/or open ducts will be sealed. Make-up air will be provided through open windows or doors or other transfer air devices. ☐ HVAC system will provide make-up air. Return air grilles will be sealed.
Y / N	Ventilation will be supplied via building's HVAC system. If "Y", check applicable: ☐ Return air grilles are sealed. Exhaust is provided via open windows or doors. ☐ Return air grilles are used for exhaust. HVAC will provide 100% outside air. Air filters with a minimum MERV rating of 8 will be provided at return air grilles.
☐ Required	Areas will be ventilated directly to outside. No ventilated air will be returned.
☐ Required	Ventilation will provide no less than three air changes per hour.
☐ Required	Ventilation will be continuous for a period no less than 72 hours after completion of installation.
☐ Required	All filtration used during Construction Ventilation will be replaced prior to Substantial Completion.

PRECONDITIONING

List all project materials requiring Preconditioning per Specification Section **01 81 19**. Attach additional sheet if necessary.

Y / N	Preconditioning will occur in dry and well-ventilated offsite location. If "Y": Where is the offsite location?
Y / N	Preconditioning will occur onsite. If "Y", check applicable: ☐ Ventilation will be supplied via open windows, temporary ducts, and temporary fans. See I.2a above. ☐ Ventilation will be supplied via area exhaust fans. See I.2b above. ☐ Ventilation will be supplied via building's HVAC system. See I.2c above.
☐ Required	Containers and packaging will be removed prior to Preconditioning.
☐ Required	Preconditioning will occur for fourteen (14) continuous days prior to installation.

SEQUENCING

List all project materials requiring Sequencing consideration per Specification Section 01 81 19. Attach additional sheet if necessary.

☐ Required	Previously installed Porous or Fibrous Materials located in a room where VOC-Emitting Materials are to be installed will be protected with polyethylene vapor retarder. Polyethylene will not be removed until completion of a 72-hour ventilation period.
☐ Required	Installation of interior finish materials will complete fourteen (14) days prior to Substantial Completion.

PROTECTION

List all project materials requiring Protection per Specification Section 01 81 19. Attach additional sheet if necessary.	
☐ Required	Porous or Fibrous Materials with visible microbial growth shall not be installed.
☐ Required	Materials that are not defined as Porous or Fibrous with visible microbial growth shall be decontaminated prior to installation.
☐ Required	Temporary ventilation will be provided during all dust producing activities. See Item I Construction Ventilation above. All supply air diffusers and return air grilles will be covered.
☐ Required	Ducts will be sealed during transportation, delivery, and construction.

END OF APPENDIX A

SECTION 01 91 13

GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. General requirements that apply to implementation of commissioning without regard to systems, subsystems, and equipment being commissioned.

B. Related Sections
1. Division 01, General Requirements for specific requirements for commissioning HVAC systems.

1.02 DEFINITIONS

A. BoD: Basis of Design.

B. CxA: Commissioning Authority.

C. OPR: Owner's Project Requirements.

D. Systems, Subsystems, and Equipment: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, and equipment.

E. TAB: Testing, Adjusting, and Balancing.

1.03 COMMISSIONING TEAM

A. Members Appointed by Contractor(s): Individuals, each having authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated actions. The commissioning team shall consist of, but not be limited to, representatives of each Contractor, including Project superintendent and subcontractors, installers, suppliers, and specialists deemed appropriate by the CxA.

B. Members Appointed by Owner:
1. CxA: The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to implement the commissioning process. Owner will engage the CxA under a separate contract.
2. Representatives of the facility user and operation and maintenance personnel.
3. Architect and engineering design professionals.

1.04 OWNER'S RESPONSIBILITIES

A. Provide the OPR documentation to the CxA and each Contractor for use in developing the commissioning plan; systems manual; operation and maintenance training plan; and testing plans and checklists.

B. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities including, but not limited to, the following:
   1. Coordination meetings.
   2. Training in operation and maintenance of systems, subsystems, and equipment.
   3. Testing meetings.
   4. Demonstration of operation of systems, subsystems, and equipment.

C. Provide the BoD documents prepared by Architect and approved by Owner, to the CxA and each Contractor for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

1.05 CONTRACTOR'S RESPONSIBILITIES

A. Provide utility services required for the commissioning process.

B. Each Contractor shall assign representatives with expertise and authority to act on behalf of the Contractor and schedule them to participate in and perform commissioning team activities including, but not limited to, the following:
   1. Participate in design- and construction-phase coordination meetings.
   2. Participate in maintenance orientation and inspection.
   3. Participate in operation and maintenance training sessions.
   4. Participate in final review at acceptance meeting.
   5. Certify that Work is complete and systems are operational according to the Contract Documents, including calibration of instrumentation and controls.
   6. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
   7. Review and approve final commissioning documentation.

C. Subcontractors shall assign representatives with expertise and authority to act on behalf of subcontractors and schedule them to participate in and perform commissioning team activities including, but not limited to, the following:
   1. Participate in design- and construction-phase coordination meetings.
   2. Participate in maintenance orientation and inspection.
   3. Participate in procedures meeting for testing.
   4. Participate in final review at acceptance meeting.
   5. Provide schedule for operation and maintenance data submittals, equipment startup, and testing to CxA for incorporation into the commissioning plan. Update schedule on a weekly basis throughout the construction period.
   6. Provide information to the CxA for developing construction-phase commissioning plan.
   7. Participate in training sessions for Owner's operation and maintenance personnel.
   8. Provide updated Project Record Documents to the CxA on a daily basis.

9. Gather and submit operation and maintenance data for systems, subsystems, and equipment to the CxA, as specified in Division 01 Section "Operation and Maintenance Data."
10. Provide technicians who are familiar with the construction and operation of installed systems and who shall develop specific test procedures and participate in testing of installed systems, subsystems, and equipment.

1.06 CxA'S RESPONSIBILITIES

A. Organize and lead the commissioning team.

B. Prepare a construction-phase commissioning plan. Collaborate with each Contractor and with subcontractors to develop test and inspection procedures. Include design changes and scheduled commissioning activities coordinated with overall Project schedule. Identify commissioning team member responsibilities, by name, firm, and trade specialty, for performance of each commissioning task.

C. Review and comment on submittals from each Contractor for compliance with the OPR, BoD, Contract Documents, and construction-phase commissioning plan. Review and comment on performance expectations of systems and equipment and interfaces between systems relating to the OPR and BoD.

D. Convene commissioning team meetings for the purpose of coordination, communication, and conflict resolution; discuss progress of the commissioning processes. Responsibilities include arranging for facilities, preparing agenda and attendance lists, and notifying participants. The CxA shall prepare and distribute minutes to commissioning team members and attendees within five workdays of the commissioning meeting.

E. At the beginning of the construction phase, conduct an initial construction-phase coordination meeting for the purpose of reviewing the commissioning activities and establishing tentative schedules for operation and maintenance submittals; operation and maintenance training sessions; TAB Work; and Project completion.

F. Observe and inspect construction and report progress and deficiencies. In addition to compliance with the OPR, BoD, and Contract Documents, inspect systems and equipment installation for adequate accessibility for maintenance and component replacement or repair.

G. Prepare Project-specific test and inspection procedures and checklists.

H. Schedule, direct, witness, and document tests, inspections, and systems startup.

I. Compile test data, inspection reports, and certificates and include them in the systems manual and commissioning report.

J. Certify date of acceptance and startup for each item of equipment for start of warranty periods.

K. Review Project Record Documents for accuracy. Request revisions from Contractor to achieve accuracy. Project Record Documents requirements are specified in Division 01 Section "Project Record Documents."

L. Review and comment on operation and maintenance documentation and systems manual outline for compliance with the OPR, BoD, and Contract Documents. Operation and maintenance documentation requirements are specified in Division 01 Section "Operation and Maintenance Data."

M. Prepare operation and maintenance training program and provide qualified instructors to conduct operation and maintenance training. Operation and maintenance training is specified in Division 01 Section "Demonstration and Training."

N. Prepare commissioning reports.

O. Assemble the final commissioning documentation, including the commissioning report and Project Record Documents.

1.07 COMMISSIONING DOCUMENTATION

A. Index of Commissioning Documents: CxA shall prepare an index to include storage location of each document.

B. OPR: A written document, prepared by Owner, that details the functional requirements of Project and expectations of how it will be used and operated. This document includes Project and design goals, measurable performance criteria, budgets, schedules, success criteria, and supporting information.

C. BoD Document: A document, prepared by Architect, that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.

D. Commissioning Plan: A document, prepared by CxA, that outlines the schedule, allocation of resources, and documentation requirements of the commissioning process, and shall include, but is not limited to the following:
   1. Plan for delivery and review of submittals, systems manuals, and other documents and reports. Identification of the relationship of these documents to other functions and a detailed description of submittals that are required to support the commissioning processes. Submittal dates shall include the latest date approved submittals must be received without adversely affecting commissioning plan.
   2. Description of the organization, layout, and content of commissioning documentation (including systems manual) and a detailed description of documents to be provided along with identification of responsible parties.
   3. Identification of systems and equipment to be commissioned.
   4. Description of schedules for testing procedures along with identification of parties involved in performing and verifying tests.
   5. Identification of items that must be completed before the next operation can proceed.

6. Description of responsibilities of commissioning team members.
7. Description of observations to be made.
8. Description of requirements for operation and maintenance training, including required training materials.
9. Description of expected performance for systems, subsystems, equipment, and controls.
10. Schedule for commissioning activities with specific dates coordinated with overall construction schedule.
11. Identification of installed systems, subsystems, and equipment, including design changes that occurred during the construction phase.
12. Process and schedule for documenting changes on a continuous basis to appear in Project Record Documents.
13. Process and schedule for completing pre-start and startup checklists for systems, subsystems, and equipment to be verified and tested.
14. Step-by-step procedures for testing systems, subsystems, and equipment with descriptions for methods of verifying relevant data, recording the results obtained, and listing parties involved in performing and verifying tests.

E. Test Checklists: CxA, with assistance of Architect, shall develop test checklists for each system, subsystem, or equipment including interfaces and interlocks, and include a separate entry, with space for comments, for each item to be tested. Prepare separate checklists for each mode of operation and provide space to indicate whether the mode under test responded as required. Provide space for testing personnel to sign off on each checklist. Specific checklist content requirements are specified in Division 01, General Requirements for commissioning HVAC systems Each checklist, regardless of system, subsystem, or equipment being tested, shall include, but not be limited to, the following:
1. Name and identification code of tested item.
2. Test number.
3. Time and date of test.
4. Indication of whether the record is for a first test or retest following correction of a problem or issue.
5. Dated signatures of the person performing test and of the witness, if applicable.
6. Individuals present for test.
7. Deficiencies.
8. Issue number, if any, generated as the result of test.

F. Certificate of Readiness: Certificate of Readiness shall be signed by each Contractor, Subcontractor(s), Installer(s), and CxA certifying that systems, subsystems, equipment, and associated controls are ready for testing. Completed test checklists signed by the responsible parties shall accompany this certificate.

G. Test and Inspection Reports: CxA shall record test data, observations, and measurements on test checklists. Photographs, forms, and other means appropriate for the application shall be included with data. CxA shall compile test and inspection reports and test and inspection certificates and include them in systems manual and commissioning report.

H. Corrective Action Documents: CxA shall document corrective action taken for systems and equipment that fail tests. Include required modifications to systems and equipment and revisions to test procedures, if any. Retest systems and equipment requiring corrective action and document retest results.

I. Issues Log: CxA shall prepare and maintain an issues log that describes design, installation, and performance issues that are at variance with the OPR, BoD, and Contract Documents. Identify and track issues as they are encountered, documenting the status of unresolved and resolved issues.
   1. Creating an Issues Log Entry:
      a. Identify the issue with unique numeric or alphanumeric identifier by which the issue may be tracked.
      b. Assign a descriptive title of the issue.
      c. Identify date and time of the issue.
      d. Identify test number of test being performed at the time of the observation, if applicable, for cross-reference.
      e. Identify system, subsystem, and equipment to which the issue applies.
      f. Identify location of system, subsystem, and equipment.
      g. Include information that may be helpful in diagnosing or evaluating the issue.
      h. Note recommended corrective action.
      i. Identify commissioning team member responsible for corrective action.
      j. Identify expected date of correction.
      k. Identify person documenting the issue.
   2. Documenting Issue Resolution:
      a. Log date correction is completed or the issue is resolved.
      b. Describe corrective action or resolution taken. Include description of diagnostic steps taken to determine root cause of the issue, if any.
      c. Identify changes to the OPR, BoD, or Contract Documents that may require action.
      d. State that correction was completed and system, subsystem, and equipment is ready for retest, if applicable.
      e. Identify person(s) who corrected or resolved the issue.
      f. Identify person(s) documenting the issue resolution.
   3. Issues Log Report: On a periodic basis, but not less than for each commissioning team meeting, CxA shall prepare a written narrative for review of outstanding issues and a status update of the issues log. As a minimum, CxA shall include the following information in the issues log and expand it in the narrative:
      a. Issue number and title.
      b. Date of the identification of the issue.
      c. Name of the commissioning team member assigned responsibility for resolution.
      d. Expected date of correction.

J. Commissioning Report: CxA shall document results of the commissioning process including unresolved issues and performance of systems, subsystems, and equipment. The commissioning report shall indicate whether systems, subsystems, and equipment have been completed and are performing according to the OPR, BoD, and Contract Documents. The commissioning report shall include, but is not limited to, the following:

1. Lists and explanations of substitutions; compromises; variances in the OPR, BoD, and Contract Documents; record of conditions; and, if appropriate, recommendations for resolution. This report shall be used to evaluate systems, subsystems, and equipment and shall serve as a future reference document during Owner occupancy and operation. It shall describe components and performance that exceed requirements of the OPR, BoD, and Contract Documents and those that do not meet requirements of the OPR, BoD, and Contract Documents. It may also include a recommendation for accepting or rejecting systems, subsystems, and equipment.
2. OPR and BoD documentation.
3. Commissioning plan.
4. Testing plans and reports.
5. Corrective modification documentation.
6. Issues log.
7. Completed test checklists.
8. Listing of off-season test(s) not performed and a schedule for their completion.

K. Systems Manual: CxA shall gather required information and compile systems manual. Systems manual shall include, but is not limited to, the following:
1. OPR and BoD, including system narratives, schematics, and changes made throughout the Project.
2. Project Record Documents as specified in Division 01 Section "Project Record Documents."
3. Final commissioning plan.
4. Commissioning report.
5. Operation and maintenance data as specified in Division 01 Section "Operation and Maintenance Data."

1.08 SUBMITTALS

A. Commissioning Plan Pre-final Submittal: CxA shall submit two hard copies of pre-final commissioning plan. Deliver one copy to each Contractor, one to Owner, and one to Architect. Present submittal in sufficient detail to evaluate data collection and arrangement process. One copy, with review comments, will be returned to the CxA for preparation of the final construction-phase commissioning plan.

B. Commissioning Plan Final Submittal: CxA shall submit two hard copies and two sets of electronically formatted information of final commissioning plan. Deliver one hard copy and one set of discs to Owner, and one copy to Architect. The final submittal must address previous review comments. The final submittal shall include a copy of the pre-final submittal review comments along with a response to each item.

C. Test Checklists and Report Forms: CxA shall submit sample checklists and forms to each Contractor quality-control manager and subcontractors for review and comment. Submit two copies of each checklist and report form.

D. Certificates of Readiness: CxA shall submit Certificates of Readiness.

E. Test and Inspection Reports: CxA shall submit test and inspection reports.

F. Corrective Action Documents: CxA shall submit corrective action documents.

G. Pre-final Commissioning Report Submittal: CxA shall submit two hard copies of the pre-final commissioning report. Include a copy of the preliminary submittal review comments along with CxA's response to each item. CxA shall deliver one copy to Owner and one copy to Architect. One copy, with review comments, will be returned to the CxA for preparation of final submittal.

H. Final Commissioning Report Submittal: CxA shall submit two hard copies and two sets of electronically formatted information of the final commissioning report. CxA shall deliver one hard copy and one set of discs to Owner, and one copy to Architect. The final submittal must address previous review comments and shall include a copy of the pre-final submittal review comments along with a response to each item.

1.09 QUALITY ASSURANCE

A. Instructor Qualifications: Factory-authorized service representatives, experienced in training, operation, and maintenance procedures for installed systems, subsystems, and equipment.

B. Test Equipment Calibration: Comply with test equipment manufacturer's calibration procedures and intervals. Recalibrate test instruments immediately whenever instruments have been repaired following damage or dropping. Affix calibration tags to test instruments. Instruments shall have been calibrated within six months prior to use.

1.10 COORDINATION

A. Coordinating Meetings: CxA shall conduct weekly coordination meetings of the commissioning team to review progress on the commissioning plan, to discuss scheduling conflicts, and to discuss upcoming commissioning process activities.

B. Pre-testing Meetings: CxA shall conduct pretest meetings of the commissioning team to review startup reports, pretest inspection results, testing procedures, testing personnel and instrumentation requirements, and manufacturers' authorized service representative services for each system, subsystem, equipment, and component to be tested.

C. Testing Coordination: CxA shall coordinate sequence of testing activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
   1. Schedule times for tests, inspections, obtaining samples, and similar activities.

D. Manufacturers' Field Services: CxA shall coordinate services of manufacturers' field services.

PART 2 - PRODUCTS

2.01 NOT USED.

PART 3 - EXECUTION

3.01 OPERATION AND MAINTENANCE TRAINING REQUIREMENTS

A. Training Preparation Conference: Before operation and maintenance training, CxA shall convene a training preparation conference to include Owner's operation and maintenance personnel, each Contractor, and subcontractors
   1. Review the OPR and BoD.
   2. Review installed systems, subsystems, and equipment.
   3. Review instructor qualifications.
   4. Review instructional methods and procedures.
   5. Review training module outlines and contents.
   6. Review course materials (including operation and maintenance manuals).
   7. Inspect and discuss locations and other facilities required for instruction.
   8. Review and finalize training schedule and verify availability of educational materials, instructors, audiovisual equipment, and facilities needed to avoid delays.
   9. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

3.02 Training Modules: Develop an instruction program that includes individual training modules for each system, subsystem, and equipment as specified in Division 01, General Requirements for Demonstration and Training.

3.03 ACOUSTIC PERFORMANCE TESTING

A. Provide acoustic performance testing in accordance with the requirements of EQ3.0 of the "CA-CHPS 2009" Criteria.
   1. Maximum Background Noise Level: Unoccupied classrooms must have a maximum background noise level of no more than 45 dBA.
   2. The standard anticipates two primary noise sources, steady HVAC equipment noise and the usually unsteady exterior environmental noise. Where the measured ambient noises due to sources other than HVAC are within 5 dBA of the measured overall noise (HVAC and exterior intrusive noise) a measurement of at least 1/2 hour duration shall be made in at least two classrooms in each building in the worst case (noisiest) locations on the school site during normal school days and hours.
      a. To evaluate the significance of intrusive exterior noise, a 30-minute Equivalent Sound Level (LAeq30, in general conformance with ANSI S12.60-2002, Annex E3) measurement shall be made in the classroom that is subjectively assessed to represent the worst case exposure to exterior noise, with the HVAC system not in operation. This Leq30 measurement shall be repeated with the HVAC in operation. If the second "HVAC-on" sound level is more than 5 dB greater than the initial "HVAC-off" measurement, exterior noise intrusion shall be deemed "not significant".

b. Where intrusive exterior noise has been deemed "not significant" short-term (15 second) A-weighted sound level measurements shall be made in each classroom with the HVAC systems in operation. Where exterior intrusive noise has been deemed "significant" (per the evaluation method noted above), LAeq30 sound level measurements shall be made in each classroom with the HVAC system in operation. In either case, where classrooms are served by variable-air-volume systems, the systems shall be operated at maximum nominal flow (typically by means of varying the thermostat set point).

c. Where exposure to exterior noise varies significantly between groups of classrooms (e.g. one side of a classroom wing adjacent to a street, the other side facing away), separate evaluations of exterior noise significance can be conducted to limit the need for LAeq30 measurements.

B. Classrooms less than 10,000 cubic feet must have a 0.6-second maximum (unoccupied) reverberation time and classrooms with volumes between 10,000 cubic feet and 20,000 cubic feet must have a 0.7-second maximum (unoccupied, furnished, and fitted-out) reverberation time. (ANSI Standard S12.60-2002).

END OF SECTION

SECTION 01 91 14

O&M TRAINING REVIEW

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Section 01 30 00, Administrative Requirements

B. Section 01 91 13, General Commissioning

C. Section 01 91 17, Mechanical Commissioning Requirements

D. Section 01 91 18, Electrical Commissioning Requirements

E. Division 23, Heating, Ventilating and Air Conditioning

F. Division 26, Electrical

PART 2 - PRODUCTS

2.01 NOT USED

PART 3 - EXECUTION

3.01 TRAINING OF OWNER PERSONNEL

A. The CONTRACTOR is responsible for training coordination and scheduling and ultimately for ensuring that training is completed.

B. The Commissioning Provider shall be responsible for overseeing and approving the content and adequacy of the training of FACILITIES personnel for commissioned equipment.
   1. The CP shall interview FACILITIES personnel to determine the special needs and areas where training will be most valuable. The OWNER'S REPRESENTATIVE and CP shall decide how rigorous the training should be for each piece of commissioned equipment. The CP shall communicate the results to the CONTRACTOR and subcontractors who have training responsibilities.
   2. In addition to these general requirements, specific training requirements are specified in Sections 01 91 17 and 01 91 18.
   3. Each contractor responsible for training will submit a written training plan to the CP for review and approval prior to training. The CP will provide a template form for this purpose.
   4. The CP develops an overall training scope for commissioned equipment and coordinates and schedules with the CONTRACTOR. The CP develops criteria for determining that the training was satisfactorily completed, including attending some of the training. The CP recommends approval of the training to the ENGINEER using a standard form.

C. The controls contractor shall provide operating manuals, training to maintenance and operation personnel.

END OF SECTION

SECTION 01 91 16

LANDSCAPE IRRIGATION COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. General requirements that apply to implementation of commissioning of the landscape irrigation system.

B. Related Sections:
1. 01 91 13 General Commissioning Process
2. 32 84 23 Landscape Irrigation

1.02 RESPONSIBILITIES

A. Contractors: Participate in the Commissioning process as a commissioning team member as described in Section 01 91 13 and in the Commissioning Plan.

1.03 SUBMITTALS

A. Contractors shall provide submittal documentation relative to commissioning as required in Section 01 30 00 Administrative Requirements.

PART 2 - PRODUCTS

2.01 TEST EQUIPMENT

A. Refer to Section 01 91 13 Part 2 for requirements.

PART 3 - EXECUTION

3.01 COMMISSIONING PROCESS REQUIREMENTS

A. Refer to Section 01 91 13 and the Commissioning Plan for information on meetings, functional testing, operations & maintenance data, training requirements, and other commissioning activities.

3.02 TESTING REQUIREMENTS

A. This section specifies the functional testing requirements for Division 2 systems and equipment. From these requirements, the Commissioning Provider will develop testing procedures in accordance with Section 01 91 13 and the Commissioning Plan. The test procedures for each piece of equipment or system will contain the information below.

1. Contractors responsible for installation, maintenance, and testing must be completed with these tasks prior to commissioning testing.
2. Contractor responsibilities for executing functional tests
3. A list of equipment & components being tested
4. Functions, modes, and testing conditions
5. Required monitoring
6. Acceptance criteria
7. Sampling strategies allowed

B. This section specifies the acceptance testing requirements for the landscape irrigation system.
1. Irrigation pipes and connections
2. Irrigation heads and coverage
3. Back-flow devices
4. Coverage of irrigation
5. Automatic sensors, timers and other controls

END OF SECTION

SECTION 01 91 17

MECHANICAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. General requirements that apply to implementation of commissioning of mechanical equipment.

B. Related work:
1. 01 91 13 General Commissioning Processes lists Divisions 21, 22 and 23 commissioned systems, and lists other commissioning sections in these Specifications.

1.02 RESPONSIBILITIES

A. Divisions 21, 22, and 23 Contractors: Participate in the Commissioning process as a commissioning team member as described in Section 01 91 13 and in the Commissioning Plan.

1.03 SUBMITTALS

A. Divisions 21, 22 and 23 Contractors shall provide submittal documentation relative to commissioning as required in Section 01 30 00 Administrative Requirements.

PART 2 - PRODUCTS

2.01 TEST EQUIPMENT

A. Refer to Section 01 91 13 Part 2 for Division 23 requirements and the requirements below.

B. All standard test equipment required by the Commissioning Process for test and balance will be provided by the testing and air balance (TAB) contractor. Mechanical testing equipment will be provided by the installing contractor. The installing contractor will provide electrical testing equipment, and the portable data loggers provided by the contractors will be used to trend data for commissioning.

C. Other special equipment, tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment will be included in the base bid price to the Contractor and left on site.

D. Testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the following tolerances: Temperature sensors and digital thermometers shall have a certified calibration within the past year to an accuracy of 0.5°F and a resolution of + or - 0.1°F. Pressure sensors shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year. Equipment shall be calibrated according to the manufacturer's recommended intervals and when dropped or damaged. Calibration tags shall be affixed or certificates readily available.

E. Refer to Part 3 of this Section for details regarding equipment that may be required to simulate required test conditions

PART 3 - EXECUTION

3.01 COMMISSIONING PROCESS REQUIREMENTS

A. Refer to Section 01 91 13 and the Commissioning Plan for information on meetings, functional testing, operations & maintenance data, training requirements, and other commissioning activities.

3.02 SENSOR CALIBRATION

A. Field-installed temperature, relative humidity, CO2, pressure sensors, pressure gages, and actuators (dampers and valves) shall be calibrated using the methods described below. Calibration procedures are documented during Contractor Start-Up or Commissioning Functional Testing. Alternate methods may be used, if approved by the Commissioning Provider.

B. Test instruments shall have had a NIST certified calibration within the last 12 months. Sensors installed in the unit at the factory with provided calibration certification need not be field calibrated.

C. Sensors:
1. Verify that sensor locations are appropriate and away from causes of erratic operation.
2. Verify that sensors with shielded cable are grounded only at one end.
3. For sensor pairs that determine a temperature difference, make sure they are reading within 0.2°F of each other.
4. For sensor pairs that determine a pressure difference, make sure they are reading within 2% of each other.
5. Calibration: Put the equipment in operation. Make a reading with a calibrated test instrument within six inches of the site sensor. Verify that the sensor reading (via the permanent thermostat or gage) is within the tolerance listed in the table below of the instrument-measured value. If not, calibrate or replace sensor.
6. Tolerances:

Sensor	Required Tolerance (+/-)
Cooling coil water temps	0.4° F
AHU wet bulb dew point	2.0° F

Hot water coil 1.5° F
Outside air, space air, duct air temps 0.4° F
Watt-hour, voltage & amperage 1% of design
Pressures, air, water, & gas 3% of sensor range (incl. design value)
Flow rates, air 10% of sensor range (incl. design value)
Flow rates, water 4% of sensor range (incl. design value)
Flow rates, natural gas 5% of sensor range (incl. design value)
Relative humidity 4%
CO_2 monitor 100 ppm
Sound level 5 dB

3.03 TESTING REQUIREMENTS

A. This section specifies the functional testing requirements for Division 23 systems and equipment. From these requirements, the Commissioning Provider will develop testing procedures in accordance with Section 01 91 13 and the Commissioning Plan. The test procedures for each piece of equipment or system will contain the information below.

1. Contractors responsible for start-up, air balance, and other testing must be completed with these tasks prior to commissioning testing.
   a. Contractor responsibilities for executing functional tests
   b. A list of equipment & components being tested
   c. Functions, modes, and testing conditions
   d. Required monitoring
   e. Acceptance criteria
   f. Sampling strategies allowed
2. Sample HVAC equipment testing requirements follow as an appendix to this Section.

END OF SECTION

SECTION 01 91 18

ELECTRICAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. General requirements that apply to implementation of commissioning of electrical equipment.

B. Related work:
1. 01 91 13 General Commissioning Processes lists Division 26 commissioned systems, and lists other commissioning sections in these Specifications.

1.02 RESPONSIBILITIES

A. Division 26 Contractors: Participate in the Commissioning process as a commissioning team member as described in Section 01 91 13 and in the Commissioning Plan.

1.03 SUBMITTALS

A. Division 26 Contractors shall provide submittal documentation relative to commissioning as required in Section 01 30 00 Administrative Requirements.

PART 2 - PRODUCTS

2.01 TEST EQUIPMENT

A. Refer to Section 01 91 13 Part 2 for Divisions 21, 22, 23 requirements.

PART 3 - EXECUTION

3.01 COMMISSIONING PROCESS REQUIREMENTS

A. Refer to Section 01 91 13 and the Commissioning Plan for information on meetings, functional testing, operations & maintenance data, training requirements, and other commissioning activities.

3.02 TESTING REQUIREMENTS

A. This section specifies the functional testing requirements for Division 26 systems and equipment. From these requirements, the Commissioning Provider will develop testing procedures in accordance with Section 01 91 13 and the Commissioning Plan. The test procedures for each piece of equipment or system will contain the information below.

1. Contractors responsible for installation, burn-in, and other testing must be completed with these tasks prior to commissioning testing.
2. Contractor responsibilities for executing functional tests
3. A list of equipment & components being tested
4. Functions, modes, and testing conditions
5. Required monitoring
6. Acceptance criteria
7. Sampling strategies allowed

B. Sample lighting equipment testing requirements follow as an appendix to this Section.

END OF SECTION

SECTION 10 14 53

PARKING AREA SIGNS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Accessible parking warning signs.

B. Designated accessible parking stall signs.

C. Fire lane law signs.

D. Tow-Away Signs.

E. Non-Illumuniated Regulatory Sign.

F. Posts, mounting brackets, fasteners, and accessories.

1.02 REFERENCE STANDARDS

A. Conform to reference standards by date of issue current on date of Contract Documents.

B. CBC - California Building Code, 2016.

C. ASTM - American Society for Testing and Materials
   1. ASTM A53 - Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
   2. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
   3. ASTM D4956-01a - Reflective Sheeting for Traffic Controls.
   4. ASTM B209-96 - Aluminum and Aluminum-Alloy Sheet and Plate.

D. FED-STD-595B - Colors used in Government Procurement.

E. California Vehicle Code.

F. MUTCD - Department of Transportation, Manual for Uniform Traffic Control Devices.

G. IR 11B-7 - Interpretation of Regulations, Title 24 California Building Standards Code, California Building Code Chapter 11B, Requirements for Accessible Parking Spaces.

1.03 SUBMITTALS

A. Product data listing sign styles, lettering and locations and overall dimensions of each sign.

B. Three samples illustrating full size sample sign, of type, style and color specified.

1.04 REGULATORY REQUIREMENTS

A. Conform to CBC for accessibility provisions.

1.05 DELIVERY, STORAGE AND HANDLING

A. Store and protect products.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products of following manufacturers form basis for design and quality intended.
   1. Western Highway Products, Inc, Stanton, CA.

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

2.02 CONSTRUCTION

A. Post- and Wall-Mounted Signs: fabricated from 0.080- to 0.063-inch thick, Alloy 5052-H32 or 5053-H38 aluminum, with screen-printing on 3M, Type 2, Engineer Grade reflective sheeting.

B. Mount signs to posts with minimum two 3/16-inch diameter round head bolts with tamperproof nuts, galvanized.

C. Posts:
   1. 2 inch diameter galvanized steel pipe weighing minimum of 3.65 pounds per foot and conforming to ASTM A53 Schedule 40.

D. Comply with Transportation, Manual for Uniform Traffic Control Devices.

2.03 ACCESSIBLE PARKING WARNING SIGNS AT TRAFFIC ENTRY

A. Warning Sign: Post- or Wall-Mounted Sign, not less than 17 by 22 inches with 1-inch high lettering and reading per CBC 11B-502.8.1. Coordinate with owner for telephone numbers, blank lines not permitted. Sign shall read: "Unauthorized vehicles parked in designated accessible spaces not displaying distinguishing placards or special license plates issued for persons with disabilities will be towed away at owner's expense. Towed vehicles may be reclaimed at 605 Venture St, Escondidi, CA 92029 or by telephoning 760-480-9600."
   1. Insert address and telephone number indicated on Drawings. A blank space or line for on-site modification is not permitted.
   2. All lettering, including reclamation contact information, shall be permanent part of factory produced sign.

B. Position sign in conspicuous location immediately adjacent to each entrance to off street parking facility or immediately adjacent to and visible from each stall or space.

C. Sign shall be mounted 36-inches maximum from bottom of sign to adjacent finish grade or ground or 80 inches to pedestrian way or sidewalk, or as indicated on Drawings.

D. Comply with California Building Code Section 11B-502.8 and Transportation, Manual for Uniform Traffic Control Devices.

2.04 ACCESSIBLE PARKING STALL SIGNS

A. Designated Accessible Parking Space Signs: Post-Mount Signs, not less than 70 square inches with white reflectorized copy on contrasting color FED-STD 595C, No.15090 - blue background. Sign shall display International Symbol of Accessibility conforming to CBC Sections 11B-703.7.2.1 and the proportions in indicated the ADA Standards.
   1. An additional sign or additional language below the symbol of accessibility shall state "Minimum Fine $250", Section 11B-502.6.2.

B. Position one sign at end of each parking space designated for disabled usage.

C. One in every eight spaces, but not less than one, also shall display a "Van Accessible" sign below symbol of accessibility.

D. Sign shall be mounted 80 inches from bottom of sign to finish grade of parking space or centered on wall at interior end of parking space at minimum height of 36 inches above parking space, finished grade, ground or sidewalk, or as indicated on Drawings.

E. Comply with California Building Code Section 11B-502 and Transportation, Manual for Uniform Traffic Control Devices.

2.05 FIRE LANE LAW SIGNS

A. Single post mount, 6 feet, 8 inches from bottom of sign to finish grade.

B. Fire Lane Law Sign shall be 24 inches wide by 18 inches high with white and black letters fabricated with sign in contrasting color design. Coordinate with owner for telephone numbers, blank lines not permitted. Sign shall read:

TRAFFIC AND PARKING LAWS ENFORCED
THIS PROPERTY SUBJECT TO ALL REGULATIONS AND CONTROLS PROVIDED BY THE CITY OF FALLBROOK ORDINANCES AND CVC 22500.1 VIOLATORS WILL BE TOWED AT OWNERS EXPENSE, CITY OF FALLBROOK POLICE DEPARTMENT
(760) 451-3100

C. Comply with Transportation, Manual for Uniform Traffic Control Devices.

2.06 TOW-AWAY SIGNS

A. Single post mount, 6 feet, 8 inches from bottom of sign to finish grade, unless noted otherwise.

B. Tow-away sign, Seton or equal, shall be 12 inches wide x 18 inches high x .125 inches thick with white and black letters fabricated with sign in contrasting color design. Engineer-Grade Reflective and High-Intensity Reflectivity aluminum.

C. Refer to Drawings.

2.07 NON-ILLUMINATED REGULATORY SIGNS

A. Sign shall be constructed of an extruded aluminum plate sign panel.

B. Sign panel shall be a 0.080-inch aluminum plate with surface applied 3M engineer grade regulatory reflective sheeting High Intensity Grade 3. Panel mechanically fastens to support post with tamper resistant fasteners.

C. Posts: 2-inch diameter galvanized steel pipe weighing minimum of 3.65 pounds per foot and conforming to ASTM A53 Schedule 40.

D. Sign to be installed with direct burial of post into concrete. If sign is to be installed with a base plate / "J" bolt type mounting, anchor at four locations, tack weld hex nuts to prevent removal.

E. Signs shall be reflective traffic control symbols complying to Department of Transportation, Manual for Uniform Traffic Control Devices (MUTCD) in color, shape proportions, text and symbols.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work.

B. Beginning of installation means installer accepts existing surfaces.

3.02 INSTALLATION

A. Set posts in 3000 psi concrete base, minimum 12-inch diameter and 18 inches deep. Signs set in asphalt, concrete paved surfaces or concrete sidewalks shall be set in core-drilled holes minimum 8-inch diameter, 18 inches deep with top of base flush to finish. Signs mounted to walls shall be attached firmly with appropriate expansion anchors or bolting, adhesive not permitted. Seal all holes watertight.

B. Clean and polish.

END OF SECTION

SECTION 12 93 00

SITE FURNISHINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Site furnishings and improvement items applicable to Work and not specified under individual technical sections.

B. Related Sections:
   1. Section 32 13 13, Sitework Concrete.

1.02 SUBMITTALS

A. Shop drawings and product data for components, hardware and accessories. Show construction and fabrications details, procedures, layout and erection diagrams, anchorages and pertinent information for specified specialty item.

B. Samples sufficiently sized to illustrate clearly all sizes, available colors, materials, patterns and finishes.

C. Manufacturer's installation instructions and maintenance recommendations.

1.03 FIELD MEASUREMENTS

A. Verify site conditions. Obtain accurate dimensions of openings, levels, locations and arrangements of embedded and concealed anchorages. Report discrepancies between drawings and field dimensions to Architect before commencing work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Metal Tables and Seating; by Landscape Forms, Kalamazoo, MI, or equal.
   1. Tables: Carousel
      a. material, style, height and finish: as indicated
   2. Seating
      a. material, style, height and finish: as indicated

SECTION 10 80 00

MISCELLANEOUS SPECIALTIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Miscellaneous specialty items applicable to Work and not specified under individual technical sections.

1.02 SUBMITTALS

A. Shop drawings and product data for all components, hardware and accessories under provisions of Division 01, General Requirements. Show construction and fabrications details, procedures, layout and erection diagrams, anchorages and pertinent information for specified specialty item.

B. Samples sufficiently sized to illustrate clearly all sizes, available colors, materials, patterns and finishes.

C. Manufacturer's installation instructions and maintenance recommendations under provisions of Division 01, General Requirements.

1.03 FIELD MEASUREMENTS

A. Verify site conditions. Obtain accurate dimensions of openings, levels, locations and arrangements of embedded and concealed anchorages. Report discrepancies between drawings and field dimensions to Architect before commencing work.

PART 2 - PRODUCTS

2.01 SPECIALTY ITEMS

A. PADLOCK: Knox Padlock exterior, heavy duty padlock, or equal, with 7/16 inch diameter stainless steel shackle, 4 7/8 inch long, heavy duty cast brass body protected by EPDM elastomeric cover.
   a. Quantities: As indicated on Drawings.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install equipment specialties in accordance with the manufacturer's recommended procedures.

B. Provide electrical and mechanical [irrigation] connections to building systems. Wire internal connections when part of unit's functionality.

C. Install with wall and floor anchors per manufacturer's recommendations.

END OF SECTION

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION, GENERAL

A. Comply with manufacturer's written installation instructions, unless more stringent requirements are indicated. Complete field assembly of site furnishings, where required.

B. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed.

C. Install site furnishings level, plumb, true, and securely anchored or positioned at locations indicated on Drawings.

3.03 CLEANING

A. After completing site furnishing installation, inspect components. Remove spots, dirt, and debris. Repair damaged finishes to match original finish or replace component.

END OF SECTION

SECTION 129300
SITE FURNISHINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes picnic tables.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product and material.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data.

PART 2 - PRODUCTS

2.1 PICNIC TABLES

A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1. Landscape Forms, Model #Carousel – 6 seat backless seats with umbrella hole, surface mount, color to be silver.

2. Landscape Forms, Model #Carousel – 5 seat backless seats with umbrella hole, surface mount, color to be silver.

B. Landscape Forms, Model #Carousel – 3 seat backless seats with umbrella hole, surface mount, color to be silver, ADA compliant.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Comply with Plans and Specifications and manufacturer's written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.

B. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed.

C. Install site furnishings level, plumb, true, and securely anchored and positioned at locations indicated on Drawings.

END OF SECTION 129300

SECTION 26 01 00

ELECTRICAL GENERAL PROVISIONS

ARTICLE 1 SUMMARY

1.1 This Division of the specification outlines the provisions of the contract work to be performed under this Division.

1.2 This Section applies to and forms a part of each section of specifications in Division 26 and all work performed under the electrical and communications contracts.

1.3 In addition, work in this Division is governed by the provisions of the bidding requirements, contract forms, general conditions and all sections under general requirements.

1.4 These specifications contain statements which may be more definitive or more restrictive than those contained in the General Conditions. Where these statements occur, they shall take precedence over the General Conditions.

1.5 Where the words 'provide' or 'provision' are used, it shall be definitely interpreted as 'furnishing and installing complete in operating condition'. Where the words 'as indicated' or 'as shown' are used, it shall mean as shown on contract drawings.

1.6 Where items are specified in the singular, this Division shall provide the quantity as shown on drawings plus any spares or extras mentioned on drawings or specifications. All specified and supplied equipment shall be new.

ARTICLE 2 CONTRACTOR QUALIFICATIONS

2.1 The Contractor shall have a current California C-10 Electrical Contractor's license and all individuals working on this project shall have passed the Department of Industrial Relations Division of apprenticeship Standards – "Electrician Certification Program."

ARTICLE 3 CODES, PERMITS AND FEES

3.1 Comply with all applicable laws, ordinances, rules, regulations, codes, or rulings of governmental units having jurisdiction as well as standards of NFPA, and serving utility requirements.

3.2 Obtain permits, fees, inspections, meter and the like, associated with work in each section of this Division.

3.3 Installation procedures, methods and conditions shall comply with the latest requirements of the Federal Occupational Safety and Health Act (OSHA).

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ARTICLE 4 EXAMINATION OF PREMISES

4.1 Examine the construction drawings and premises prior to bidding. No allowances will be made for not being knowledgeable of existing conditions.

ARTICLE 5 STANDARDS

5.1 The following standard publications of the latest editions enforced and supplements thereto shall form a part of these specifications. All electrical work must, as a minimum, be in accordance with these standards.

5.1.1 2016 California Electrical Code (CEC), Part 3 Title 24 CCR.
5.1.2 National Fire Protection Association.
5.1.3 Underwriters' Laboratories, Inc. (UL).
5.1.4 Certified Ballast Manufacturers' Association (CBM).
5.1.5 National Electrical Manufacturers' Association (NEMA).
5.1.6 Institution of Electrical & Electronics Engineers (IEEE).
5.1.7 American Society for Testing & Materials (ASTM).
5.1.8 National Board of Fire Underwriters (NBFU).
5.1.9 National Board of Standards (NBS).
5.1.10 American National Standards Institute (ANSI).
5.1.11 Insulated Power Cable Engineers Association (IPECS).
5.1.12 Electrical Testing Laboratories (ETL).
5.1.13 National Electrical Safety Code (NESC).
5.1.14 2016 California Building Code (CBC), Part 2, Title 24 CCR.
5.1.15 2016 California Fire Code (CFC), Part 9, Title 24, CCR.
5.1.16 2016 NFPA 72 with California State Amendments
5.1.17 National Electrical Testing Association (NETA), 2010 or most current

ARTICLE 6 DEFINITIONS

6.1 Concealed: Hidden from sight, as in trenches, chases, hollow construction, or above furred spaces, hung ceilings - acoustical or plastic type, or exposed to view only in tunnels, attics, shafts, crawl spaces, unfinished spaces, or other areas solely for maintenance and repair.

6.2 Exposed, Non-Concealed, Unfinished Space: A room or space that is ordinarily accessible only to building maintenance personnel, a room noted on the 'finish schedule' with exposed and unpainted construction for walls, floors, or ceilings or specifically mentioned as 'unfinished'.

6.3 Finish Space: Any space ordinarily visible, including exterior areas.

ARTICLE 7 WORK AND MATERIALS

7.1 Unless otherwise specified, all materials must be new and of the best quality. Materials previously incorporated into other projects, salvaged, or refurbished are not considered new. Perform all labor in a thorough and workmanlike manner.

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7.2 All materials provided under the contract must bear the UL label where normally available. Note that this requirement may be repeated under equipment specifications. In general, such devices as will void the label should be provided in separate enclosures and wired to the labeled unit in proper manner.

ARTICLE 8 SHOP DRAWINGS AND SUBMITTALS

8.1 Submit shop drawings and all data in accordance with Division 1 of these specifications and as noted below for all equipment provided under this Division.

8.2 Shop drawings submittals demonstrate to the Architect that the Contractor understands the design concept. The Contractor demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods of material and equipment he intends to use. If deviations, discrepancies, or conflicts between submittals and specifications are discovered either prior to or after submittals are processed, notify the Architect immediately.

8.3 Manufacturer's data and dimension sheets shall be submitted giving all pertinent physical and engineering data including weights, cross sections and maintenance instructions. Standard items of equipment such as receptacles, switches, plates, etc., which are cataloged items, shall be listed by manufacturer.

8.4 Index all submittals and reference them to these specifications. All submittal items shall be assembled and submitted, one for each specification section. (Multiple specification sections may be grouped together in one common submittal binder, as long as each individual section is clearly identified.) Partial or incomplete submittal sections will not be reviewed.

ARTICLE 9 EQUIPMENT PURCHASES

9.1 Arrange for purchase and delivery of all materials and equipment within 20 days after approval of submittals. All materials and equipment must be ordered in ample quantities for delivery at the proper time. If items are not on the project in time to expedite completion, the Owner may purchase said equipment and materials and deduct the cost from the contract sum.

9.2 Provide all materials of similar class or service by one manufacturer.

ARTICLE 10 COOPERATIVE WORK

10.1 Correct without charge any work requiring alteration due to lack of proper supervision or failure to make proper provision in time. Correct without charge any damage to adjacent work caused by the alteration.

10.2 Cooperative work includes: General supervision and responsibility for proper location and size of work related to this Division, but provided under the other

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sections of these specifications, and installation of sleeves, inserts, and anchor bolts for work under each section in this Division.

ARTICLE 11 VERIFICATION OF DIMENSIONS

11.1 Scaled and figured dimensions are approximate only. Before proceeding with work, carefully check and verify dimensions, etc., and be responsible for properly fitting equipment and materials together and to the structure in spaces provided.

11.2 Drawings are essentially diagrammatic, and many offsets, bends, pull boxes, special fittings, and exact locations are not indicated. Carefully study drawings and premises in order to determine best methods, exact location, routes, building obstructions, etc. and install apparatus and equipment in manner and locations to avoid obstructions, preserve headroom, keep openings and passageways clear, and maintain proper clearances.

ARTICLE 12 CUTTING AND PATCHING

12.1 All cutting and patching shall be in accordance with Division 1 of these specifications and as noted below.

12.2 Cut existing work and patch as necessary to properly install new work. As the work progresses, leave necessary openings, holes, chases, etc., in their correct location. If the required openings, holes, chases, etc., are not in their correct locations, make the necessary corrections at no cost to the Owner. Avoid excessive cutting and do not cut structural members including wall framing without the consent of the Architect.

ARTICLE 13 CLOSING-IN OF UNINSPECTED WORK

13.1 Cover no work until inspected, tested, and approved by the Architect. Where work is covered before inspection and test, uncover it and when inspected, tested, and approved, restore all work to original proper condition at no additional cost to Owner.

ARTICLE 14 EXCAVATION AND BACKFILL

14.1 All excavation and backfill shall be in accordance with Division 1 of these specifications and as noted below.

14.2 Perform all necessary excavation, shoring, and backfilling required for the proper laying of all conduits inside the building and premises, and outside as may be necessary.

14.3 Excavate all trenches open cut, keep trench banks as nearly vertical as practicable, and sheet and brace trenches where required for stability and safety. Excavate trenches true to line and make bottoms no wider than necessary to provide ample work room. Grade trench bottoms accurately. Machine grade only to the top line of the conduits, doing the remainder by hand. Do not cut any

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trench near or under footings without first consulting the Architect. All trenches shall be done in accordance with OSHA standards and regulations.

14.4 Backfilling shall be done with each layer compacted before another layer is added. No stones or coarse lumps shall be laid directly on a conduit or conduits.

14.5 Trenches shall be filled with the specified material. Sod, if any, shall be removed in cut sections and replaced in same manners.

14.6 Provide pumps and drainage of all open trenches for purposes of installing electrical duct and wiring.

14.7 Perform all backfilling in accordance with the requirements of and under the direction of the Geotechnical Engineer(90% compaction).

14.8 Where new underground trenching is required on sites or in any area where existing underground utilities exist, the Contractor shall provide an independent professional utility locating service to locate exact vertical and horizontal locations of all existing utilities. Where existing utilities are found the Contractor shall hand dig those areas to avoid disruption. The Contractor shall be responsible for immediate repairs to existing underground utilities damaged during construction. The Contractor shall repair all existing asphalt, concrete and landscape surfaces damaged or removed during construction to match their original conditions. Where trenching extends through public streets or roadways, the Contractor shall notify underground service alert in addition to the independent locating service 48 hours before start of construction to determine location of existing utilities by calling (800) 422-4133.

ARTICLE 15 CONCRETE

15.1 Where used for structures to be provided under the contract such as bases, etc., concrete work, and associated reinforcing shall be as specified under Division 3 of these specifications.

15.2 See other sections for additional requirements for underground vaults, cable ducts, etc.

ARTICLE 16 ACCESSIBILITY

16.1 Install all control devices or other specialties requiring reading, adjustment, inspection, repairs, removal, or replacement conveniently and accessibly throughout the finished building.

16.2 All required access doors or panels in walls and ceilings are to be furnished and installed as part of the work under this Section. Refer to Division 1 of these specifications and as noted below.

16.3 Where located in fire rated assemblies, provide doors which match the rating of the assembly and are approved by the jurisdictional authority.

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16.4 Refer to 'finish schedule' for types of walls and ceilings in each area and the architectural drawings for rated wall construction.

16.5 Coordinate work of the various sections to locate specialties requiring accessibility with others to avoid unnecessary duplication of access doors.

ARTICLE 17 FLASHING

17.1 Flash and counter flash all conduits penetrating roofing membrane as shown on Architectural drawings. All work shall be in accordance with Division 7 of these specifications.

ARTICLE 18 IDENTIFICATION OF EQUIPMENT

18.1 All electrical equipment shall be labeled, tagged, stamped, or otherwise identified in accordance with the following schedules:

18.1.1 General:

18.1.1.1 In general, the installed laminated nameplates as hereinafter called for shall also clearly indicate its use, areas served, circuit identification, voltage and any other useful data.

18.1.1.2 All auxiliary systems, including communications, shall be labeled to indicate function.

18.1.2 Lighting and Local Panelboards:

18.1.2.1 Panel identification shall be with white and black micarta nameplates. Letters shall be no less than 3/8" high.

18.1.2.2 Circuit directory shall be two column typewritten card set under glass or glass equivalent. Each circuit shall be identified by the room number and/or number of unit and other pertinent data as required.

18.1.3 Distribution Switchboards and Feeders Sections:

18.1.3.1 Identification shall be with 1" x 4" laminated white micarta nameplates with black lettering on each major component, each with name and/or number of unit and other pertinent data as required. Letters shall be no less than 3/8" high.

18.1.3.2 Circuit breakers and switches shall be identified by number and name with 3/8" x 1-1/2" laminated micarta nameplates with 3/16" high letters mounted adjacent to or on circuit breaker or switch.

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18.1.4 Disconnect Switches, Motor Starters and Transformers:

18.1.4.1 Identification shall be with white micarta laminated labels and 3/8" high black lettering.

18.1.5 All communication system terminal boxes including T.V., telephone/intercom, security, fire alarm, clock, and computer networking shall be provided with white micarta laminated labels and 3/8" high black lettering.

ARTICLE 19 CONSTRUCTION FACILITIES

19.1 Furnish and maintain from the beginning to the completion all lawful and necessary guards, railings, fences, canopies, lights, warning signs, etc. Take all necessary precautions required by City, State Laws, and OSHA to avoid injury or damage to any persons and property.

19.2 Temporary power and lighting for construction purposes shall be provided under this Section. All work shall be in accordance with Division 1 of these specifications.

ARTICLE 20 GUARANTEE

20.1 Guarantee all material, equipment and workmanship for all sections under this Division in writing to be free from defect of material and workmanship for one year from date of final acceptance, as outlined in the general conditions. Replace without charge any material or equipment proven defective during this period. The guarantee shall include performance of equipment under all site conditions, conditions of load, installing any additional items of control and/or protective devices, as required.

ARTICLE 21 PATENTS

21.1 Refer to the General Conditions for Contractor's responsibilities regarding patents.

ARTICLE 22 PLUMBING (DIVISION 22) / HEATING, VENTILATING, AND AIR CONDTIONING (DIVISION 23) / ELECTRICAL – COORDINATION REQUIREMENTS

22.1 All electrical work performed for this project shall conform to the California Electrical Code, to Local Building Codes and in conformance with Division 22, 23, and 26 of these specifications, whether the work is provided under the "Plumbing", "Heating, Ventilating, and Air Conditioning", or the "Electrical" Division of these specifications. Where the Division 22 and/or Division 23 Contractor is required to provide electrical work, he shall arrange for the work to be done by a licensed Division 26 Contractor, using qualified electricians. The Division 22 and/or Division 23 Contractor shall be solely and completely responsible for the correct functioning of all equipment regardless of who provided the electrical work.

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22.2 The work under Division 22 and/or Division 23 shall include the following:

22.2.1 All motors required by mechanical equipment.

22.2.2 All starters for mechanical equipment which are not provided under the electrical division as part of a motor control center or otherwise indicated on the electrical drawings.

22.2.3 All wiring interior to packaged equipment furnished as an integral part of the equipment.

22.2.4 All control **wiring and conduit** for mechanical control systems.

22.2.5 All control systems required by mechanical equipment.

22.3 The work under Division 26 shall include the following:

22.3.1 All power wiring and conduit; and conduit only for EMS control conductors between each building and the main control panel.

22.3.2 Electrical disconnects as shown on the electrical drawings.

22.3.3 Starters forming part of a motor control center.

22.4 All power wiring and conduit to equipment furnished under Division 22 and/or Division 23 shall be provided under Division 26. Control wiring and conduit, whether line voltage or low voltage, shall be provided under the division which furnishes the equipment.

22.5 Power wiring shall be defined as all wiring between the panelboard switchboard overcurrent device, motor control center starter or switch, and the safety disconnect switch or control panel serving the equipment. Also, the power wiring between safety disconnect switch and the equipment line terminals.

22.6 Control wiring shall be defined as all wiring, either line voltage or low voltage, required for the control and interlocking of equipment, including but not limited to wiring to motor control stations, solenoid valves, pressure switches, limit switches, flow switches, thermostats, humidistats, safety devices, smoke detectors, and other components required for the proper operation of the equipment.

22.7 All motor starters which are not part of motor control centers and which are required for equipment furnished under this Division shall be furnished and installed by the Division furnishing the equipment and power wiring connected under Division 26. Motor starters and control devices in motor control centers shall be furnished and installed under Division 26.

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22.8 Division 26 Contractor shall make all final connections of power wiring to equipment furnished under this Division.

22.9 Wiring diagrams complete with all connection details shall be furnished under each respective Section.

22.10 Motor starters supplied by Plumbing and/or Heating, Ventilating and Air Conditioning shall be fused combination type minimum NEMA Size 1, and conform to appropriate NEMA standards for the service required. Provide NEMA type 3R/12 gasketed enclosures in wet locations. Provide all starters with appropriately sized overload protection and heater strips provided in each phase, hand/off auto switches, a minimum of 2 NO and NC auxiliary contacts as required, and an integral disconnecting means. For ½ horsepower motors and below, when control requirements do not dictate the use of a starter, a manual motor starter switch with overload protection in each phase may be provided. Acceptable manufacturers are Allen Bradley, General Electric, Square D, Furnas and Cutler Hammer.

ARTICLE 23 EQUIPMENT ROUGH-IN

23.1 Rough-in all equipment, fixtures, etc. as designed on the drawings and as specified herein. The drawings indicate only the approximate location of rough-ins. Mounting heights of all switches, receptacles, wall mounted fixtures and such equipment must be coordinated with the Architectural Designs. The Contractor shall obtain all rough-in information before progressing with any work for rough-in connections. Minor changes in the contract drawings shall be anticipated and provided for under this Division of the specifications to comply with rough-in requirements.

ARTICLE 24 OWNER FURNISHED AND OTHER EQUIPMENT

24.1 Rough-in and make final connections to all Owner furnished equipment shown on the drawings and specified, and all equipment furnished under other sections of the specifications.

ARTICLE 25 EQUIPMENT FINAL CONNECTIONS

25.1 Provide all final connections for the following:

25.1.1 All equipment furnished under this Division.

25.1.2 Electrical equipment furnished under other sections of the specification.

25.1.3 Owner furnished equipment as specified under this Division.

ARTICLE 26 INSERTS, ANCHORS, AND MOUNTING SLEEVES

26.1 Inserts and anchors must be:

26.1.1 Furnished and installed for support of work under this Division.

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26.1.2 Mounting of equipment that is of such size as to be free standing and that equipment which cannot conveniently be located on walls, such as motor starters, etc., shall be rigidly supported on a framework of galvanized steel angle of Unistrut or B-line systems with all unfinished edges painted.

26.1.3 Furnish and install all sleeves as required for the installation of all work under all Sections of this Division and for all communication systems including any communication systems described in this Section which are bid to the General Contractor. Sleeves through floors, roof, and walls shall be as described in "Conduit and Fittings" Section 26 05 33.

ARTICLE 27 SEISMIC ANCHORING

27.1 All switchgear and other free standing electrical equipment or enclosures shall be anchored to the floor and braced at the top of the equipment to the structure. Where details have not been provided on the drawings, anchorage shall comply with CBC Section 1616A.1.12. The Contractor shall submit drawings signed by the Contractors registered structural Engineer indicating method of compliance prior installation.

27.2 All sound systems, communication, signal or data networking equipment or enclosures shall be anchored to the structure. Where details have not been provided on the drawings, anchorage shall comply with CBC Section 1616A.1.12. The Contractor shall submit drawings signed by the Contractors registered Structural Engineer indicating method of compliance prior to installation.

ARTICLE 28 RUST PROOFING

28.1 Rust proofing must be applied to all ferrous metals and shall be in accordance with Section 05500 of these specifications and as noted below.

28.1.1 Hot-dipped galvanized shall be applied and after forming of angle-iron, bolts, anchors, etc.

28.1.2 Hot-dipped galvanized coating shall be applied after fabrication for junction boxes and pull boxes cast in concrete.

ARTICLE 29 GENERAL WIRING

29.1 Where located adjacent in walls, outlet boxes shall not be placed back to back, nor shall extension rings be used in place of double boxes, all to limit sound transmission between rooms. Provide short horizontal nipple between adjacent outlet boxes, which shall have depth sufficient to maintain wall coverage in rear by masonry wall.

29.2 In those instances where outlet boxes, recessed terminal boxes, or recessed equipment enclosures are installed in a fire rated assembly, provide "Flamesafe FSD 1077" fire stopping pads or approved equal, over the outlet or box.

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29.3 Complete rough-in requirements of all equipment to be wired under the contract are not indicated. Coordinate with respective trades furnishing equipment or with the Architect as the case may be for complete and accurate requirements to result in a neat, workmanlike installation.

ARTICLE 30 SEPARATE CONDUIT SYSTEMS

30.1 Each electrical and signal system shall be contained in a separate conduit system as shown on the drawings and as specified herein. This includes each power system, each lighting system, each signal system of whatever nature, telephone, standby system, sound system, control system, fire alarm system, etc.

30.2 Further, each item of building equipment must have its own run of power wiring. Control wiring may be included in properly sized conduit for equipment feeders of #6 AWG and smaller, having separate conduit for larger sizes.

ARTICLE 31 CLEANUP

31.1 In addition to cleanup specified under other sections, thoroughly clean all parts of the equipment. Where exposed parts are to be painted, thoroughly clean off any spattered construction materials and remove all oil and grease spots. Wipe the surface carefully and scrape out all cracks and corners.

31.2 Use steel brushes on exposed metal work to carefully remove rust, etc., and leave smooth and clean.

31.3 During the progress of the work, keep the premises clean and free of debris.

ARTICLE 32 UTILITY SERVICES

32.1 The Division 26 Contractor shall contact the serving utility companies; notify the serving power, telephone and cable TV utilities of the following:

32.1.1 Name and address of Contractor.

32.1.2 Estimated times of construction start, completion and required service connections.

32.1.3 Project service voltage, phase load, and service size.

32.1.4 Provide to the Architect written verification from each utility company indicating their concurrence with the contract documents.

32.2 Contractor shall notify underground service alert 48 hours before start of construction to determine location of existing utilities by calling (800) 422-4133. All work shall be in accordance with the Division 1 Sections of these specifications.

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32.3 All utility company requirements shall be complied with and approval shall be obtained from the utility company for service equipment. Such as, verification of a field test of the ground fault protection on the main service equipment, panic hardware and etc.

ARTICLE 33 PAINTING

33.1 Paint all unfinished metal as required in accordance with Division 1 of these specifications. (Galvanized and factory painted equipment shall be considered as having a sub-base finish.)

ARTICLE 34 PROJECT CLOSEOUT

34.1 Prior to completion of project, compile a complete equipment maintenance manual for all equipment supplied under sections of this Division, in accordance with Division 1 of these specifications and as described below.

34.2 Equipment Lists and Maintenance Manuals:

34.2.1 Prior to completion of job, Contractor shall compile a complete equipment list and maintenance manuals. The equipment list shall include the following items for every piece of material equipment supplied under this Section of the specifications:

34.2.1.1 Name, model, and manufacturer.

34.2.1.2 Complete parts drawings and lists.

34.2.1.3 Local supply for parts and replacement and telephone number.

34.2.1.4 All tags, inspection slips, instruction packages, etc., removed from equipment as shipped from the factory, properly identified as to the piece of equipment it was taken from.

34.3 Maintenance manuals shall be furnished for each applicable section of the specifications and shall be suitably bound with hard covers and shall include all available manufacturers' operating and maintenance instructions, together with "as-built" drawings to properly operate and maintain the equipment. The equipment lists and maintenance manuals shall be submitted in duplicate to the Architect for approval not less than 10 days prior to the completion of the job. The maintenance manuals shall also include the name, address, and phone numbers of all subcontractors involved in any of the work specified herein. Four copies of the maintenance manuals bound in single volumes shall be provided.

ARTICLE 35 RECORD DRAWINGS

35.1 The Division 26 Contractor shall maintain record drawings as specified in accordance with Division 1 of these specifications, and as noted below.

35.2 Drawings shall show locations of all concealed underground conduit runs, giving the number and size of conduit and wires. Underground ducts shall be shown with cross section elevations and shall be dimensioned in relation to permanent structures to indicate their exact location. Drawing changes shall not be identified only with referencing CORs and RFIs, the drawings shall reflect all of the actual additions or changes made. All as-built drawing information shall be prepared by the contractor in AutoCAD, updating the contract computer files as needed to reflect actual installed conditions for all site plans, lighting, power, communication, networking, audio visual, security or fire alarms systems included in the scope of work for this project.

35.3 One set of these record drawings shall be delivered to the Architect. The engineer will review documents for completeness, and will not be responsible for editing contractor computer files.

ARTICLE 36 CHANGES AND EXTRA WORK

36.1 When **changes** in work are requested, the Division 26 Contractor shall provide unit prices for the work involved in accordance with Division 1 of these specifications, and the following:

36.1.1 The material Costs shall **not exceed** the latest edition of the "Trade Service" end column "C" price list. The materials prices may be higher only where the Contractor can produce invoices to substantiate higher material costs. The Contractor shall submit a print out copy of the trade service sheets with the change order to substantiate these values.

36.1.2 The labor Costs shall **not exceed** the latest edition of the "NECA Manual of Labor Units" **normal column**.

36.2 When **credits** in work are requested, the Division 26 Contractor shall provide unit prices for the work involved in accordance with Division 1 of these specifications, and the following:

36.2.1 The Material Costs shall **not be less than 80% of** the latest edition of the "Trade Service" end column price list. The materials prices may be lower only where the Contractor can produce invoices to substantiate lower material costs. Restocking fees may also be included in this amount where applicable.

36.2.2 The Labor Costs shall **not be less than 80% of** the latest edition of the "NECA Manual of Labor Units" **normal column**.

36.3 Conduit pricing for conduits of all types sized 3" or smaller.

When changes in the scope of work require the Contractor to estimate conduit Installations, they shall **NOT include labor values (only material cost may be included)** for any of the below items. The labor values for conduit installation

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represented in the NECA manual are inflated to a point where additional labor for the below items can not be justified.

36.3.1 Couplings.

36.3.2 Set Screw or Compression Fittings, locknuts, Bushings and washers.

36.3.3 Conduit straps and associated screws or nails.

36.3.4 LB fittings or other specialty fittings or specialty mounting hardware may be included where needed.

36.4 Wire pricing for all types and sizes.

When changes in the scope of work require the Contractor to estimate wire installations they shall **NOT include labor values (only material cost may be included)** for any of the below items. The labor values for wire installation represented in the NECA manual are inflated to a point where additional labor for the below items can not be justified.

36.4.1 Locknuts, Bushings, tape, wire markers.

36.5 When changes in the scope of work require other equipment installations such as lighting fixtures, panelboards, switchboards, wiring devices, communications equipment etc. the Contractor shall **NOT include labor values (only material cost may be included)** for any of the below items. The labor values for these equipment items represented in the NECA manual are inflated to a point where additional labor for the below items can not be justified.

36.5.1 Associated screws, nails, bolts, anchors or supports.

36.5.2 Locknuts, washers, tape.

36.6 The total labor hours for extra work will be required to be calculated as follows:

36.6.1 Change orders with 1 to 30 total labor hours

General Laborer	10%	of total labor hours
Journeyman	10%	of total labor hours
Foreman	80%	of total labor hours

36.6.2 Change orders with 31 to 100 total labor hours

General Laborer	20%	of total labor hours
Journeyman	40%	of total labor hours
Foreman	40%	of total labor hours

36.6.3 Change orders with over 100 total labor hours

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General Laborer	30%	of total labor hours
Journeyman	50%	of total labor hours
Foreman	20%	of total labor hours

36.7 When change orders are issued which allow the work to be completed in the normal sequence of construction, the labor rates shall be based on the most current "Prevailing Wage" – straight time total hourly rate. When change orders require the Contractor to work out of sequence the "Prevailing Wage" – daily overtime hourly rate shall apply. Special condition situations shall be reviewed on an individual basis for alternate hourly rate schedules.

36.8 Costs **will not** be permitted for additional supervision on site or office time for processing any change order other than the 10% overhead allowance as described in Division 1. Cost for special equipment required to install items for an individual change order are permitted and must be individually identified. Lump Sum cost for small tools or any other cost not specifically required for the change order are not permitted.

36.9 Contractor estimates shall be formatted to clearly identify each of the following:

36.9.1 Line item description of each type of material or labor item.

36.9.2 Description of quantity for each item.

36.9.3 Description of (material cost per / quantity).

36.9.4 Description of (labor cost per / quantity).

36.9.5 Description of total labor hour breakdown per Foreman, Journeyman or General Laborer as described above.

ARTICLE 37 ELECTRONIC FILES

37.1 The Contractor shall make a ***written*** request directly to Johnson Consulting Engineers for electronic drawing files. As a part of the written request, please include the following information:

37.1.1 Clearly indicate each drawing sheet needed (i.e., E1.1, E2.1, etc.).

37.1.2 Identify the name, phone number, mailing address and e-mail address of the person to receive the files.

37.1.3 Provide written confirmation and agreement with the requirements described for payment of computer files, as described below.

37.2 Detail or riser diagram sheets, or any other drawings other than floor plans or site plans, ***will not be made available to the Contractor***.

37.3 Files will only be provided in the AutoCAD format in which they were created.

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37.4 Requests for files will be processed as soon as possible; a minimum of 7 working days should be the normal processing time. The Contractor shall be completely responsible for requesting the files in time for their use.

END OF SECTION

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SECTION 26 05 19

POWER CONDUCTORS

PART 1 – GENERAL

1.1 Furnish and install wire and cable for branch circuits and feeders specified herein and as shown on the electrical drawings.

1.2 Submittals: Submit manufacturers' data for the following items:

1.2.1 All cables and terminations

1.3 <u>Common submittal mistakes which will result in the submittals being rejected:</u>

1.3.1 Not including all items listed in the above itemized description.

1.3.2 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining, or clouding the items to be reviewed, or crossing out the items which are not applicable.

1.3.3 Not including actual manufacturer's catalog information of proposed products.

1.3.4 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements, or "to be determined later" statements. The products being submitted must be the products installed

PART 2 – PRODUCTS

2.1 Wire and cable Rated 120 volt to 600 volt.

2.1.1 All wire and cable shall be new, 600 volt insulated copper, of types specified below for each application. All wire and cable shall bear the UL label and shall be brought to the job in unbroken packages. Wire insulation shall be the color as specified herein and shall be type THWN-2. Insulated conductors shall be installed in all exterior exposed raceways. Conductors for branch circuit lighting, receptacle, power and miscellaneous systems shall be a minimum of No. 12 AWG. Increase conductor size to No. 10 AWG for 120 volt circuits greater than 100 feet from the panel to the load and for 277 volt circuits greater than 200 feet from the panel to the load. Circuit home-runs indicated to be larger than No. 12 must be increased the entire length of the circuit, including equipment grounding conductor. Wire sizes No. 14 through No. 10 shall be solid. No. 8 and larger shall be stranded.

2.1.2 Aluminum conductors will be permitted (only where specifically identified on the drawings. See "600 Volt Feeder Schedule") in sizes 2/0 or larger. Conductors shall be listed by Underwriters Laboratories (UL) and suitable for operation at 600 volts or less, at a maximum operating temperature of 90N C maximum in wet or dry locations. Conductors shall be marked "SUN-RES". Aluminum alloy conductors shall be compact stranded conductors of STABILOY® (AA-8030) as manufactured by Alcan Cable or Listed equal. AA-8000 Series aluminum alloy conductor material shall be recognized by The Aluminum Association.

2.1.3 MC type armored cable reference Section 26 05 33.

2.2 Wire and cable for systems below120 volts.

2.2.1 All low voltage and communications systems cables routed underground shall be provided with a moisture resistant outer jacket, West Penn "Aquaseal" or equal, unless otherwise specified.

PART 3 - EXECUTION

3.1 Wire and cable shall be pulled into conduits without strain using powdered soapstone, mineralac, or other approved lubricant. In no case shall wire be repulled if same has been pulled out of a conduit run for any purpose. No conductor shall be pulled into conduit until conduit system is complete, including junction boxes, pull boxes, etc.

3.2 All connections of wires shall be made as noted below:

3.2.1 Connections to outlets and switches: Wire formed around binding post of screw.

3.2.2 No. 10 wire and smaller: Circuit wiring connections to lighting fixtures and other hard wired equipment shall be made with pressure type solderless connectors, Buchanan, Scotchlock, Wing Nut, or approved equal. Alternate "WAGO" #773 series or "IDEAL" #32, 33, 34 and 39 series push wire style connectors are also acceptable.

3.3 All wiring shall be continuous without splicing unless where specifically noted on the drawings or where permitted below.

3.3.1 No. 10 wire and smaller above grade: Quantities as needed, connection made with pressure type solderless connectors, Scotchlock or equal.

3.3.2 No. 10 wire and smaller below grade: Quantities as needed, connection made with 'Raychem' long barrel compression terminals with crimping tool and quantity of crimps as recommended by manufacturer, provide 'Raychem' WCSM-S series in-line heat shrink, sealant coated splice kit. Alternate products must be UL listed for direct burial/submersible and rated to (1000V).

3.3.3 No. 8 wire and larger above grade: Quantities only where indicated, 'Raychem' long barrel compression terminals with crimping tool and quantity of crimps as recommended by manufacturer, provide 'Raychem' WCSM-S series in-line heat shrink, sealant coated splice kit. Alternate products must be UL listed for direct burial/submersible and rated to (1000V).

3.3.4 No. 8 wire and larger below grade: Quantities only where indicated, 'Raychem' long barrel compression terminals with crimping tool and quantity of crimps as recommended by manufacturer, provide 'Raychem' WCSM-S series in-line heat shrink, sealant coated splice kit. Alternate products must be UL listed for direct burial/submersible and rated to (1000V).

3.4 All wiring throughout shall be color coded as follows:

	480 volt system	208 or 240 volt system
A Phase	Brown	Black
B Phase	Orange	Red
C Phase	Yellow	Blue
Neutral	Grey	White
Ground	Green	Green

3.5 Wiring must be color coded throughout its entire length, except feeders may have color coded plastic tape at both ends and any other accessible point.

3.6 All control wiring in a circuit shall be color coded, each phase leg having a separate color, and with all segments of the control circuit, whether in apparatus or conduit, utilizing the same color coding.

3.7 At all terminations of control wiring, the wiring shall have a numbered T&B or Brady plastic wire marker.

3.8 Cables when installed are to be properly trained in junction boxes, etc., and in such a manner as to prevent any forces on the cable which might damage the cable.

3.9 All conductors to be installed into a common raceway, shall be pulled into the raceway at the same time.

3.10 All conductors shall be installed in such a manner as to not exceed the manufacturers' recommended pulling tension and bending radius. The equipment used for pulling must be specifically designed for the purpose. Motorized vehicles such as pickup trucks, are not acceptable.

END OF SECTION

SECTION 26 05 26

GROUNDING

PART 1 – GENERAL

1.1 Furnish and install grounding and grounding conductors and electrodes as specified herein and as shown on the drawings.

1.2 Submit catalog data for all components.

1.3 **Common submittal mistakes which will result in the submittals being rejected:**

1.3.1 Not including all items listed in the above itemized description.

1.3.2 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining or clouding the items to be reviewed, or crossing out the items which are not applicable.

1.3.3 Not including actual manufacturer's catalog information of proposed products.

1.3.4 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements, or "to be determined later" statements. The products being submitted must be the products installed.

PART 2 – EXECUTION

2.1 Grounding

2.1.1 All panelboard cabinets, equipment, enclosures, and complete conduit system shall be grounded securely in accordance with pertinent sections of CEC Article 250. Conductors shall be copper. All electrically operated equipment shall be bonded to the grounded conduit system. All non-current carrying conductive surfaces that are likely to become energized and subject to personal contact shall be grounded by one or more of the methods detailed in CEC Article 250. All ground connections shall have clean contact surfaces. Install all grounding conductors in conduit and make connections readily accessible for inspection.

2.1.2 Provide an insulated equipment grounding conductor in all branch circuit and feeder raceway systems, sized in accordance with CEC 250-1122.

2.1.3 Provide an additional individual insulated grounding conductor for each circuit which contains an isolated ground receptacle or surge suppression receptacle.

2.1.4 Grounding of metal raceways shall be assured by means of provisions of grounding bushings on feeder conduit terminations at the panelboard, and by means of insulated continuous stranded copper grounding wire extended from the ground bus in the panelboard to the conduit grounding bushings.

2.1.5 Except for connections which access for periodic testing is required, make grounding connections which are buried or otherwise inaccessible by exothermite type process.

2.1.6 The following ohmic values shall be test certified for each item listed. A written report signed and witnessed by the project IOR shall be provided to the engineer. If the ohmic value listed cannot be obtained additional grounding shall be installed to reach the value listed.

2.1.6.1 Service. . . . . .10 ohms.

2.1.6.2 Step down transformers and non-current carrying metal parts . . . . . 25 ohms.

2.1.6.3 Manholes, handholes, etc. . . . . 10 ohms.

END OF SECTION

SECTION 26 05 33

CONDUIT AND FITTINGS

PART 1 – GENERAL

1.1 Furnish and install conduit and fittings as shown on the drawings and as specified herein.

1.2 Submit Manufacturer's data on the following:

1.2.1 Conduit.

1.2.2 Fittings

1.2.3 Fire stopping Material.

1.3 **Common submittal mistakes which will result in the submittals being rejected:**

1.3.1 Not including all items listed in the above itemized description.

1.3.2 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining or clouding the items to be reviewed, or crossing out the items which are not applicable.

1.3.3 Not including actual manufacturer's catalog information of proposed products.

1.3.4 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements, or "to be determined later" statements. The products being submitted must be the products installed.

PART 2 – PRODUCTS

2.1 Rigid steel conduit, intermediate metal conduit (IMC), electrical metallic tubing (EMT) and flexible metallic conduit shall be steel, hot dipped galvanized after fabrication.

2.2 PVC conduit shall be Carlon or approved equal.

2.3 Liquid tight flexible metal conduit shall be Anaconda Sealtite type UA or approved equal. Fittings shall be Appleton, Crouse-Hinds, Steel City, T&B, or equivalent.

2.4 MC type armored cable – not approve for this project.

2.5 Fire stopping material shall provide an effective seal against fire, heat, smoke and fire gases. Fire stopping material shall be tested to comply with ASTME 814 and UL 1479. The submittal for this product shall include the UL listed system number and installation requirements for each type of penetration seal required for this project.

2.6 Each length of conduit shall be stamped with the name or trademark of the manufacturer and shall bear the UL label.

2.7 All plastic conduit shall be rigid, schedule 40, heavy wall PVC. All PVC conduit shall be UL listed. Underground utility company conduits shall comply with local utility co. requirements.

2.8 Plastic conduit shall be stored on a flat surface, and protected from the direct rays of the sun.

PART 3 – FITTINGS

3.1 All metallic fittings, including those for EMT, flexible conduit, or malleable iron. Die cast fittings of any other material are not permitted.

3.2 Locknuts shall be steel or malleable iron with sharp clean cut threads.

3.3 Entrance seals shall be O.Z. type FSK or equivalent.

3.4 Bushings and locknuts: Where conduits enter boxes, panels, cabinets, etc., they shall be rigidly clamped to the box by locknuts on the outside, and a lock nut and plastic bushing on the inside of the box. All conduits shall enter the box squarely.

3.5 Furnish and install insulated bushings as per CEC article No. 300 - 4 (F) on all conduits. The use of insulated bushings does not exclude the use of double locknuts to fasten conduit to the box.

3.6 Transition from plastic to steel conduits shall be with PVC female threaded adaptors.

3.7 Couplings and connectors for rigid steel or IMC conduit must be threaded, or compression type (set screw fittings are not permitted).

3.8 Couplings and connectors for EMT shall be compression, watertight. Set screw connectors are not acceptable, except for systems below 120 volts.

3.9 Install approved expansion fittings, or liquid tight flex conduit with a minimum 6" slack for conduits passing through all expansion and seismic joints.

PART 4 - EXECUTION

4.1 All branch circuits shall be installed concealed in walls or above ceilings or in concrete floor slabs. PVC conduits installed in concrete floor slabs shall transition to PVC coated rigid steel where conduits penetrate above finished grade or finished floor.

4.2 Conduit sizes for various numbers and sizes of wire shall be as required by the CEC, but not smaller than ½" for power wiring and ¾" for communications and fire alarm systems unless otherwise noted. Conduit in slab or below grade shall be ¾" minimum trade size, unless otherwise identified.

4.3 Conduit size shall be such that the required number and sizes of wires can be easily pulled in and the Contractor shall be responsible for the selection of the conduit sizes to facilitate the ease of pulling. Conduit sizes shown on the drawings are minimum sizes in accordance with appropriate tables in the CEC. If because of bends or elbows a larger conduit size is required, the Contractor shall so furnish without further cost to the Owner.

4.4 The Contractor shall be entirely responsible for the proper protection of this work from the other trades on the job. When conduit becomes bent or holes are punched through same, or outlets moved after being roughed-in, the Contractor shall replace same, without additional cost to the Owner.

4.5 Rigid steel conduit or IMC shall be used as follows:

4.5.1 Exposed exterior locations.

4.5.2 Exposed interior locations below eight feet above floor, except in electrical rooms and closets.

4.5.3 In hazardous or classified areas as required by CEC.

4.6 EMT conduit shall be used for areas as follows:

4.6.1 All interior communications, signal, and data networking systems.

4.6.2 All interior power wiring systems where not required to be in rigid steel, IMC or flexible conduit.

4.7 Flexible conduit shall be used for areas as follows:

4.7.1 To connect motors, transformers, and other equipment subjected to vibration or where specifically detailed on the drawings.

4.7.2 Flexible conduit shall not be used to replace EMT in other locations where the conduit will be exposed.

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4.7.3 Flexible metal conduit shall be ferrous. Installation shall be such that considerable slack is realized. The conduit shall contain separate code sized grounding conductor.

4.7.4 Liquid tight flexible conduit shall be used in conformance with CEC in lengths not to exceed 4'. For equipment connections, route the conduit at 90 degrees to the adjacent path for point of connection. The conduit shall contain separate code sized grounding conductor. Use liquid tight flexible conduit for all equipment connections exposed in possible wet, corrosive or oil contaminated areas, e.g., shops and outside areas.

4.8 Plastic conduit shall be used for all exterior underground, in slab, and below slab on grade conduit installations. Install bell ends at all conduit terminations in manholes and pull boxes. Where plastic conduit transitions from below grade to above grade, no plastic conduit shall extend above finished exterior grade, or above interior finished floor level.

4.9 Plastic conduit joints shall be made up in accordance with the manufacturer's recommendations for the particular conduit and coupling selected. Conduit joint couplings shall be made watertight. Plastic conduit joints shall be made up by brushing a plastic solvent cement on the inside of a plastic fitting and on the outside of the conduit ends. The conduit and fitting shall then be slipped together with a quick one-quarter turn twist to set the joint tightly.

4.10 All underground conduit depths shall be as detailed on the drawings or a minimum of 30" below finished grade (when not specifically detailed otherwise), for all exterior underground conduits. Where concrete slurry or concrete encasement is provided, include “Red” color dye in mixture.

4.11 All underground conduits for power systems (600v and higher), shall be concrete encased and a minimum of 48” below grade or as detailed on the drawings. Where concrete slurry or concrete encasement is provided, include “Red” color dye in mixture.

4.12 Conduit shall be continuous from outlet to outlet, cabinet or junction box, and shall be so arranged that wire may be pulled in with the minimum practical number of junction boxes.

4.13 All conduits shall be concealed wherever possible. All conduit runs may be exposed in mechanical equipment rooms, electrical equipment rooms, electrical closets, and in existing or unfinished spaces. No conduit shall be run exposed in finished areas without the specific approval of the Architect.

4.14 All raceways which are not buried or embedded in concrete shall be supported by straps, clamps, or hangers to provide a rigid installation. Exposed conduit shall be run in straight lines at right angles to or parallel with walls, beams, or columns. In no case shall conduit be supported or fastened to other pipes or installed to prevent the ready removal of other trades piping. Wire shall not be used to support conduit.

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4.15 It shall be the responsibility of the Contractor to consult the other trades before installing conduit and boxes. Any conflict between the location of conduit and boxes, piping, duct work, or structural steel supports, shall be adjusted before installation. In general, large pipe mains, waste, drain, and steam lines shall be given priority.

4.16 Conduits above lay-in grid type ceilings shall be installed in such a manner that they do not interfere with the "lift-out" feature of the ceiling system. Conduit runs shall be installed to maintain the following minimum spacing wherever practical.

4.16.1 Water and waste piping not less than 3".

4.16.2 Steam and steam condensate lines not less than 12".

4.16.3 Radiation and reheat lines not less than 6".

4.17 Provide all necessary sleeves and chases required where conduits pass through floors or walls as part of the work of this section. Core drilling will only be permitted where approved by the Architect.

4.18 All empty conduits and surface mounted raceways shall be provided with a ¼" polypropylene plastic pull cord and threaded plastic or metal plugs over the ends. Fasten plastic "Dymo" tape label to exposed spare conduit to identify "power" or "communication" system, and to where it goes.

4.19 The ends of all conduits shall be securely plugged, and all boxes temporarily covered to prevent foreign material from entering the conduits during construction. All conduit shall be thoroughly swabbed out with a dry swab to remove moisture and debris before conductors are drawn into place.

4.20 Bending: Changes in direction shall be made by bends in the conduit. These shall be made smooth and even without flattening the pipe or flaking the finish. Bends shall be of as long a radius as possible, and in no case smaller than CEC requirements.

4.20.1 For power conduits for conductors (600v and below), provide minimum 36" radius (vertical) and 72" radius (horizontal) bends.

4.20.2 For power conduits for conductors (greater than 600v), provide minimum 72" radius (vertical) and 72" radius (horizontal) bends.

4.21 Supports: Conduit shall be supported at intervals as required by the California Electrical Code. Where conduits are run individually, they shall be supported by approved conduit straps or beam clamps. Straps shall be secured by means of toggle bolts on hollow masonry, machine screws or bolts on metal surfaces, and wood screws on wood construction. **[No perforated straps or wire hangers of any kind will be permitted. Where individual conduits are routed, or above ceilings, they shall be supported by hanger rods and hangers.]** Conduits

installed exposed in damp locations shall be provided with clamp backs under each conduit clamp, to prevent accumulation of moisture around the conduits.

4.22 Where a number of conduits are to be run exposed and parallel, one with another, they shall be grouped and supported by trapeze hangers. Hanger rods shall be fastened to structural steel members with suitable beam clamps or to concrete inserts set flush with surface. A reinforced rod shall be installed through the opening provided in the concrete inserts. Beam clamps shall be suitable for structural members and conditions. Rods shall be galvanized steel 3/8" diameter minimum. Each conduit shall be clamped to the trapeze hanger with conduit clamps.

4.23 All concrete inserts and pipe clamps shall be galvanized. All steel bolts, nuts, washers, and screws shall be galvanized or cadmium plated. Individual hangers, trapeze hangers and rods shall be prime-coated.

4.24 Openings through fire rated floors/walls and/or smoke walls through which conduits pass shall be sealed by Fire stopping material to comply with Division 1 to seal off flame, heat, smoke and fire gases. Sleeves shall be provided for power or communication system cables which are not installed in conduits, and shall be sealed inside and out to comply with manufacturers UL system design details. Where multiple conduits and/or cable tray systems pass thru fire-rated walls at one location, the Contractor shall submit copies of the manufacturers UL system design details proposed for use on this project. All Fire stopping material shall have an hourly fire-rating equal to or higher than the fire rating of the floor or wall through which the conduit, cables, or cable trays pass.

4.25 Provide cap or other sealing type fitting on all spare conduits. Conduits stubbed into buildings from underground where cable only extends to equipment, the conduit/cable end shall be sealed to prevent moisture from entering the room or space.

4.26 All conduits which are part of a paralleled feeder or branch circuit shall be installed underground.

4.27 All conduits which are required as a part of systems specified in Divisions 27 or 28, or any other low voltage communication systems, shall be furnished and installed by the Division 26 Contractor.

4.27.1 The Contractor shall coordinate all conduit requirements with each system supplier prior to bid to determine special conduit system requirements.

4.27.2 The Contractor shall provide a pull rope in all conduits for these systems.

4.27.3 The Contractor shall provide conduit sleeves for all open cable installations thru rated walls or block walls. Provide conduit from each building main termination cabinet or backboard to the nearest accessible ceiling for access into all electrical or communications rooms.

4.28 In addition to the above requirements, the following requirements shall apply to all data networking conduits:

4.28.1 Flexible metal conduit may only be used where required at building seismic and/or expansion joints.

4.28.2 All underground conduits shall be provided with minimum 24" radius elbows (vertical) and 60" (horizontal).

4.28.3 No length of conduit above grade shall be installed to exceed 150 feet between pull boxes, or points of connection, unless where specifically detailed on the drawings.

4.28.4 No length of conduit shall be installed to exceed two 90 degree bends between pull boxes, or points of connection, unless where specifically detailed on the drawings.

END OF SECTION

SECTION 26 05 34

OUTLET AND JUNCTION BOXES

PART 1 – GENERAL

1.1 Furnish and install electrical wiring boxes as specified and as shown on the electrical drawings.

1.2 Submit manufacturer's data for all items.

1.3 <u>Common submittal mistakes which will result in the submittals being rejected:</u>

1.3.1 Not including all items listed in the above itemized description.

1.3.2 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining or clouding the items to be reviewed, or crossing out the items which are not applicable.

1.3.3 Not including actual manufacturer's catalog information of proposed products.

1.3.4 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements, or "to be determined later" statements. The products being submitted must be the products installed.

PART 2 – PRODUCTS

2.1 Boxes shall be as manufactured by Steel City, Appleton, Raco, or approved equal.

2.2 All boxes must conform to the provisions of Article 370 of the CEC. All boxes shall be of the proper size to accommodate the quantity of conductors enclosed in the box. Minimum box size shall be 4" square x 1-½" deep.

2.3 Boxes generally shall be hot dipped galvanized steel with knockouts. Boxes on exterior surfaces or in damp locations shall be corrosion resistant, cast feraloy and shall have threaded hubs for rigid conduit and neoprene gaskets for their covers. Boxes shall be Appleton Type FS, Crouse-Hinds, or the approved equal. Conduit bodies shall be corrosion resistant, cast malleable iron. Conduit bodies shall have threaded hubs for rigid conduit and neoprene gaskets for their covers. Conduit bodies shall be Appleton Unilets, Crouse-Hinds, or the approved equal. Where recessed, boxes shall have square cut corners.

2.4 Deep boxes shall be used in wall covered by wainscot or paneling and in walls or glazed tile, brick, or other masonry which will not be covered with plaster.

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Through the wall type boxes shall not be used unless specifically called for. All boxes shall be nongangable. Boxes in concrete shall be of a type to allow the placing of conduit without displacing the reinforcing bars. All lighting fixture outlet boxes shall be equipped with the proper fittings to support and attach a light fixture.

2.5 All light, switch, receptacle, fire alarm devices and similar outlets shall be provided with approved boxes, suitable for their function. Back boxes shall be furnished and installed as required for the equipment and/or systems under this contract.

2.6 Pull and junction boxes shall be code gauge boxes with screw covers. Boxes shall be rigid under torsional and deflecting forces and shall be provided with angle from framing where required. Boxes shall be 4" square with a blank cover in unfinished areas and with a plaster ring and blank cover in finished areas. Covers for flush mounted oversize boxes shall extend ¾" past boxes all around. Covers for 4" square boxes shall extend ¼" past box all around.

2.7 All terminal cabinets and junction boxes or equipment back boxes which are required as a part of systems specified in Divisions 27 or 28, or any other low voltage communication systems, shall be furnished and installed by the Division 26 Contractor.

2.7.1 The Division 26 Contractor shall coordinate all box requirements with each system supplier prior to bid to determine special cabinet or back box requirements. The Contractor shall also provide stainless steel blank cover plates for all low voltage systems installed for future equipment.

2.7.2 The Contractor shall provide all plywood backboards indicated on walls or inside equipment enclosures. All backboards shall be a minimum of ¾" thick fire rated type plywood.

2.7.3 The Contractor shall coordinate exact rough in locations and requirements with each system supplier.

2.8 In addition to the above requirements, boxes for data networking wiring and equipment shall comply with the following:

2.8.1 All boxes shall be a minimum of 4-11/16" square x 2-1/8" deep.

2.8.2 Where pull boxes are required on individual conduits 1-¼" or smaller, provide 4-11/16" square x 2-1/8" deep boxes. Where pull boxes are required on conduits larger than 1-¼" for straight pull through, provide eight times the conduit trade size for box length. Where pull boxes are required on conduits larger than 1-¼" for an angle or a U-pull through installation, provide a minimum distance of six times the conduit trade size between the entering and exiting conduit run for each cable.

2.9 Recessed boxes installed in fire rated floors/walls and /or smoke walls shall be sealed by Fire stopping material to comply with Division 1 to seal off flame, heat, smoke and fire gases. The Contractor shall submit copies of the manufacturers UL system design details proposed for use on this project. All Fire stopping material shall have an hourly fire-rating equal to or higher than the fire rating of the floor or wall through which the conduit, cables, or cable trays pass.

PART 3 – EXECUTION

3.1 Boxes shall be installed where required to pull cable or wire, but in finished areas only by approval of the Architect. Boxes shall be rigidly attached to the structure, independent of any conduit support. Boxes shall have their covers accessible. Covers shall be fastened to boxes with machine screws to ensure continuous contact all around. Covers for surface mounted boxes shall line up evenly with the edges of the boxes.

3.2 Outlets are only approximately located on the plans and great care must be used in the actual location of the outlets by consulting the various detailed drawings and specifications. Outlets shall be flush with finished wall or ceiling, boxes installed symmetrically on such trim or fixture. Refer to drawings for location and orientation of all outlet boxes.

3.3 Furnish and install all plaster rings as may be required. Plaster rings shall be installed on all boxes where the boxes are recessed. Plaster rings shall be of a depth to reach the finished surface. Where required, extension rings shall be installed so that the plaster ring is flush with the finished surface.

3.4 All cabinets and boxes shall be secured by means of toggle bolts on hollow masonry; expansion shields and machine screws or standard precast inserts on concrete or solid masonry; machine screws or bolts on metal surfaces and wood screws on wood construction. All wall and ceiling mounted outlet boxes shall be supported by bar supports extending from the studs or channels on either side of the box. Boxes mounted on drywall or plaster shall be secured to wall studs or adequate internal structure.

3.5 Boxes with unused punched-out openings shall have the openings filled with factory-made knockout seals.

3.6 Where standby power and normal power are to be located in the same outlet box or 480V in a switch box, install partition barriers to separate the various systems.

3.7 All device boxes and junction boxes for fire alarm system shall be painted red and shall be 4-11/16" square by 2-1/8" deep. No exceptions.

END OF SECTION

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SECTION 26 05 43

UNDERGROUND PULL BOXES AND MANHOLES

PART 1 – GENERAL

1.1 Furnish and install electrical underground pullboxes and manholes as specified and as shown on the electrical drawings.

1.2 Submit manufacturer's data for all items.

1.3 **Common submittal mistakes which will result in the submittals being rejected:**

1.3.1 Not including all items listed in the above itemized description.

1.3.2 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining or clouding the items to be reviewed, or crossing out the items which are not applicable.

1.3.3 Not including actual manufacturer's catalog information of proposed products.

1.3.4 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements or "to be determined later" statements. The products being submitted must be the products installed.

PART 2 – PRODUCTS

2.1 The concrete for pull boxes and manholes shall be class 5500 psi or as noted on the drawings. All pullboxes and manholes and covers located in parking lots, driveways, roads, or any other driveable areas shall be traffic rated.

2.2 Each manhole shall be provided with a fiberglass ladder and ground rod. Ground rods shall be copper or a copper-clad steel 3/4" diameter by 10-feet long. All non-current carrying metallic components shall be grounded to the ground rods with minimum #6 copper wire.

2.3 All underground pullboxes shall be provided with steel bolt down type covers. Bolts shall be bronze or brass. All communication or signal system pullboxes shall be sized to comply with CEC Article 370 unless where other sizes are specifically noted on the drawings.

2.4 All underground pullbox and manhole covers shall be provided with either "electrical" or "telephone" or "fire alarm" markings. The telephone marking shall be used to identify telephone, T.V., clock or any other types of communication systems.

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2.5 All power and communication systems shall be provided with separate pullboxes or manholes. Fire alarm circuits shall also be provided with separate pullboxes from any other type of communication systems.

PART 3 – INSTALLATION

3.1 Shoring of the excavation shall be in accordance with all federal, state and local regulations.

3.2 Provide sealing material for the joints between sections per manufacturer's instructions.

3.3 The contractor shall make the top and access assembly or lid flush with surrounding areas where installed in driveable or normal walking areas.

END OF SECTION

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SECTION 26 08 00

COMMISSIONING OF ELECTRICAL SYSTEMS

PART 1 – GENERAL

RELATED DOCUMENTS

1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01, 27, 28 Specification Sections, apply to this Section.

1.2 Acceptance and start-up testing requirements for electrical power distribution equipment and systems. Contractor shall retain and pay for the services of a recognized, independent testing firm for the purpose of performing inspections and tests as herein specified and as required by code.

1.2.1 The testing firm shall provide all material, equipment, labor, and technical supervision to perform such tests and inspections.

1.2.2 It is the purpose of these tests to assure that all tested electrical equipment is operational and within industry and manufacturers tolerances, and is installed in accordance with design specifications.

1.2.3 The tests and inspections shall determine suitability for start-up and energization.

1.2.4 The following equipment shall be tested and calibrated:

1.2.4.1 Medium voltage cables

1.2.4.2 Medium voltage interrupter switches, fuses, and circuit breakers.

1.2.4.3 Low voltage switches, fuses, and circuit breakers, 100A frame and larger.

1.2.4.4 Low voltage cables and feeders.

1.2.4.5 Motor Control Centers and adjustable frequency drives.

1.2.4.6 Protective relays, instruments, and metering systems.

CODES, STANDARDS, AND REFERENCES

1.3 All inspections and tests shall be in accordance with the following codes and standards except as provided otherwise herein.

1.3.1 ANSI/IEEE C2: National Electrical Safety Code (NESC).

1.3.2 ANSI/NFPA 70: National Electrical Code, with California Amendments (CEC).

1.3.3 ANSI/NFPA 70E: Standard for Electrical Safety in the Workplace.

1.3.4 ANSI/NFPA 78: Lightning Protection Code.

1.3.5 ANSI/NFPA 101: Life Safety Code.

1.3.6 American Society for Testing and Materials – ASTM.

1.3.7 Applicable State and Local Codes, Ordinances and Standards, including City of San Diego, San Diego Gas & Electric, and San Diego Unified School District.

1.3.8 California Code of Regulations (CCR), Title 8, Title 24.

1.3.9 Division 1, Section 019113, "General Commissioning Requirements".

1.3.10 Institute of Electrical and Electronic Engineers – IEEE.

1.3.11 Insulated Cable Engineers Association – ICEA.

1.3.12 International Electrical Testing Association - NETA Accept: The NETA Acceptance Testing Specifications, latest edition.

1.3.13 National Electrical Manufacturers Association – NEMA.

1.3.14 Occupational Safety and Health Administration (OSHA) – 29 CFR 1910.7: OSHA Occupational Safety and Health Standards.

QUALIFICAITONS OF TESTING FIRM

1.4 All Inspections and tests shall utilize the following references:

1.4.1 Project design specifications.

1.4.2 Project design drawings

1.4.3 Project list of equipment to be inspected and tested

1.4.4 Manufacturer's instruction manuals applicable to each particular equipment.

1.5 The testing firm shall be an independent testing organization with the experience and capability to conduct the testing indicated, that is a member company of the International Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

1.6 The testing firm shall be regularly engaged in the testing of electrical equipment devices, installations, and systems, with at least five (5) years of documented experience.

1.7 The lead, on-site, technical person shall be currently certified by the International Electrical Association (NETA), or National Institute for Certification in Engineering Technologies (NICET) in electrical power distribution system testing.

1.8 The testing firm shall utilize engineers and technicians who are regularly employed by the firm for testing services.

1.9 The testing firm shall submit proof of the above qualifications with bid documents when requested.

1.10 The terms used herein, such as Testing Agency, Testing Contractor, Testing Laboratory, or Contractor Test Company, shall be construed to mean the testing firm.

SUBMITTALS

1.11 Provide submittals per Division 1, Section 013300, "Submittal Procedures".

1.12 Qualifications of testing firm and personnel.

1.13 Certified test reports.

1.14 Two copies of blank forms for checklists, test reports, and other related forms for Engineer's review and approval.

GENERAL REQUIREMENTS

1.15 Routine insulation resistance, continuity, and rotation tests for all distribution and utilization equipment shall be performed prior to and in addition to acceptance tests specified herein.

1.16 The Testing Firm shall notify the Engineer no fewer than 3 working days prior to commencement of any testing.

1.17 Any system, material, or workmanship, which is found defective on the basis of Acceptance Tests shall be reported to the Engineer with recommendations for corrective action.

1.18 The Testing Firm shall maintain a written record of all tests, and upon completion of project, shall assemble and certify a final test report.

1.19 The final Test Report shall be submitted on conclusion of all required tests and corrective measures.

SAFETY AND PRECAUTIONS

1.20 Safety practices shall include, but will not be limited to, compliance with the following requirements:

1.20.1 Occupational Safety and Health Act.

1.20.2 Accident Prevention Manual for Industrial Operations, National Safety Council.

1.20.3 Applicable State and Local safety operating procedures.

1.20.4 Owners' Safety Practices.

1.20.5 National Fire Protection Association – NFPA 70E.

1.20.6 American National Standards for Personnel Protection.

1.21 All tests shall be performed with apparatus de-energized. Exceptions must be thoroughly reviewed to identify safety hazards and adequate safeguards must be devised.

1.22 The Testing Firm shall have a designated safety representative on the project site to supervise the testing operations with respect to safety.

1.23 Test Report:

1.23.1 The test report shall include the following:

1.23.1.1 Summary of Project.

1.23.1.2 List of testing equipment used.

1.23.1.3 Calibration date of testing equipment and due date of next calibration.

1.23.1.4 Ambient temperature and humidity at time of test.

1.23.1.5 Listing of equipment tested.

1.23.1.6 Test results.

1.23.1.7 Recommendations.

1.23.2 Furnish original and four copies of the complete report to the Architect/District in accordance with requirements of Contract Documents.

INSPECTION AND TEST PROCEDURES

1.24 Contractor shall provide the Testing Firm, a copy of related contract documents such as drawings, specifications, engineer-reviewed submittals, coordination study report including all relay settings and other necessary information.

1.25 Contractor shall supply a suitable source of power to each site and location per testing firm requirements.

1.26 Contractor shall notify the testing firm when equipment becomes available for acceptance tests. Work shall be coordinated to expedite project scheduling.

1.27 Testing Firm shall review and evaluate all received documents and notify the Contractor and Engineer of any discrepancies in the documents and/or any other requirements immediately.

1.28 Testing Firm shall provide and comply with the following:

1.28.1 Acceptance test procedures for each individual equipment listed in Part 1 of this section for Engineer review and approval prior to any test and after thorough evaluation of the system. Testing shall conform to the International Electrical Testing Association (NETA) specifications and standards for electrical power distribution equipment and systems and manufacturer's instructions.

1.28.2 Refer to each individual specification section for testing requirements and comply.

1.28.3 Inspect installed equipment and report any discrepancy and/or deficiency with respect to the contract documents and governing codes prior to testing.

SYSTEM FUNCTION TEST

1.29 Perform system function test upon completion of equipment tests as defined in this section. It is the purpose of system function tests to verify proper interaction of all sensing, processing, and action devices.

1.30 Implementation.

1.31 Submit manufacturers' data on all items:

1.31.1 Develop test parameters for the purpose of evaluation performance of all integral components and their functioning as a complete unit within design requirements.

1.31.2 Test all interlocking devices.

1.31.3 Record the operation of alarms and indicating devices.

1.32 DEFICIENCIES

1.33 Submit manufacturers' data on all items.

1.33.1 All deficiencies reported by the Testing Firm shall be corrected by the Contractor and Acceptance and System Function Tests shall be repeated to verify conformance with requirements.

PART 2 – PRODUCTS

2.1 Not applicable

PART 3 - EXECUTION

END OF SECTION

SECTION 26 09 23

DIGITAL LIGHTING CONTROL SYSTEM

PART 1 – GENERAL

1.1 Furnish and install automatic lighting controls as shown on the drawings and as specified herein Submit manufacturers' data on all items.

1.2 Equipment shall be UL listed, comply with those portions of CEC as applicable to electrical wiring work and comply with those portions of NEMA or UL pertaining to types of electrical equipment and enclosures. The equipment shall also be certified by the California Energy Commission.

1.3 The manufacturer of the lighting control equipment shall have been actively engaged in the manufacture of the types and capacities required for the application for at least three years. It is the sole responsibility of the Division 26 contractor to ensure that submittals of material meets the performance specifications contained herein.

1.4 All components and assemblies shall be factory pre-tested and burned-in as a system for 48 hours prior to shipping.

1.5 Control Intent – Control Intent includes, but is not limited to:

1.5.1 Defaults and initial calibration settings for such items as time delay, sensitivity, fade rates, etc.

1.5.2 Initial sensor and switching zones

1.5.3 Initial time switch settings

1.5.4 Manufacturer shall submit a point-to-point line diagram of the system configuration including all devices and accessories required to complete the system.

1.5.5 Manufacturer shall submit data sheets on the components and system submitted, with descriptions of hardware and software components.

SYSTEM DESCRIPTION & OPERATION

1.6 The Lighting Control and Automation system as defined under this section covers the following equipment:

1.6.1 Handheld remotes for personal control – One-button dimming, two-button on/off, or five-button scene remotes provide control using infrared communications. Remote may be configured in the field to control selected loads or scenes without special tools

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1.6.2 Digital Daylighting Sensors – Single-zone closed loop, multi-zone open loop and single-zone dual-loop daylighting sensors with two-way active infrared (IR) communications can provide switching, bi-level, tri-level or dimming control for daylight harvesting

1.6.3 Configuration Tools – Handheld remote for room configuration and relay panel programming provides two way infrared (IR) communications to digital devices and allows complete configuration and reconfiguration of the device / room from up to 30 feet away. Unit to have Organic LED display, simple pushbutton interface, and allow bi-directional communication of room variables and occupancy sensor settings. Computer software also customizes room settings

1.6.4 Digital Lighting Management (DLM) local network – Free topology, plug-in wiring system (Cat 5e) for power and data to room devices

1.6.5 Digital Lighting Management (DLM) segment network – Linear topology, BACnet MS/TP network (1.5 twisted pair, shielded,) to connect multiple DLM local networks for centralized control

1.6.6 Network Bridge – provides BACnet MS?TP-compliant digital networked communication between rooms, panels and the Segment Manager or building automation system (BAS) and automatically creates BACnet objects representative of connected devices.

1.6.7 Segment Manager – provides web browser-based user interface for system control, scheduling, power monitoring, room device parameter administration and reporting

1.6.8 Programming and Configuration software – Optional PC-native application capable of accessing DLM control parameters within a room, for the local network, via a USB adapter, or globally, for many segment networks simultaneously, via BACnet/IP communication

1.6.9 LMCP Digital Lighting Management Relay Panel – provides 48 mechanically latching relays. Relays include a manual override and a single push-on connector for easy installation or removal from the panel. Panel accepts program changes from handheld configuration tool for date and time, location, holidays, event scheduling, button binding and group programming. Provides BACnet MS/TP-compliant digital networked communication between other lighting controls and/or building automation system (BAS)

LIGHTING CONTROL APPLICATIONS

1.7 Unless relevant provisions of the applicable local Energy Codes are more stringent, provide a minimum application of lighting controls as follows:

1.8 Submit shop drawings and manufacturers' data for all components including:

1.8.1 Manufacturer shall submit in bill-of-material form an itemized list of all materials supplied to meet the specification.

1.8.2 Manufacturer shall submit dimensional drawings of lighting control panel(s).

1.8.3 Manufacturer shall submit a point-to-point line diagram of the system configuration including all devices and accessories required to complete the system.

1.8.4 Manufacturer shall submit data sheets on the components and system submitted, with descriptions of hardware and software components

1.8.5 Composite wiring and/or schematic diagram of each control circuit as proposed to be installed

1.8.6 Show exact location of all digital devices, including at minimum sensors, room controllers, and switches for each area on reflected ceiling plans. (Contractor must provide AutoCAD format reflected ceiling plans)

1.8.7 Provide room/area details including products and sequence of operation for each room or area. Illustrate typical acceptable room/area connection topologies

1.8.8 Network riser diagram including floor and building level details. Include network cable specification and end-of-line termination details, if required. Illustrate points of connection to integrated systems. Coordinate integration with mechanical and/or other trades

QUALITY ASSURANCE

1.9 Manufacturer: Minimum 10 years' experience in manufacture of lighting controls

PROJECT CONDITIONS

1.10 Do not install equipment until following conditions can be maintained in spaces to receive equipment:

1.10.1 Ambient temperature: 0° to 40° C (32° to 104° F)

1.10.2 Relative humidity: Maximum 90 percent, non-condensing.

WARRANTY

1.11 Provide a five year limited manufacturer's warranty on all room control devices and panels

MAINTENANCE

1.12 Spare Parts:

1.12.1 Provide 5% spares of each product to be used for this project. All unused items shall be boxed and delivered to the owner at the completion of the project.

PART 2 – PRODUCTS

2.1 Acceptable Manufacturers: **WattStopper, Digital Lighting Management (DLM), Eaton Greengate or Sensorswitch Nlight Network Control system**

Substitutions:

2.2 Bidder's wishing to obtain approval on manufacturers other than those specified in these specifications or on the drawings shall comply with the following procedures:

2.2.1 All substitution requests shall be submitted to the Architect / Engineer no less than 10 business days prior to the project bid opening date. Approvals when accepted will be issued in the form of an addendum to the contract. No consideration for substitutions will be provided after the award of the contract.

2.2.2 The substitution request must include a statement indicating how the substituted product may impact the completion of the project.

2.2.3 The substitution request must include a statement indicating the difference in price (both list price and Contractor price) between the specified product and the substitution.

2.2.4 The substitution request must include a detailed analysis indicating <u>any</u> differences between the specified product and the substitution.

2.2.5 Catalog literature for both the specified and the substitution shall be provided along with contact information of the manufacturer for the substituted product.

2.3 The contractor shall pay the Engineer (at their current standard hourly rates) for the time spent reviewing substitutions. These costs will be included as an addendum to be issued to all bidders to include in their proposals, and must be paid to the Engineer within 60 days of award of the project.

DIGITAL LIGHTING CONTROLS

2.4 Furnish the Company's system which accommodates the square-footage coverage requirements for each area controlled, utilizing room controllers, digital occupancy sensors, switches, daylighting sensors and accessories which suit the lighting and electrical system parameters.

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HANDHELD REMOTE CONTROLS

2.5 Battery-operated handheld devices in 1, 2 and 5 button configurations for remote switching or dimming control. Remote controls shall include the following features:

2.5.1 Two-way infrared (IR) transceiver for line of sight communication with DLM local network within up to 30 feet

2.5.2 LED on each button confirms button press

2.5.3 Load buttons may be bound to any load on a room controller and are not load type dependent; each button may be bound to multiple loads

2.5.4 Inactivity timeout to save battery life

2.6 A wall mount holster and mounting hardware shall be included with each remote control

2.7 WattStopper part numbers: LMRH-101, LMRH-102, LMRH-105

CONFIGURATION TOOLS

2.8 A wireless configuration tool facilitates optional customization of DLM local networks using two-way infrared communications, while PC software connects to each local network via a USB interface

2.9 Features and functionality of the wireless configuration tool shall include but not be limited to:

2.9.1 Two-way infrared (IR) communication with DLM IR-enabled devices within a range of approximately 30 feet

2.9.2 High visibility organic LED (OLED) display, pushbutton user interface and menu-driven operation

2.9.3 Must be able to read and modify parameters for room controllers, occupancy sensors, wall switches, daylighting sensors, network bridges and relay panels, and identify room devices by type and serial number

2.9.4 Save up to eight occupancy sensor setting profiles, and apply profiles to selected sensors

2.9.5 Temporarily adjust light level of any load(s) on the local network, and incorporate those levels in scene setting. Set room mode for testing of Normal Hours (NH) and After Hours (AH) parameter settings

2.9.6 Adjust or fine-tune daylighting settings established during auto-configuration, and input light level data to complete configuration of open loop daylighting controls

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2.9.7 Set room mode for testing of Normal Hours (NH) and After Hours (AH) parameter settings

2.9.8 Verify status of building level network devices

2.10 WattStopper Product Numbers: LMCT-100, LMCI-100/LMCS-100

NETWORK BRIDGE

2.11 The network bridge module connects a DLM local network to a BACnet-compliant segment network for communication between rooms, relay panels and a segment manager or BAS. Each local network shall include a network bridge component to provide a connection to the local network room devices. The network bridge shall use industry standard BACnet MS/TP network communication and an optically isolated EIA/TIA RS-485 transceiver

2.11.1 The network bridge shall be provided as a separate module connected on the local network through an available RJ-45 por

2.11.2 Provide Plug n' Go operation to automatically discover room devices connected to the local network and make all device parameters visible to the segment manager via the segment network. No commissioning shall be required for set up of the network bridge on the local network

2.11.3 The network bridge shall automatically create standard BACnet objects for selected room device parameters to allow any BACnet-compliant BAS to include lighting control and power monitoring features as provided by the DLM room devices on each local network. BACnet objects will be created for the addition or replacement of any given in-room DLM device for the installed life of the system. Products requiring that an application-specific point database be loaded to create or map BACnet objects are not acceptable. Systems not capable of providing BACnet data for control devices via a dedicated BACnet Device ID and physical MS/TP termination per room are not acceptable. Standard BACnet objects shall be provided as follows:

2.11.3.1 Read/write the normal or after hours schedule state for the room

2.11.3.2 Read the detection state of each occupancy sensor

2.11.3.3 Read the aggregate occupancy state of the room

2.11.3.4 Read/write the On/Off state of loads

2.11.3.5 Read/write the dimmed light level of loads

2.11.3.6 Read the button states of switches

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2.11.3.7 Read total current in amps, and total power in watts through the room control

2.11.3.8 Read/write occupancy sensor time delay, PIR sensitivity and ultrasonic sensitivity settings

2.11.3.9 Activate a preset scene for the room

2.11.3.10 Read/write daylight sensor fade time and day and night setpoints

2.11.3.11 Read the current light level, in footcandles, from interior and exterior photosensors and photocells

2.11.3.12 Set daylight sensor operating mode

2.11.3.13 Read/write wall switch lock status

2.11.3.14 Read watts per square foot for the entire controlled room

2.11.3.15 Write maximum light level per load for demand response mode

2.11.3.16 Read/write activation of demand response mode for the room

2.11.3.17 Activate/restore demand response mode for the room

2.12 Wattstopper product number: LMBC-300

SEGMENT MANAGER

2.13 For networked applications, the Digital Lighting Management system shall include at least one segment manager to manage network communication. It shall be capable of serving up a graphical user interface via a standard web browser utilizing either unencrypted TCP/IP traffic via a configurable port (default is 80) or 256 bit AES encrypted SSL TCP/IP traffic via a configurable port (default is 443)

2.14 Each segment manager shall have integral support for at least three segment networks. Segment networks may alternately be connected to the segment manger via external routers and switches, using standard Ethernet structured wiring. Each router shall accommodate one segment network. Provide the quantity of routers and switches as shown on the plans

2.15 Operational features of the Segment Manager shall include the following:

2.15.1 Connection to PC or LAN via standard Ethernet TCP/IP via standard Ethernet TCP/IP with the option to use SSL encrypted connections for all traffic

2.15.2 Easy to learn and use graphical user interface, compatible with Internet Explorer 8, or equal browser. Shall not require installation of any lighting control software to an end-user PC

2.15.3 Log in security capable of restricting some users to view-only or other limited operations

2.15.4 Automatic discovery of DLM devices and relay panels on the segment network(s). Commissioning beyond activation of the discovery function shall not be required to provide communication, monitoring or control of all local networks and lighting control panels

2.15.5 After discovery, all rooms and panels shall be presented in a standard navigation tree format. Selecting a device from the tree will allow the device settings and operational parameters to be viewed and changed by the use

2.15.6 Ability to view and modify room device operational parameters. It shall be possible to set device parameters independently for normal hours and after hours operation including sensor time delays and sensitivities, and load response to sensor including Manual-On or Auto-On

2.15.7 Ability to set up schedules for rooms and panels, view and override current status of panel channels and relays, and assign relays to groups. Schedules shall automatically set controlled zones or areas to either a normal hours or after hours mode of operation. Support for a minimum of 100 unique schedules, each with up to four time events per day. Support for annual schedules, holiday schedules and unique date-bound schedules

2.15.8 Ability to group rooms and loads for common control by schedules, switches or network commands

2.15.9 Ability to monitor connected load current and display power consumption for areas equipped with room controllers incorporating the integral current monitoring feature

2.15.10 Provide capabilities for integration with a BAS via BACnet protocol. At a minimum, the following points shall be available to the BAS via BACnet IP connection to the segment manager: room occupancy state; room schedule mode; room switch lock control; individual occupancy sensor state; room lighting power; room plug-load power; load ON/OFF state; load dimming level; panel channel schedule state; panel relay state; and Segment Manager Group schedule state control

2.15.11 The Segment Manager shall allow access and control of the overall system database via Native Niagara AX FOX connectivity. Systems that must utilize a Tridium Niagara controller in addition to the programming, scheduling and configuration server are not acceptable

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2.16 Segment Manager shall support multiple DLM rooms as follows

2.16.1 Support up to 120 network bridges and 900 digital in-room devices (LMSM-3E)

2.16.2 Support up to 300 network bridges and 2,200 digital in room devices, connected via network routers and switches (LMSM-6E)

2.17 WattStopper Product Numbers: LMSM-3E, LMSM-6E, NB-ROUTER, NB-SWITCH, NB-SWITCH-8, NB-SWITCH-16

PROGRAMMING, CONFIGUARION AND DOCUMENTATION SOFTWARE

2.18 PC-native application for optional programming of detailed technician-level parameter information for all DLM products, including all parameters not accessible via BACnet and the handled IR configuration tool. Software must be capable of accessing room-level parameter information locally within the room when connected via the optional LMCI-100 USB programming adapter, or globally for many segment networks simultaneously utilizing standard BACnet/IP communication. Additional parameters exposed through this method include but are not limited to:

2.18.1 Occupancy sensor detection LED disable for performance and other aesthetic spaces where blinking LEDs present a distraction.

2.18.2 Six occupancy sensor action behaviors for each controlled load, separately configurable for normal hours and after hours modes. Modes include: No Action, Follow Off Only, Follow On Only, Follow On and Off, Follow On Only with Override Time Delay, Follow Off Only with Blink Warn Grace Time, Follow On and Off with Blink Warn Grace Time.

2.18.3 Separate fade time adjustments per load for both normal and after hours from 0 - 4 hours.

2.18.4 Configurable occupancy sensor re-trigger grace period from 0 - 4 minutes separate for both normal hours and after hours.

2.18.5 Separate normal hours and after hours per-load button mode with modes including: Do nothing, on only, off only, on and off.

2.18.6 Load control polarity reversal so that on events turn loads off and vice versa.

2.18.7 Per-load DR (demand response) shed level in units of percent.

2.18.8 Load output pulse mode in increments of 1second.

2.18.9 Fade trip point for each load for normal hours and after hours that establishes the dimmer command level at which a switched load closes

its relay to allow for staggered On of switched loads in response to a dimmer

2.19 Generation of reports at the whole file, partial file, or room level. Reports include but are not limited to:

2.19.1 Device list report: All devices in a project listed by type.

2.19.2 Load binding report: All load controller bindings showing interaction with sensors, switches, and daylighting.

2.19.3 BACnet points report: Per room Device ID report of the valid BACnet points for a given site's BOM.

2.19.4 Room summary report: Device manifest for each room, aggregated by common BOM, showing basic sequence of operations.

2.19.5 Device parameter report: Per-room lists of all configured parameters accessible via hand held IR programmer for use with O&M documentation.

2.19.6 Scene report: All project scene pattern values not left at defaults (i.e. 1 = all loads 100%, 2 = all loads 75%, 3 = all loads 50%, 4 = all loads 25%, 5-16 = same as scene 1).

2.19.7 Occupancy sensor report: Basic settings including time delay and sensitivity(ies) for all occupancy sensors

2.20 Network-wide programming of parameter data in a spreadsheet-like programming environment including but not limited to the following operations

2.20.1 Set, copy/paste an entire project site of sensor time delays.

2.20.2 Set, copy/paste an entire project site of sensor sensitivity settings.

2.20.3 Search based on room name and text labels.

2.20.4 Filter by product type (i.e. LMRC-212) to allow parameter set by product.

2.20.5 Filter by parameter value to search for product with specific configurations

2.21 Network-wide firmware upgrading remotely via the BACnet/IP network

2.21.1 Mass firmware update of entire rooms

2.21.2 Mass firmware update of specifically selected rooms or areas

2.21.3 Mass firmware upgrade of specific products

2.22 WattStopper Product Number: LMCS-100, LMCI-100

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LMCP LIGHTING CONTROL PANELS

2.23 Provide lighting control panels in the locations and capacities as indicated on the plans and schedules. Each panel shall be of modular construction and consist of the following components:

2.23.1 Enclosure/Tub shall be NEMA 1, sized to accept an interior with 1 - 48 relays .

2.23.2 Cover shall be configured for surface or flush wall mounting of the panel as indicated on the plans. The panel cover shall have a hinged and lockable door with restricted access to line voltage section of the panel

2.23.3 Interior assembly shall be supplied as a factory assembled component specifically designed and listed for field installation. The interior construction shall provide total isolation of high voltage (Class 1) wiring from low voltage (Class 2) wiring within the assembled panel. The interior assembly shall include intelligence boards, power supply, DIN rails for mounting optional Class 2 control devices, and individually replaceable latching type relays. The panel interiors shall include the following features

2.23.3.1 Removable, plug-in terminal blocks with connections for all low voltage terminations

2.23.3.2 Individual terminal block, override pushbutton, and LED status light for each relay

2.23.3.3 Direct wired switch inputs associated with each relay shall support 2-wire momentary switches only

2.23.3.4 Digital inputs (four RJ-45 jacks) shall support 1-, 2-, 3-, 4-, and 8-button digital switches; digital IO modules capable of receiving 0-5V or 0-10V analog photocell inputs; digital IO modules capable of receiving momentary or maintained contact closure inputs or analog sensor inputs; digital daylighting sensors; and digital occupancy sensors. Inputs are divided into two separate digital networks, each capable of supplying 250mA to connected devices

2.23.3.5 True relay state shall be indicated by the on-board LED and shall be available to external control devices and systems via BACnet

2.23.3.6 Automatically sequenced operation of relays to reduce impact on the electrical distribution system when large loads are controlled simultaneously

2.23.3.7 Group and pattern control of relays shall be provided through a simple keypad interface from a handheld IR

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programmer. Any set of relays can be associated with a group for direct on/off control or pattern (scene) control via a simple programming sequence using the relay override pushbuttons and LED displays for groups 1-8 or a handheld IR programmer for groups 1-99

2.23.3.8 Relay group status for shall be provided through LED indicators for groups 1-8 and via BACnet for groups 1-99. A solid LED indicates that the last group action called for an ON state and relays in the group are on or in a mixed state

2.23.3.9 Single-pole latching relays with modular plug-in design. Relays shall provide the following ratings and features:

Electrical

2.23.3.9.1 30 amp ballast at 277V

2.23.3.9.2 20 amp ballast at 347V

2.23.3.9.3 20 amp tungsten at 120V

2.23.3.9.4 30 amp resistive at 347V

2.23.3.9.5 1.5 HP motor at 120V

2.23.3.9.6 14,000 amp short circuit current rating (SCCR) at 347V

2.23.3.9.7 Relays shall be specifically UL 20 listed for control of plug-loads

Mechanical

2.23.3.9.8 Replaceable, ½" KO mounting with removable Class 2 wire harness

2.23.3.9.9 Actuator on relay housing provides manual override and visual status indication, accessible from Class 2 section of panel

2.23.3.9.10 Dual line and load terminals each support two #14 - #12 solid or stranded conductors

2.23.3.9.11 Tested to 300,000 mechanical on/off cycles

2.24 Isolated low voltage contacts provide for true relay status feedback and pilot light indication

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2.25 Power supply shall be a multi-voltage transformer assembly with rated power to supply all electronics, occupancy sensors, switches, pilot lights, and photocells as necessary to meet the project requirements. Power supply to have internal over-current protection with automatic reset and metal oxide varistor protection

2.26 Where indicated, lighting control panels designated for control of emergency lighting shall be provided with factory installed provision for automatic by pass of relays controlling emergency circuits upon loss of normal power. Panels shall be properly listed and labeled for use on emergency lighting circuits and shall meet the requirements of UL924 and NFPA 70 - Article 700

2.27 Integral system clock shall provide scheduling capabilities for panel-only projects without DLM segment networks or BAS control

2.27.1 Each panel shall include digital clock capability able to issue system wide automation commands to up to (11) eleven other panels for a total of (12) twelve networked lighting control panels. The clock shall provide capability for up to 254 independent schedule events per panel for each of the ninety-nine system wide channel groups

2.27.2 The clock capability of each panel shall support the time-based energy saving requirements of applicable local energy codes

2.27.3 The clock module shall provide astronomic capabilities, time delays, blink warning, daylight savings, and holiday functions and will include a battery back up for the clock function and program retention in non-volatile FLASH memory. Clocks that require multiple events to meet local code lighting shut off requirements shall not be allowed

2.27.4 The clock capability of each panel shall operate on a basis of ON/OFF or Normal Hours/After Hours messages to automation groups that implement pre-configured control scenarios. Scenarios shall include:

2.27.4.1 Scheduled ON / OFF

2.27.4.2 Manual ON / Scheduled OFF

2.27.4.3 Astro ON / OFF (or Photo ON / OFF)

2.27.4.4 Astro and Schedule ON / OFF (or Photo and Schedule ON / OFF)

2.27.5 The user interface shall be a portable IR handheld remote control capable of programming any panel in the system (LMCT-100)

2.27.6 The clock capability of each panel shall employ non-volatile memory and shall retain user programming and time for a minimum of 10 years

2.27.7 Schedules programmed into the clock of any one panel shall be capable of executing panel local schedule or Dark/Light (photocell or Astro) events

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for that panel in the event that global network communication is lost. Lighting control panels that are not capable of executing events independently of the global network shall not be acceptable

2.28 The lighting control panel can operate as a stand-alone system, or can support schedule, group, and photocell control functions, as configured in a Segment Manager controller, via a segment network connection

2.29 The lighting control panel shall support digital communications to facilitate the extension of control to include interoperation with building automation systems and other intelligent field devices. Digital communications shall be RS485 MS/TP-based using the BACnet® protocol

2.29.1 The panel shall have provision for an individual BACnet device ID and shall support the full 2^{22} range (0 – 4,193,304). The device ID description property shall be writable via the network to allow unique identification of the lighting control panel on the network

2.29.2 The panel shall support MS/TP MAC addresses in the range of 0 – 127 and baud rates of 9600k, 38400k, 76800k, and 115.2k bits per second

2.29.3 Lighting control relays shall be controllable as binary output objects in the instance range of 1 – 64. The state of each relay shall be readable and writable by the BAS via the object present value property

2.29.4 Lighting control relays shall report their true on/off state as binary input objects in the instance range of 1 – 64

2.29.5 The 99 group Normal Hours/After Hours control objects associated with the panel shall be represented by binary value objects in the instance range of 201 – 299. The occupancy state of each channel group shall be readable and writable by the BAS via the object present value property. Commanding 1 to a channel group will put all relays associated with the channel into the normal hours mode. Commanding 0 or NULL shall put the relays into the after hours mode

2.29.6 Setup and commissioning of the panel shall not require manufacturer-specific software or a computer. All configuration of the lighting control panel shall be performed using standard BACnet objects or via the handheld IR programming remote. Provide BACnet objects for panel setup and control as follows:

2.29.6.1 Binary output objects in the instance range of 1 – 64 (one per relay) for on/off control of relays

2.29.6.2 Binary value objects in the instance range of 1 – 99 (one per channel) for normal hours/after hours schedule control

2.29.6.3 Binary input objects in the instance range of 1 – 64 (one per relay) for reading true on/off state of the relays

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2.29.6.4 Analog value objects in the instance range of 101 – 199 (one per channel group) shall assign a blink warn time value to each channel. A value of 5 shall activate the blink warn feature for the channel and set a 5-minute grace-time period. A value of 250 shall activate the sweep feature for the channel and enable the use of sweep type automatic wall switches

2.29.7 The description property for all objects shall be writable via the network and shall be saved in non-volatile memory within the panel

2.29.8 The BO and BV 1 – 99 objects shall support BACnet priority array with a relinquish default of off and after hours respectively. Prioritized writes to the channel BV objects shall propagate prioritized control to each member relay in a way analogous to the BACnet Channel object described in addendum aa. (http://www.bacnet.org/Addenda/Add-135-2010aa.pdf)

2.29.9 Panel-aggregate control of relay Force Off at priority 2 shall be available via a single BV5 object. Force On at priority 1 shall be available via a single BV4 object

2.29.10 Lockout of all digital switch buttons connected to a given panel shall be command-able via a single BV2 object. The lock status of any connected switch station shall be represented as BV101-196

2.30 WattStopper Product Number: LMCP8, LMCP24 or LMCP48

USER INTERFACE

2.31 Each lighting control panel system shall be supplied with at least (1) handheld configuration tool (LMCT-100). As a remote programming interface the configuration tool shall allow setup, configuration, and diagnostics of the panel without the need for software or connection of a computer. The user interface shall have the following panel-specific functions as a minimum:

2.31.1 Set network parameters including panel device ID, MS/TP MAC address, baud rate and max master range.

2.31.2 Relay Group creation of up to 99 groups. Group creation shall result in programming of all seven key relay parameters for member relays. The seven parameters are as follows: After-hours Override Time Delay, Normal Hours Override Time Delay, Action on Transition to Normal Hours, Action on Transition to After Hours, Sensor Action During Normal Hours, Sensor Action During After Hours, Blink-Warn Time for After Hours.

2.31.3 Program up to 254 separate scheduled events. Events shall occur on seven day intervals with each day selectable as active or inactive, and

shall be configurable as to whether the event is active on holidays. Holidays are also defined through the User Interface.

2.31.4 Program up to 32 separate Dark/Light events. Events shall have a selectable source as either calculated Astro with delay, or a digital IO module with an integral 0-5V or 0-10V analog photocell. Dark/Light events shall occur on seven day intervals with each day selectable as active or inactive, and shall be configurable as to whether the event is active on holidays.

2.31.5 Button binding of digital switches to groups shall be accessible via the handheld IR remote and accomplished from the digital switch station.

2.31.6 Programming of panel location information shall be accomplished by the handheld IR remote and include at a minimum LAT, LON, DST zone, and an approximate city/state location.

2.31.7 An additional handheld IR remote may optionally be specified to be permanently mounted to the panel interior via a retractable anti-theft lanyard to allow for convenient programming of the panel while assuring that the handheld programmer is always present at that panel. An unlimited number of handheld IR remotes may also be purchased for facilities staff as determined by the end user's representative.

2.32 WattStopper Product Number: LMCT-100

PART 3 - EXECUTION

PRE-INSTALLATION MEETING

3.1 A factory authorized manufacturer's representative shall provide the electrical contractor a functional overview of the lighting control system prior to installation. The contractor shall schedule the pre-installation site visit after receipt of approved submittals to review the following:

3.1.1 Confirm the location and mounting of all digital devices, with special attention to placement of occupancy and daylighting sensors.

3.1.2 Review the specifications for low voltage control wiring and termination.

3.1.3 Discuss the functionality and configuration of all products, including sequences of operation, per design requirements.

3.1.4 Discuss requirements for integration with other trades

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CONTRACTOR INSTALLATOIN AND SERVICES

3.2 Contractor to install all devices and wiring in a professional manner. All line voltage connections to be tagged to indicate circuit and switched legs

3.3 Contractor to install all room/area devices using manufacturer's factory-tested Cat 5e cable with pre-terminated RJ-45 connectors. If pre-terminated cable is not used for room/area wiring, the contractor is responsible for testing each field-terminated cable following installation, and shall supply the lighting controls manufacturers with test results. Contractor to install any room to room network devices using manufacturer-supplied LM-MSTP network wire. Network wire substitution is not permitted and may result in loss of product warranty per DLM SEGMENT NETWORK section of specification. Low voltage wiring topology must comply with manufacturer's specifications. Contractor shall route network wiring as shown in submittal drawings as closely as possible, and shall document final wiring location, routing and topology on as built drawings

3.4 Install the work of this Section in accordance with manufacturer's printed instructions unless otherwise indicated. Before start up, contractor shall test all devices to ensure proper communication

3.5 Calibrate all sensor time delays and sensitivity to guarantee proper detection of occupants and energy savings

3.5.1 Adjust time delay so that controlled area remains lighted while occupied

3.6 Provide written or computer-generated documentation on the configuration of the system including room by room description including:

3.6.1 Sensor parameters, time delays, sensitivities, and daylighting setpoints.

3.6.2 Sequence of operation, (e.g. manual ON, Auto OFF. etc.)

3.6.3 Load Parameters (e.g. blink warning, etc

3.7 Post start-up tuning – After 30 days from occupancy contractor shall adjust sensor time delays and sensitivities to meet the Owner's requirements. Provide a detailed report to the Architect / Owner of post start-up activity

FACTORY SERVICES

3.8 Upon completion of the installation, the manufacturer's factory authorized representative shall start up and verify a complete fully functional system

3.9 The electrical contractor shall provide both the manufacturer and the electrical engineer with three weeks written notice of the system start up and adjustment date

3.10 Upon completion of the system start up, the factory-authorized technician shall provide the proper training to the owner's personnel on the adjustment and maintenance of the system

COMMISSIONING SUPPORT SERVICES

3.11 On this project, a commissioning agent will be hired to verify the installation and programming of all building systems, which includes the lighting control system. Manufacturer should include an extra day of technician's time to review the functionality and settings of the lighting control hardware with the commissioning agent, including reviewing submittal drawings and ensuring that instructions on how to configure each device are readily available. Manufacturer is NOT responsible for helping the commissioning agent inspect the individual devices. It will be the commissioning agent's responsibility to create and complete any forms required for the commissioning process, although the manufacturer or contractor may offer spreadsheets and/or printouts to assist the agent with this task.

3.12 The commissioning agent shall work with the electrical contractor during installation of the lighting control hardware to become familiar with the specific products. The agent may also accompany the manufacturer's technicians during their start-up work to better understand the process of testing, calibration and configuration of the products. However, the contractor and manufacturer shall ensure that interfacing with the agent does not prevent them from completing the requirements outlined in the contract documents

ACCEPTANCE TESTING SUPPORT SERVICES

3.13 On all California projects, a certified lighting controls acceptance test technician (CLCATT) must verify the installation of the lighting control system. Manufacturer should include an extra day of factory technician's time to assist the CLCATT review the functionality and settings of the lighting control hardware per the requirements in the California State forms. It will be the CLCATT's responsibility to create and complete any forms required for the commissioning process, although the manufacturer or contractor may offer spreadsheets and/or printouts to assist the CLCATT with this task

END OF SECTION

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SECTION 26 09 24

TIME CLOCKS

PART 1 – GENERAL

1.1 Furnish and install all time clocks that are not specifically called for to be furnished by others.

1.2 Submit manufacturer's data.

1.3 <u>Common submittal mistakes which will result in submittals being rejected:</u>

1.3.1 Not including all items listed in the above itemized description.

1.3.2 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining or clouding the items to be reviewed, or crossing out the items which are not applicable.

1.3.3 Not including actual manufacturer's catalog information of proposed products.

1.3.4 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements, or "to be determined later" statements. The products being submitted must be the products installed.

PART 2 – PRODUCTS

2.1 Acceptable manufacturers are Tork, Paragon, or Intermatic.

2.2 Contacts shall have a minimum rating of 10 amperes at 120V.

2.3 Controller is to have two channels. Both channels shall be astronomic with 1 to 99 minutes, plus or minus offset from sunrise or sunset.

2.4 Controller shall program in AM/PM or 24-hour format, with one minute resolution, suing two buttons for all basic settings.

2.5 Controller shall be capable of 48 events per channel per week, and separate scheduling for each day of the week.

2.6 Controller shall have the following features:

2.6.1 Scheduling of 16 individual holiday dates, and five holiday blocks.

2.6.2 Automatic leap year compensation, and daylight saving.

2.7 Controller shall have 72-hour memory backup with rechargeable backup.

2.8 Clock shall be housed in a flush enclosure where supply circuits emanate from a flush mounted panelboard and surface enclosure when supply circuits are from a surface mounted panel.

PART 3 – EXECUTION

3.1 Furnish and install time clocks as shown on the drawings and herein specified.

END OF SECTION

SECTION 26 22 13

DRY TYPE TRANSFORMERS

PART 1 – GENERAL

1.1 Furnish and install where indicated on the drawings dry type transformers with voltage and phase as shown on the drawings. The transformers shall be 60 Hz with KVA rating as shown on the drawings.

1.2 Submit shop drawings and manufacturer's data for each transformer including:

1.2.1 Incident energy level calculations

1.3 **Common submittal mistakes which will result in the submittal being rejected:**

1.3.1 Not including all items listed in the above itemized description.

1.3.2 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining or clouding the items to be reviewed, or crossing out the items which are not applicable.

1.3.3 Not including actual manufacturer's catalog information of proposed products.

1.3.4 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements, or "to be determined later" statements. The products being submitted must be the products installed.

PART 2 – PRODUCTS

2.1 Acceptable manufacturers are Square D, Eaton-Cutler Hammer, or Siemens

2.2 Equipment manufactured by any other manufacturers not specifically listed in Section 2.1 are not considered equal, or approved for use on this project.

2.3 Energy efficient transformers shall be provided in compliance with NEMA TP-1 and requirements as outlined in the California Code of Regulations, Title 20: Division 2, Chapter 4, Article 4, Sections 1601-1609: Appliance Efficiency Regulations and California Code of Regulations, Title 24: part 6, Subchapter 2, Sections 110-11: Building Standards. Transformers shall also meet the Class 1 Efficiency levels for distribution transformers specified in Table 4-2 of the National Electrical Association (NEMA) TP-102002, Guide for Determining Energy Efficiency for Distribution Transformers" The TP-1 efficiency rating will apply to both conventional transformers and K-rated transformers.

2.4 Transformers shall comply with the latest NEMA and ANSI standards.

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2.5 Transformers shall be encased in a sheet steel enclosure. Ten (10) KVA and smaller shall be non-ventilated, and above 10 KVA shall be ventilated, self-cooled. The core and coil assembly shall be completely isolated from the enclosure by means of neoprene rubber isolation pads or other acceptable vibration isolators. Transformers installed outdoors shall be provided with suitable rain shields and shall be UL listed for outdoor installation.

2.5.1 Fan cooled transformers will not be accepted.

2.6 Transformers shall have a 185□C insulation system and shall not exceed 115□C rise above a 40□C ambient under full load conditions.

2.7 Transformers shall be capable of operating at 100 PCT. for taps below normal. Transformers rated 30 KVA and larger shall be 6 - 2-1/2 PCT., four below, and two above normal.

2.8 Transformer cable termination compartment shall be rated at not more than 75 degrees C.

2.9 Transformers shall have aluminum windings.

2.10 Sound outputs of transformers shall not exceed the following levels, based on NEMA standard testing procedures:

KVA Rating	Decibel Sound Output
0 - 9	40
10 - 50	45
51 - 150	50
151 - 300	55
301 - 500	60

PART 3 – EXECUTION

3.1 Dry type transformers larger than 112.5KVA rating shall have a minimum of twelve inches clearance between transformer ventilation openings and adjacent structure. Transformer connections shall be made with flexible conduit.

3.2 All lugs shall be torque tested in the presence of the inspector of record.

3.3 Transformers shall be anchored to the structure to resist seismic activity in accordance with Zone 4 requirements. Provide a minimum of four (4) ½-inch diameter anchor bolts for floor or roof mounted transformers.

3.4 Transformers mounted on roofs shall be installed on a roof curb. All conduits shall enter the transformer enclosure within the curbed area.

3.5 Arc Flash and Shock Hazard

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3.5.1 The Contractor is to provide, and submit to the engineer for approval, incident energy level calculations as determined using the methodologies described in NFPA 70E or IEEE standard 1584-2002.

3.5.2 A warning label, as specified in the above standard, shall be placed on each switchboard, panelboard, and safety switch indicating the incident energy levels on the equipment to warn qualified personnel in accordance with NFPA 70E, section 110.16. Labels shall be laminated white micarta with black lettering on each. Letters shall be no less than 3/8" high.

3.5.3 The incident level calculations for each piece of equipment shall be given to the owner and maintained on file by the maintenance department.

3.5.4 The design goal is to minimize the incident energy to which a maintenance employee may be exposed.

END OF SECTION

SECTION 26 24 13

SWITCHBOARDS

PART 1 – GENERAL

1.1 Furnish and install service entrance and distribution switchboards as herein specified and as shown on the drawings. In order to establish the minimum acceptable quality and type of equipment described in this section, the switchboard was technically and dimensionally designed around "Square D." If other acceptable manufacturer products listed in 2.1 are used, it shall be the responsibility of the Contractor to verify the equipment will meet the requirements of the design, both technically and dimensionally.

1.2 All electrical materials and equipment shall be new, and of the type and quality specified: Listed by Underwriters' Laboratories, and bear their label, where standards have been established; in compliance with the applicable standards of CEC (NFPA 70), NFPA, ANSI, IEEE, IPCEA and NEMA. All components and equipment enclosures shall be manufactured by the same manufacturer.

1.3 SUBMITTALS

1.3.1 Submit shop drawings and manufacturers' data on the switchboard and components including:

1.3.1.1 Equipment elevation diagrams indicating the bussing configurations and ampere ratings.

1.3.1.2 Coordination study and incident energy level calculations.

1.3.1.3 Metering equipment

1.3.1.4 Breakers or fused switches

1.3.1.5 Surge Protective Device (SPD)

1.4 **Common submittal mistakes which will result in the submittals being rejected:**

1.4.1 Not including the Short Circuit and Coordination Study with the material submittals.

1.4.2 Not including all items listed in the above itemized description.

1.4.3 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining or clouding the items to be reviewed, or crossing out the items which are not applicable.

1.4.4 Not including actual manufacturer's catalog information of proposed products.

1.4.5 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements, or "to be determined later" statements. The products being submitted must be the products installed.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

2.1.1 Acceptable manufacturers are:

2.1.1.1 Siemens

2.1.1.2 Eaton

2.1.1.3 Square D

2.2 Equipment manufactured by any other manufacturers not specifically listed in Section 2.1, are not considered equal or approved for use on this project.

2.3 Switchboards shall be of the dead front, safety type with voltage and ampere capacity as indicated. Provide a 25% minimum tin plated aluminum ground bus running the full length of the switchboards. The neutral bus shall be **100**% rated throughout.

2.4 Where conductor sizes exceed the standard breaker lug wire range, or where multiple conductors per phase are required, the manufacturer shall provide the breaker with suitable lugs for terminating the specified conductors.

2.5 All bussing shall be tin plated aluminum and braced for a short circuit current of 100,000 RMS symmetrical amperes minimum, or as noted on the drawings. Horizontal and vertical bussing shall be 100% fully rated; not tapered unless otherwise noted on the drawings. All sections shall have full height bus.

2.6 The main circuit breaker (480 volt or 208 volt, 800 amp or larger) shall be a stored energy solid state trip insulated case type breaker and shall consist of a three-pole electrically and mechanically trip-free circuit breaker with inter-pole barriers, arc quenchers, manual stored-energy closing mechanism, mechanical push-button trip, position indicator, and equipped for fixed mounting in the switchboard section. Main breaker shall be **100%** rated and shall be sized as indicated on the drawings. Minimum short circuit interrupting rating shall be 65,000 ampere symmetrical for all breakers in the main switchboard or as indicated on the drawings. For main breakers rated 2,500 amps and larger this rating shall be increased to 100,000 amps, or as indicated on the drawings.

2.6.1 The over current trip devices to be furnished with the main circuit breaker shall be of the three-phase construction and employ solid-state components in their design to afford combinations of long, short time, and instantaneous and ground fault characteristics (480 volt only) as specified. The circuit breaker and integral solid-state trip device shall be self-contained to include necessary power supply, transformers and tapped current level sensing transformers. An external source shall not be required to trip the circuit breaker under fault of overload conditions or to test the ground fault trip.

2.6.2 Field installed rating plug taps shall be provided.

2.6.3 Main breakers 400 amp and larger shall be solid state trip.

2.6.4 The main circuit breaker shall be provided with the following:

2.6.4.1 Adjustable longtime delay element pickup.

2.6.4.2 Adjustable short-time delay element pickup.

2.6.4.3 The instantaneous trip element pickup shall be adjustable from 1.5 to 10 times the sensor setting or none.

2.6.5 The feeder circuit breakers (480 volt or 208 volt, 400 amp or larger) shall be solid state trip molded case type breakers. They shall consist of a three-pole electrically and mechanically trip-free circuit breakers with inter-pole barriers, arc quenchers, manual closing mechanism, position indicator, and equipped for fixed mounting in the switchboard section. The breakers shall be a minimum of **80%** rated, unless otherwise identified on the drawings and shall be sized as indicated on the drawings. Minimum short circuit interrupting rating shall be 65,000 ampere symmetrical or as indicated on the drawings.

2.6.5.1 The overcurrent trip devices to be furnished with these circuit breakers shall be of the three-phase construction and employ solid-state components in their design to afford combinations of long, short time, and instantaneous and ground fault characteristics (480 volt only) as specified. The circuit breaker and integral solid-state trip device shall be self-contained to include necessary power supply, transformers and tapped current level sensing transformers. An external source shall not be required to trip the circuit breaker under fault of overload conditions or to test the ground fault trip.

2.6.5.2 Field installed rating plug taps shall be provided as required.

2.6.5.3 These circuit breakers shall be provided with the following:

2.6.5.3.1 Adjustable long-time delay element pickup.

2.6.5.3.2 Adjustable short-time delay element pickup.

2.6.5.3.3 The instantaneous trip element pickup shall be adjustable from 1.5 to 10 times the sensor setting.

2.6.5.3.4 Where the GFI function is required the settings shall be set at maximum levels.

2.7 Feeder breakers identified as 100% rating on the drawings may be molded case type below 1600 amp but 1600 amp and above shall be insulated case type. All breakers shall accept copper or aluminum conductors. Contractor must verify that the breaker can accept the possibility of aluminum conductors.

2.8 Circuit breakers less than 400 amps shall be molded case, trip free, quick-make, quick-break, thermal magnetic type, with handles clearly indicating rating and position-on, off, tripped.

2.9 Circuit breakers used in service entrance equipment, identified on the drawings shall have short circuit current ratings equal to the bracing and in no case smaller than 22,000 amperes RMS symmetrical.

2.10 The switchboard shall be manufactured to locate the utility company metering within the local utility company requirements, for maximum centerline height. This maximum height must include the 2-1/2" high (above finished grade) concrete housekeeping.

2.11 Provide a metal embossed nameplate adjacent to the switchboard rating, indicating the maximum short circuit current rating of the switchboard as determined by UL 891, September 30, 1982.

2.12 Where devices indicated are fusible type, fuses shall be Bussman or Littlefuse (no known equal).

2.13 Where a switchboard is indicated to be provided with an NEMA 3R (weatherproof) enclosure, the enclosure shall be manufactured to allow the equipment to mount flush against a vertical surface or wall. Rear roof equipment overhangs will not be permitted for weatherproof equipment.

2.14 Where auxiliary test kits or other devices are needed for setting breaker parameters they shall be supplied.

Service Entrance – Surge Protective Device

2.15 IEEE C62.41.1, IEEE Guide on the Surge Environment in Low-Voltage (1000 V and Less) AC Power Circuits

2.16 IEEE C62.41.2, IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits

2.17 IEEE C62.45, IEEE Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000 V and Less) AC Power Circuits

2.18 National Electrical Code: Article 285

2.19 UL 1283 - Electromagnetic Interference Filters

2.20 SPD shall be UL 1449 labeled as Type 1 or Type 4 intended for Type 1 applications, verifiable at UL.com without need for external or supplemental over current controls. Every suppression component of every mode, including N-G, shall be protected by internal over current and thermal over temperature controls. SPDs relying upon external or supplementary installed safety disconnectors do not meet the intent of the specification

2.21 SPD shall be factory installed integral to electrical distribution equipment

2.22 SPD shall be UL labeled with 20kA I-nominal (I-n)

2.23 SPD shall be UL labeled with 200kA Short Circuit Current Rating (SCCR)

2.24 Standard Mode Protection paths: SPD shall provide surge current paths for all modes of protection: L-N, L-G, L-L, and N-G for Wye systems.

2.25 SPD shall be connected to the buss of the distribution equipment with an appropriately sized 200kA SCCR rated disconnect

2.26 SPD shall meet or exceed the following criteria:

2.26.1 MAXIMUM 7-Mode sure current capability per phase shall be 400kA for mountain and desert areas with over 5 lightning strikes per year.

2.26.2 UL 1449 – Third Edition Revisions; effective September 29, 2009 Voltage Protection Ratings shall not exceed the following:

VOLTAGE	L-N	L-G	N-G	L-L	MCOV
208Y/120	700V	700V	700V	1200V	150V
480Y/277	1200V	1200V	1200V	2000V	320V

2.26.3 UL 1449 Listed Maximum Continuous Operating Voltage (MCOV) (verifiable at UL.com)

System Voltage	Allowable System Voltage Fluctuation (%)	MCOV
208Y/120	25%	150V
480Y/277	15%	320V

2.27 SPD shall incorporate a UL 1283 listed EMI/RFI filter with minimum attenuation of -50dB at 100 kHz

2.28 Suppression components shall be heavy duty 'large block' MOVs, each exceeding 30mm diameter.

2.29 SPD shall include a serviceable, replaceable module.

2.30 SPD shall be equipped with the following diagnostics:

2.30.1 Visual LED diagnostics including a minimum of one green LED indicator per phase, and one red service Led

2.30.2 Audible alarm with on/off silence function and diagnostic test function (excluding branch)

2.30.3 Form C dry Contacts

No other test equipment shall be required for SPD monitoring or testing before or after installation.

2.30.4 SPD shall have a 10 year warranty

Short-Circuit and Coordination Studies

2.31 The contractor shall provide the following studies; a time current and complete short-circuit study, equipment-interrupting or withstand evaluation, and a protective-device coordination study as described below for the distribution system. The equipment study shall be included with the equipment submittals. The studies shall include all portions of the electrical distribution system from the normal and alternate sources of power throughout the low-voltage distribution system. Normal system operating method, alternate operation, and operations which could result in maximum-fault conditions shall be thoroughly covered in the study. The studies are to be reviewed by a Professional Engineer registered in the State of California.

2.31.1 **All studies shall be performed by "Emerson Electric" (858) 695-9551, MTA (858) 472-0193, or Terra Power Solutions (858) 380-8170. Studies performed by manufactures or other engineering or testing companies must submit qualifications for approval by Johnson Consulting Engineers, 7 days prior to bid for this project.**

2.32 Short-Circuit Study

2.32.1 The study shall be in accordance with applicable ANSI and IEEE standards.

2.32.2 The study input data shall include the short-circuit single- and three-phase contributions from all sources, with the X/R ratio, the resistance

and reactance components of each branch impedance, motor and generator contributions, base quantities selected, and all other applicable circuit parameters.

2.32.3 Short-circuit momentary duties and interrupting duties shall be calculated on the basis of maximum available fault current at each switchgear bus, switchboard, motor control center, distribution panelboard, pertinent branch circuit panelboards, and other significant locations through the system.

2.32.4 For the portions of a system utilizing medium- and high-voltage breakers, separate calculations shall be made for one-half cycle (close and latch) currents and interrupting currents. Calculations shall be for three-phase and phase-to-ground faults at each bus under consideration.

2.32.5 For the portions of a system utilizing low-voltage breakers (less than 1,000 volts), calculations shall be made for three-phase and phase-to-ground interrupting currents at each bus under consideration.

2.33 Equipment Evaluation Study

2.33.1 An equipment evaluation study shall be performed to assure the adequacy of circuit breakers, controllers, surge arresters, busways, switches, and fuses by tabulating and comparing the short-circuit ratings of these devices with the maximum short-circuit momentary and interrupting duties. Series rating of over current protective devices shall be permitted to reduce the maximum available short circuit current to panelboard branch circuit breakers to no more than 10,000 amps symmetrical for the 120/208 volt system and 14,000 amps symmetrical for the 277/480 volt system.

2.34 Protective-Device Coordination Study

2.34.1 A protective-device coordination study shall be performed to select or to verify the selection of power fuse ratings, protective-relay characteristics and settings, ratios, and characteristics of associated voltage and current transformers, and low-voltage breaker trip characteristics and settings. Time current curves are to be colored to clearly indicate coordination.

2.34.2 The coordination study shall include all voltage classes of equipment from the source's incoming line protective device down to and including each motor control center and/or panelboard. The phase and ground over current protection shall be included as well as settings for all other adjustable protective devices. Ground fault settings are to, as a minimum coordinate with a downstream 50 amp branch circuit breaker.

2.34.3 Protective device selection and settings shall be in accordance with requirements of the National Electrical Code and the recommendations of the ANSI/IEEE Standard 399, as applicable.

2.35 Study Report

2.35.1 The results of the power-system studies shall be summarized in a final report. The report shall include the following sections:

2.35.1.1 Description, purpose, basis, and scope of the study and a single-line diagram of the portion of the power system which is included within the scope of study.

2.35.1.2 Tabulations of circuit breaker, fuse, and other equipment ratings versus calculated short-circuit duties and commentary regarding same.

2.35.1.3 Protective device coordination curves, with commentary.

2.35.1.4 The selection and settings of the protective devices shall be provided separately in a tabulated form listing circuit identification, IEEE device number, current transformer ratios, manufacturer, type, range of adjustment, and recommended settings. A tabulation of the recommended power fuse selection shall be provided for all fuses in the system.

2.35.1.5 Fault-current tabulations including a definition of terms and a guide for interpretation.

2.35.1.6 The report must be submitted with the material submittal for the engineers approval.

2.36 Implementation

2.36.1 The equipment manufacturer is to be responsible for providing over current devices which are in compliance with the results of the above study.

PART 3 – EXECUTION

3.1 Switchboard shall be provided with adequate lifting means and capable of being rolled or moved directly to the floor without the use of floor sills.

3.2 Switchboard installation shall be done in accordance with National Electrical Installation Standards (NECA 400-1998) for installing and maintaining switchboards.

3.3 Provide 2-1/2" concrete housekeeping pads for service entrance and distribution switchboards. For switchboards containing local utility company metering equipment, the concrete pad must be flush with the front edge of the switchboard enclosure.

3.4 Provide permanently affixed engraved nameplate stating UL listed fault current rating of switchboard assembly. Locate adjacent to the equipment nameplate on front of switchboard.

3.5 All lugs shall be torque tested in the presence of the inspector of record.

3.6 Arc Flash and Shock Hazard

3.6.1 The Contractor is to provide, and submit to the engineer for approval, incident energy level calculations as determined using the methodologies described in NFPA 70E or IEEE standard 1584-2002.

3.6.2 A warning label, as specified in the above standard, shall be placed on each switchboard, panelboard, and safety switch indicating the incident energy levels on the equipment to warn qualified personnel in accordance with NFPA 70E, section 110.16. Labels shall be laminated white micarta with black lettering on each. Letters shall be no less than 3/8" high. The label is not to identify the party performing the study but only the technical information needed.

3.6.3 The incident level calculations for each piece of equipment shall be given to the owner and maintained on file by the maintenance department.

3.6.4 The design goal is to minimize the incident energy to which a maintenance employee may be exposed.

END OF SECTION

SECTION 26 24 16

PANEL BOARDS

PART 1 – GENERAL

1.1 Furnish and install branch circuit panel boards as specified herein and as indicated on the drawings. Submit manufacturers' data on all items.

1.2 Submit manufacturers' data on all panel boards and components including:

1.2.1 Enclosures and covers

1.2.2 Breakers

1.2.3 Surge Protective Device (SPD) equipment

1.2.4 Incident energy level calculations

1.2.5 Common submittal mistakes which will result in the submittals being rejected:

1.2.5.1 Not arranging the circuit breakers in panels to match the orientations indicated on the drawings. In other words, if a 30 amp breaker is shown on the drawing in Space #2, this must be the location it appears on the submittal schedule. Standard factory arrangements will not be accepted.

1.2.5.2 Not including all items listed in the above itemized description.

1.2.5.3 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining or clouding the items to be reviewed, or crossing out the items which are not applicable.

1.2.5.4 Not including actual manufacturer's catalog information of proposed products.

1.2.5.5 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements or "to be determined later" statements. The products being submitted must be the products installed.

PART 2 – PRODUCTS

2.1 The interrupting rating of circuit breakers shall be 10,000 amps for the 120/208 system and 14,000 amp for 277/480 volt systems. Refer to drawings for higher interrupting rating requirements. All components and equipment enclosures shall be manufactured by the same manufacturer. Circuit breakers shall be permitted

to be series rated to limit the available fault current to no more than the above ratings.

2.2 All panels shall be fully bussed. Recessed panel enclosures shall be a maximum of 20" wide and 5-3/4" deep for all panels 600 amp rated and less.

2.3 All busses shall be tin-plated aluminum and shall be located in the rear of the panelboard cabinet. Individual circuit breakers shall be bolt on type and removable from the cabinet without disturbing the bussing in any way. All panel boards shall contain ground busses.

2.4 Panel covers shall be door in door style, with one lock. Door lock shall allow access to breakers only. Access to wireways without removal of cover shall be permitted by (non removable) screws behind the locked door. Panel cover shall be provided with full length piano hinge. All locks for all panels provided in this project shall be keyed alike.

2.5 Each panel shall have a two-column circuit index card set under glass or glass equivalent on the inside of the door. Each circuit shall be identified as to use and room or area. Areas shall be designated by room numbers. Room numbers shown on the drawings may change and contractor shall verify final room numbers with the architect prior to project completion.

2.6 Tandem mounted or wafer type breakers are not acceptable.

2.7 Multiple breakers shall have one common trip handle or be internally connected. Handle ties are not acceptable.

2.8 Breaker arrangements shown in the drawings shall be maintained. The circuit breakers in panels must match the orientations indicated on the drawings. In other words, if a 30 amp breaker is shown on the drawing in Space #2, this must be the location it appears on the submittal schedule. Standard factory arrangements will not be accepted.

2.9 Where conductor sizes exceed the standard breaker lug wire range, or where multiple conductors per phase are required, the panelboard manufacturer shall provide the breaker with suitable lugs for terminating the specified conductors.

2.10 Acceptable manufacturers are Square D, Eaton, or Siemens

2.11 Equipment manufactured by any other manufacturers not specifically listed in Section 2.10 are <u>not</u> considered equal, or approved for use on this project.

Surge Protective Devise (SPD)

2.12 Surge Protective Device (SPD) panelboards, shall be provided with an integrated circuit breaker panelboard and parallel connected suppression / filter system in a single enclosure. The SPD panelboard shall meet the following parameters:

IEEE C62.41.1, IEEE C62.41.2, IEEE C62.45, UL 1283 and the UL 1449, Third Edition, effective September 29, 2009.

2.13 The panelboard shall be UL 67 Listed and the SPD shall be UL 1449 labeled as Type 1 or Type 2 or as Type 4 intended for Type 1 or Type 2 applications. SPD shall be factory installed integral to the panel board.

2.14 The SPD panelboard shall be top or bottom feed according to requirements. A circuit directory shall be located inside the door.

2.15 SPD shall meet or exceed the following criteria:

2.15.1 For standard areas supply SPD having 100kA per phase surge current capacity. For mountain and desert areas (areas with over 5 lightning strikes per year), SPD shall have a per phase surge current capacity of 200kA.

2.15.2 UL 1449 – Third Edition Revision; effective September 29, 2009, Voltage Protection Ratings shall not exceed the following:

VOLTAGE	L-N	L-G	N-G	L-L	MCOV
208Y/120	700V	700V	700V	1200V	150V
480Y/277	1200V	1200V	1200V	2000V	320V

2.15.3 SPD shall be UL labeled with 100kA Short Circuit Current Rating (SCCR).

2.16 UL 1449 - Third Edition Revision; effective September 29, 2009, Voltage Protection Ratings shall not exceed the following:

VOLTAGE	L-N	L-G	N-G	L-L	MCOV
208Y/120	700V	700V	700V	1200V	150V
480Y/277	1200V	1200V	1200V	2000V	320V

2.17 SPD shall be UL labeled with a minimum 100kVA short circuit rated (SCCR).

2.18 UL 1449 Listed Maximum Continuous Operating Voltage (MCOV) (verifiable at UL.com):

System Voltage	Allowable System Voltage Fluctuation (%)	MCOV
208Y/120	25%	150V
480Y/277	15%	320V

2.19 SPD shall incorporate a UL 1283 listed EMI/RFI filter with minimum attenuation of - 50dB at 100 kHz. No filtering is required for a 100kA SPD.

2.20 Suppression components shall be heavy duty 'large block' MOVs, each exceeding 30mm diameter.

2.21 Type 4 SPD shall include a serviceable, replaceable module.

2.22 SPD shall be equipped with the following diagnostics:

2.22.1 Visual LED diagnostics including a minimum of one green LED indicator per phase, and one red service LED.

2.22.2 No other test equipment shall be required for SPD monitoring or testing before or after installation.

2.23 SPD shall have a response time no greater than 1/2 nanosecond

2.24 SPD shall have a 10 year warranty

2.25 The SPD panelboard shall have removable interior

2.26 The SPD panelboard main bus shall be aluminum and rated for the load current required

2.27 The SPD panelboard shall include a 200% rated neutral assembly with copper neutral bus

2.28 The unit shall be provided with a safety ground bus

(SPD) Quality Assurance

2.29 Manufacturer Qualifications: Engage a firm with at least 5 years experience in manufacturing transient voltage surge suppressors.

2.30 Manufacturer shall be ISO 9001 or 9002 certified.

2.31 The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of ten (10) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

2.32 The SPD shall be compliant with the Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC.

PART 3 – EXECUTION

3.1 Painting of panelboard covers in finished areas shall be done by the general contractor.

3.2 Provide a spare 3/4" conduit stubbed to an accessible area for each of every three (3) spares or spaces provided in recessed panel boards.

3.3 All lugs shall be torque tested in the presence of the inspector of record.

Arc Flash and Shock Hazard

3.4 The Contractor is to provide, and submit to the engineer for approval, incident energy level calculations as determined using the methodologies described in NFPA 70E or IEEE standard 1584-2002.

3.4.1 **All studies shall be performed by "Emerson Electric" (858) 695-9551, MTA (858) 472-0193, or Terra Power Solutions (858) 380-8170. Studies performed by manufactures or other engineering or testing companies must submit qualifications for approval by Johnson Consulting Engineers, 7 days prior to bid for this project.**

3.5 A warning label, as specified in the above standard, shall be placed on each switchboard, panelboard, and safety switch indicating the incident energy levels on the equipment to warn qualified personnel in accordance with NFPA 70E, section 110.16 Labels shall be laminated white micarta with black lettering on each. Letters shall be no less than 3/8" high.

3.6 The incident level calculations for each piece of equipment shall be given to the owner and maintained on file by the maintenance department

3.7 The design goal is to minimize the incident energy to which a maintenance employee may be exposed.

END OF SECTION

SECTION 26 27 13

POWER PEDESTALS

PART 1 – GENERAL

1.1 Furnish and install service entrance meter pedestal as herein specified and as shown on the drawings. In order to establish the minimum acceptable quality and type of equipment described in this section, the meter pedestal is technically and dimensionally designed around "Myers." If other acceptable manufacturer products are used, it shall be the responsibility of the Contractor to verify that the equipment will meet the requirements of the design, both technically and dimensionally before being considered in the bid.

1.2 All electrical materials and equipment shall be new, and of the type and quality specified: Listed by Underwriters' Laboratories, and bear their label, where standards have been established; in compliance with the applicable standards of NEC (NFPA #70), NFPA, ANSI, IEEE, IPCEA, and NEMA. All components and equipment enclosures shall be manufactured by the same manufacturer.

1.3 Submittals: Submit shop drawings and manufacturer's data on switchboard and components, including:

1.3.1 Equipment elevation diagrams indicating the bussing configurations and ampere ratings

1.3.2 Breakers and fused switches.

1.3.3 Incident energy level calculations

1.4 **Common submittal mistakes which will result in the submittals being rejected:**

1.4.1 Not including all items listed in the above itemized description.

1.4.2 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining or clouding the items to be reviewed, or crossing out the items which are not applicable.

1.4.3 Not including actual manufacturer's catalog information of proposed products.

1.4.4 Do not indicate multiple manufacturers for similar products and do not indicate "or approved equal" statements, or "to be determined later" statements. The products being submitted must be the products installed.

PART 2 – PRODUCTS

2.1 Acceptable manufacturers are Meyers.

2.2 The electrical service shall be a Meyers-type MEUGL, free-standing pedestal type. Service shall have distribution and utility section is complete with meter socket and factory-installed test blocks, and shall comply with the requirements of the serving utility. The pedestal shall be furnished as a complete pre-wired assembly.

2.3 Enclosure shall be zinc coated steel, minimum 12 gauge thickness. Cabinet shall be protected against corrosion in accordance with UL 50, cabinets and boxes, Section 13. Exterior covers to be minimum 14 gauge steel and shall have padlocking provisions. Deadfront shall be a hinged type, 16 gauge minimum, and shall not require the use of a tool to expose interior components for installation or servicing. All factory installed components shall be UL listed. All factory installed conductors shall be copper; size and type to conform to NEC and UL requirements.

2.4 Enclosure shall be furnished with a detachable sub-base designed to be encased in concrete. Enclosure shall fasten to sub-base with ½" diameter bolts. Mounting bolts shall be visible outside the enclosure after installation on sub-base.

2.5 Circuit breakers shall be molded case, trip free, quick-make, quick-break, thermal magnetic type, with handles clearly indicating rating and position on, off, tripped.

2.6 Circuit breakers used in service entrance equipment and distribution switchboards shall have short circuit current ratings equal to the bracing of the equipment and in excess of the available fault current and in no case smaller than 42,000 amperes RMS symmetrical.

2.7 Provide UL tested and certified series combination ratings of equipment to comply with all codes and utility requirements.

2.8 Provide a metal embossed nameplate adjacent to the meter pedestal rating, indicating the maximum short circuit current rating of the meter pedestal as determined by UL 891, September 30, 1982.

2.9 Provide light green powder coat finish in accordance with ASTM-B-117.

PART 3 – EXECUTION

3.1 Meter pedestal shall be provided with adequate lifting means and capable of being rolled or moved directly to the floor without the use of floor sills.

3.2 Provide concrete equipment pads for meter pedestals containing local utility company metering equipment. The concrete pad must provide the working clearance space required by the service utility company.

3.3 Provide permanently affixed engraved name plate stating UL listed fault current rating of meter pedestal assembly. Locate adjacent to the equipment nameplate on front of meter pedestal.

3.4 Furnish and deliver to owner (6) six spare fuses for each type and size listed.

3.5 Arc Flash and Shock Hazard

3.5.1 The contractor is to provide, and submit to the engineer for approval, incident energy level calculations as determined using the methodologies described in NFPA 70E or IEEE standard 1584-2002.

3.5.2 A warning label, as specified in the above standard, shall be placed on each switchboard, panelboard, and safety switch indicating the incident energy levels on the equipment to warn qualified personnel in accordance with NFPA 70E, section 110.16. Labels shall be laminated white micarta with black lettering on each. Letters shall be no less than 3/8" high.

3.5.3 The incident level calculations for each piece of equipment shall be given to the owner and maintained on file by the maintenance department.

3.5.4 The design goal is to minimize the incident energy to which a maintenance employee may be exposed and in no case more than 8 cal./cm^2.

END OF SECTION

SECTION 26 27 26

SWITCHES AND RECEPTACLES

PART 1 – GENERAL

1.1 Furnish and install all wiring devices as shown on drawings and as herein specified. Unless otherwise noted, device and plate numbers shown are Hubbell and shall be considered the minimum standard acceptable. Other acceptable manufacturers are Pass and Seymour, Leviton, General Electric and Bryant.

1.2 Submit manufacturers' data on all items.

1.3 **Common submittal mistakes which will result in the submittals being rejected:**

1.3.1 Not correctly indicating ampacity rating of proposed devices.

1.3.2 Not including all items listed in the above itemized description.

1.3.3 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining or clouding the items to be reviewed, or crossing out the items which are not applicable.

1.3.4 Not including actual manufacturer's catalog information of proposed products.

1.3.5 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements or "to be determined later" statements. The products being submitted must be the products installed.

PART 2 – PRODUCTS

2.1 All switches shall be of the quiet mechanical type, Specification Grade, 20 amp, 120/277 volt AC as follows:

	HUBBELL	LEVITON	PASS & SEYMOUR
Single Pole	CS120	CS1202	CS20AC1
Two Pole	CS1222	CS2202	CSB20AC2
Three-way	CS320	CS3202	CS20AC3
Key Switch	HBL1221L	1221-2L	PS20AC1-L

2.2 All switches shall have the "on" and the "off" position indicated on the handle. If switches of higher ampere ratings are required, they shall be of similar type and quality as those shown above. Groups of switches shown at one location shall be installed under a single plate up to a maximum of six where more than six switches are shown coordinate arrangement with the Architect.

2.3 Dimmer switches for incandescent lamp loads shall be square-law type, slide control dimmer with OFF position, Lutron or Hubbell "Nova-T" Series NT-600 (0-500 watt load), NT-1000 (501-900 watt load), NT-1500 (901-1500 watt load), or equal (no known equal).

2.4 All convenience receptacles and special outlets throughout shall be grounding type. Convenience receptacles shall be side wired, parallel slot, two pole, three wire, 20 amp as follows:

	HUBBELL	LEVITON	PASS & SEYMOUR
Duplex	5352	5362	PS5362
GFCI	GFR5362	7899	2097
Isolated Ground	IG5362	5362IG	IG6300
Tamper Proof		8300SG	TR63H

2.5 All safety or tamper proof receptacles shall have no exposed external current carrying metal parts, and shall have integral wiring leads suitable for two or three wire installations.

2.6 Special receptacles shall be as noted on the drawings.

2.7 Weatherproof plates shall be designed to meet CEC Article 410-57, wet location listed with cover "open." Where weatherproof receptacles have been identified to be provided with locking covers, the cover shall be as manufactured by Pass & Seymour #4600-8 or Cole Lighting 310 Series. Rough-in requirements vary between manufacturers. Contractor to field verify requirements prior to installation.

2.8 All plates throughout shall be stainless steel. Where wiring devices are installed in concrete block walls, provide oversized 3-1/2" x 5" coverplates.

2.9 All devices shall be white unless otherwise noted or a special purpose outlet.

2.10 Unless where specifically detailed on the drawings, floor boxes shall be PVC suitable for concrete poured floors of minimum 3-1/2" depth, with a modular design to gang two or three sections together.

2.10.1 Carlon #E976 series or approved equal

2.10.2 Provide brass cover with brass carpet flange unless otherwise detailed.

PART 3 – EXECUTION

3.1 Switches for room lighting shall be located no more than 12" center line from door jamb at plus 48" center line above finished floor or +46" to top of devices where located over casework, reference CBC Figure 11B-5D.

3.2 All receptacles shall be mounted at plus 18" to center line above finished floor unless noted or shown otherwise. All receptacles shall be installed with the ground pin up, at the top of the receptacle to comply with IEEE 602-1986.

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3.3 Furnish and install wall plates for all wiring devices, and outlet boxes, including special outlets, sound, communication, signal, and telephone outlets, etc. as required. All cover plates shall be appropriate for type of device.

END OF SECTION

SECTION 26 28 16

DISCONNECTS

PART 1 – GENERAL

1.1 Furnish and install all disconnect switches as shown on the drawings and as required by the CEC.

1.2 Submit manufacturers' data for all disconnects and fuses.

1.2.1 Disconnects

1.2.2 Fuses

1.3 **Common submittal mistakes which will result in the submittals being rejected:**

1.3.1 Not including all items listed in the above itemized description.

1.3.2 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining or clouding the items to be reviewed, or crossing out the items which are not applicable.

1.3.3 Not including actual manufacturer's catalog information of proposed products.

1.3.4 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements, or "to be determined later" statements. The products being submitted must be the products installed.

PART 2 – PRODUCTS

2.1 Acceptable manufacturers shall be Square D, Cutler Hammer, or Siemens

2.2 Equipment manufactured by any other manufacturers not specifically listed in Section 2.1 are not considered equal, or approved for use on this project.

2.3 All switches shall be heavy-duty type, externally operated, quick-make, quick-break, rated 600 volts or 240 volts as required, with the number of poles and ampacity as noted. All switches for motors shall be HP rated. Switches shall have NEMA-Type 1 enclosures, except switches located where exposed to outdoor conditions shall have NEMA Type 3R enclosure. Switches generally shall be fused except where noted to be non-fused on the drawings.

2.4 Where fuses are indicated, fuses shall be Bussman or Littlefuse (no known equal). Fuses shall be current limiting type with time delay characteristics to suit the equipment served.

PART 3 – EXECUTION

3.1 Mount all switches to structure or U-channel support. U-channel supports shall be cleaned and painted to prevent rust.

3.2 Switches shall be accessible with proper clearances in front per CEC 110-16.

3.3 All lugs shall be torque tested in the presence of the inspector of record.

3.4 Arc Flash and Shock Hazard

3.4.1 The contractor is to provide, and submit to the engineer for approval, incident energy level calculations as determined using the methodologies described in NFPA 70E or IEEE standard 1584-2002.

3.4.2 A warning label, as specified in the above standard, shall be placed on each switchboard, panelboard, and safety switch indicating the incident energy levels on the equipment to warn qualified personnel in accordance with NFPA 70E, section 110.16 Labels shall be laminated white micarta with black lettering on each. Letters shall be no less than 3/8" high.

3.4.3 The incident level calculations for each piece of equipment shall be given to the owner and maintained on file by the maintenance department.

3.4.4 The design goal is to minimize the incident energy to which a maintenance employee may be exposed and in no case more than 8 cal./cm^2.

END OF SECTION

SECTION 26 51 14

LED LIGHTING FIXTURES AND LAMPS

PART 1 – GENERAL

1.1 Furnish and install all lighting fixtures with lamps as specified and as shown on the drawings. Fixtures shall be complete including canopies, hanger, diffusers, ballasts, etc.

1.2 Submit manufacturer's data for each fixture type including the following:

1.2.1 Lighting fixture catalog data and photometry.
1.2.2 Lamp catalog data for each fixture type.
1.2.3 Driver catalog data for each fixture type.
1.2.4 Fixture warranty.

1.3 <u>Common submittal mistakes which will result in the submittal being rejected:</u>

1.3.1 Not including lamp and driver information for each fixture type.

1.3.2 Not including all items listed in the above itemized description.

1.3.3 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining or clouding the items to be reviewed, or crossing out the items which are not applicable.

1.3.4 Not including actual manufacturer's catalog information of proposed products.

1.3.5 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements, or "to be determined later" statements. The products being submitted must be the products installed.

PRODUCT SUBSTITUTION

1.4 All substitutions or alternate fixtures to those indicated on the project fixture schedule shall be submitted for approval (7) business days prior to the project bid date. Approvals <u>when</u> accepted will be issued in the form of an addendum. No consideration for substitutions will be provided after the award of the contract.

1.4.1 The substitution request must include a statement indicating the difference in price of both the specified and alternate product, both contractor and list price. The substitution request must include a comparison of the total fixture wattage, total fixture lumens, fixture efficiency and warranty comparison.

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1.4.2 When proposing to substitute lighting fixture and/or fixture retrofit, a point by point photometric calculation of a typical application as used in this project shall be included. A calculation of the specified and the proposed alternate shall be included.

PART 2 – PRODUCTS

2.1 All catalog numbers are given for manufacturer's identification and shall not relieve Contractor from responsibility of full conformance to all applicable written description requirements governing material and fabrication, either in the general or specific sections. Where catalog numbers are indicated as modified, no modification will be required if the standard unit fully conforms to descriptive requirements in the Specifications and matches specified ceiling.

2.2 All fixtures of the same type shall be of one manufacturer and of identical finish and appearance. All fixtures and component parts shall bear the UL label.

2.3 All steel parts shall be phosphate treated in multistage power spray system for corrosion resistance and paint adhesion. Final finish shall be electrostatically applied baked white enamel of not less than 87 pct. reflectance on reflecting surfaces.

2.4 Each fixture shall have a continuous light-seal gasket seated in such manner as to prevent any light leak through any portion or around any edge of the trim frame.

2.5 Diffusers shall be framed in a hinged, continuous assembly. Diffuser frame latches shall be spring-loaded or cam-operated.

2.6 All recessed fixtures shall be provided with frames appropriate for the type of ceiling involved. No fixtures shall be ordered until the ceiling construction has been verified by the Contractor.

MINIMUM LUMINARY REQUIREMENTS

2.7 Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70 by a qualified testing agency, and marked for intended location and application.

2.8 Recessed Fixtures: Comply with NEMA LE 4.

2.9 CRI of **minimum 80 CCT of 4100 K**.

2.10 Rated lamp life of 50,000 hours minimum.

2.11 Lamps dimmable from 100 percent to 0 percent of maximum light output.

2.12 Nominal Operating Voltage: **120 V / 277 V ac**

PART 3 – EXECUTION

3.1 All lighting fixtures shall be supported as follows:

3.1.1 From the outlet box by means of a metal strap where its weight is less than five pounds.

3.1.2 From its outlet box by means of a hickey or other threaded connection where its weight is from five to fifty pounds.

3.1.3 Directly from the structural slab or joists where its weight exceeds fifty pounds.

3.1.4 Lighting fixtures shall be supported independent of the ceiling system or additional ceiling support must be added to carry the weight of the lighting fixtures. Recessed lighting fixtures supported from ceiling grid tees shall be furnished with hold down clips in conformance with CEC 410 - 16, spring clips will not be permitted. All fixtures which the manufacturer has not provided UL approved clips, must be attached to the fixture and ceiling grid by metal screws.

3.2 Furnish and install supplementary blocking and support as required to support fixture from structural members. Contractor shall submit proposed blocking method for all suspended lighting fixtures for approval prior to rough in.

3.3 Suspended and/or pendant mounted fixtures shall be provided with four aircraft safety cables extending in opposite directions, attached to the fixture, and supported from a structural member. The contractor shall submit proposed fixture mounting and aircraft cable attachment methods for approval prior to fixture rough in.

3.4 Chain suspension may be used only where specifically permitted on the drawings. Chain shall be heavy duty, nickel or cadmium plated, suitable for weight of specific fixture.

3.5 Shop drawings shall be furnished for each fixture type. Catalog cuts, illustrating conformance with specifications, will be acceptable for standard units. Shop drawings shall indicate materials, assembly, finish and dimensions.

3.6 Photometric data shall be furnished for any fixture substituted for those listed on the schedule.

3.7 Any driver which produces a greater than normal amount of noise shall be replaced by the contractor. Normal will be determined by the level of sound produced by other similar fixtures operating in the area.

END OF SECTION

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SECTION 26 90 90

TESTING

PART 1 – GENERAL

1.1 Upon completion of the electrical work, the entire installation shall be tested by the Contractor, and demonstrated to be operating satisfactorily to the Architect, Engineer, Inspector and Owner.

1.2 All testing and corrections shall be made prior to demonstration of operation to the Architect, Engineer, Inspector and Owner.

1.3 In addition to the demonstration of operation, the Contractor is also required to review the content and quality of instructions provided on items demonstrated with the Architect, Engineer, Inspector and Owner.

PART 2 – EXECUTION

2.1 Wiring shall be tested for continuity, short circuits and/or accidental grounds. All systems shall be entirely free from "grounds," "short circuits," and any or all defects.

2.2 Motors shall be operating in proper rotations, and control devices functioning properly. Check all motor controllers to determine that properly sized overload devices are installed, and all other electrical equipment for proper operation.

2.3 Tests and adjustments shall be made prior to acceptance of the electrical installation by the Architect, and a certificate of inspection and acceptance of the electrical installation by local inspection authorities shall be provided.

2.4 All equipment or wiring provided which tests prove to be defective or operating improperly shall be corrected or replaced promptly, at no additional cost to the Owner.

2.5 Test all motor and feeder circuits with a "megger" tester to determine that insulation values conform to Section 110-20, California Electrical Code (CED). Test reports must be submitted and approved by the engineer before final acceptance.

2.6 Test all grounding electrode connections to assure a resistance of no more than 10 ohms is achieved. Augment grounding until the ohmic value stated above is achieved. Provide certified test results to the Architect, Engineer and Inspector.

END OF SECTION

SECTION 27 05 00

REQUIREMENTS FOR COMMUNICATIONS INSTALLATIONS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Provide a standard defining the structured communications cabling systems to be installed within customer facility. The goal is to accomplish this in the most economic and systematic fashion possible, and in a manner compliant with the latest codes, cabling standards and industry best practices.
   2. Scope of Work Compliance.
   3. Sub-contractor Qualifications.
   4. Warranty.
   5. Safety.
   6. Working Conditions.

1.02 GENERAL TERMS AND CONDITIONS.

A. General Contractor is responsible for all required Division 27 scope of work and shall ensure all communication sub-tier sub-contractors adhere to the qualifications set forth in all project Division 27 specifications including project experience and certifications.

B. Prices quoted shall be all-inclusive and represent a complete fully-engineered system installation at the Project site as contemplated by and detailed in the drawing package and in accompanying specifications.

C. Omissions in the specification of any provision herein described shall not be construed as to relieve the sub-contractor of any responsibility or obligation requisite to the complete and satisfactory delivery, installation, operation and support of any and all systems, equipment or services. Correction of any omission on the part of the Sub-contractor, either due to misinterpretation of this specification or any other conditions of the project, shall be the responsibility of the Sub-contractor and shall not result in any contract modification or additional costs to Owner.

D. Where conflicts and/or irregularities occur between project documents, specifications, drawings, and/or applicable codes, rules, regulations, ordinances, standards, guidelines and practices, the more stringent requirement shall apply as reasonably determined by Owner or government agency inspector.

E. This specification represents the design intent for the project communicated by way of narrative descriptions of intended functionality and single line or detail drawings indicating likely equipment connectivity to achieve that functionality. The designs in this specification do not represent fully engineered technical solutions. Sub-contractors are required to review the designs presented in the project documents closely, submit any questions and clarifications regarding the design intent through the RFI process and develop their own engineered solutions representing a fully functional turn-key solution in their bid responses.

F. The scope of this project includes the complete system engineering, procurement, fabrication, installation, programming, testing, training and warranty.

G. Proposed solutions shall be based on the designs communicated in the specifications, but shall include any additional equipment, materials, software, licenses and/or labor required for the sub-contractor to deliver a fully functional turn-key system solution that meets intended operational performance requirements.

H. It is the responsibility of the Sub-contractor awarded this project to ensure that all quantities, materials, labor, licenses, permits, sales taxes and any and all other costs to provide a turnkey project are included in their bid.

I. Floor plans, drawings, elevation drawings, and other drawings received by the Sub-contractor as part of the construction process are hereby incorporated into this document by reference. It is the responsibility of the Sub-contractor to ensure that amounts and lengths of cabling and pathways are correct, and that all materials and labor are included to install the system per the drawings and these specifications.

J. Permits, licenses, applicable sales taxes, insurance requirements, payment/performance bond costs, and other miscellaneous costs are the responsibility of the Sub-contractor and must be included in the contract price and this scope of work. Such items are to be listed separately on pricing sheets, if provided. Copies of all required permits, licenses, insurance requirements and bond(s) are to be delivered to Owner prior to commencement of any work.

K. Installation Schedule and Coordination: Sub-contractor must take the fast-track nature of this project and potential requirement for installation/work schedule adjustments and quick turnarounds into consideration in constructing this project as Owner will NOT entertain or agree to added-cost change orders associated with scheduling changes.

L. Work will need to be closely coordinated with architect, College Personnel, GC, MEP sub-contractors, structural sub-contractor and all low-voltage sub-contractors and each of their respective schedules.

M. This will be a turnkey Project. Any item of the equipment or material not specifically addressed on the drawings, specifications or elsewhere in Division 27 specifications documents, but required to provide complete and functional systems as contemplated and/or specified herein, shall be provided at no additional charge to owner in a quantity and quality consistent with other specified items.

N. Coordination with Project Design Team: The build sub-contractor will be responsible for coordinating all communications cabling infrastructure requirements, including review of existing site conditions, review and coordination of electrical power and grounding requirements, conduits and back boxes, structural support requirements, and coordination.

O. Assembly: The sub-contractor shall procure and assemble all hardware and equipment and any additional materials as required to deliver the completely functioning communications cabling system and/or Audio Visual System.

P. Installation: The sub-contractor shall install all equipment, inter-rack and intra-rack cable, wiring of equipment, connectors, panels, plates, and other material at the Project site.

Q. Testing and Adjustment: The sub-contractor shall perform all tests and adjustments, furnish all test equipment necessary and perform all work required to properly configure the systems and to verify their performance in accordance with the information in this document and the design-build integrator's approved engineered designs.

R. Warranty: The sub-contractor shall warrant the installed system in accordance with the terms of this document and accompanying contractual documents.

1.03 RELATED DOCUMENTS

A. All divisions of the specification and general provisions of the Construction Documents.

B. Architectural, mechanical, electrical, and all technology drawings including but not limited to Telecommunication Drawings.

C. Refer to Structural Seismic Requirement design documents Specifications, if available, for Non-Structural Components for all structural bracing and support of telecommunications equipment.

1.04 REFERENCES

A. Abbreviations and Acronyms:

1.	A/E:	Architect / Engineer (designer)
2.	BICSI:	Building Industry Consulting Service International
3.	EIA:	Electronics Industry Alliance
4.	ELFEXT	Equal Level far End Cross Talk
5.	FTP	Foiled Twisted Pair
6.	IDF:	Intermediate Distribution Facility
7.	ILEC/LEC:	Incumbent Local Exchange Carrier
8.	ISP:	Inside Plant
9.	IT:	Information Technology
10.	MDF:	Main Distribution Facility
11.	MPOE:	Minimum Point of Entry
12.	NEXT	Near End Cross Talk
13.	OSP:	Outside Plant
14.	PSELFEXT:	Power Sum Equal Level far End Cross Talk
15.	PSNEXT:	Power Sum Near End Cross Talk
16.	RCDD:	Registered Communications Distribution Designer
17.	TBD:	To Be Determined
18.	TCIM:	Telecommunication Cabling Installation Manual
19.	TDMM:	Telecommunications Distribution Methods Manual
20.	TIA:	Telecommunications Industry Association
21.	UTP:	Unshielded Twisted Pair
22.	WAP:	Wireless Access Point.

1.05 APPLICABLE REGULATORY REFERENCES

A. Sub-contractor is responsible for knowledge and application of current versions of all applicable Standards and Codes. In cases where listed Standards and Codes have been updated, Sub-contractor shall adhere to the most recent revisions, including all relevant changes or addenda at the time of installation.

1. ANSI/TIA:
   a. TIA-526-7 (OFSTP-7) (July 2015) Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant
   b. TIA-526-14-B (April 2015) (OFSTP-14) Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant
   c. ANSI/TIA/EIA-598-C (July 2014) Optical Fiber Cable Color Coding
   d. ANSI/TIA-568-C.0 (December 2015) Generic Telecommunications Cabling for Customer Premises
   e. TIA-568-C.0-1 (September 2012) Generic Telecommunications Cabling for Customer Premises-Addendum 1, Updated Reference for Balanced Twisted-Pair Cabling
   f. ANSI/TIA-568-C.1 (February 2012) Commercial Building Telecommunications Cabling Standards
   g. TIA-568-C.1-2 (November 2014) Commercial Building Telecommunications Cabling Standard, Addendum 2 General Updates
   h. ANSI/TIA-568-C.2 (June 2016) Balanced Twisted Pair Communications Cabling and Components Standards
   i. ANSI/TIA-568-C.3 (June 2011) Optical Fiber Cabling Components Standard
   j. ANSI/TIA-568-C.3-1 (December 2011) Optical Fiber Cabling Component Standard- Addendum 1, Addition of OM4 Cabled Optical Fiber and array connectors
   k. ANSI/TIA-1183 (August 2012) Test Fixtures for Balun-Less Measurements of Balanced Components and Systems
   l. ANSI/TIA-1183-1 (January 2016) Test Fixtures for Balun-Less Measurements of Balanced Components and Systems, Addendum 1 – Extending Frequency Capabilities to 2 GHz.
   m. ANSI/TIA-568-C.4 (July 2011) Broadband Coaxial Cabling Components Standard
   n. ANSI/TIA-942-A (August 2012) Telecommunications Infrastructure Standard for Data Centers
   o. ANSI/TIA-942-A-1 (March 2013) Telecommunications Infrastructure Standard for Data Centers, Addendum 1 - Cabling Guidelines for Data Center Fabrics
   p. TIA-569-D (April 2015) Telecommunications Pathways and Spaces
   q. TIA-569-D-1 (October 2016) Telecommunications Pathways and Spaces Addendum 1- Revised Temperature and Humidity Requirements for Telecommunications Spaces
   r. ANSI/TIA-606-B (December 2015) Administration Standard for Telecommunications Infrastructure
   s. TIA-607-B (November 2015) Generic Telecommunications Grounding (Earthing) and Bonding for Customer Premises
   t. TIA-607-B-1 (January 2017) Generic Telecommunications Grounding (Earthing) and Bonding for Customer Premises - External Grounding Addendum

u. TIA-758-B (April 2012) Customer-Owned Outside Plant Telecommunication Infrastructure Standard
v. TIA-1152 (November 2016) Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling
w. ANSI/TIA-862-B (February 2016) Structured Cabling Infrastructure Standard for Intelligent Building Systems.
x. TIA-570-C (August 2012) Residential Telecommunications Infrastructure Standard
y. TIA-1005-A (June 2012) Industrial Telecommunications Infrastructure Standard for Manufacturing, Process & Refining
z. ANSI/TIA-1005 (January 2015) Telecommunications Infrastructure Standard for Industrial Premises
aa. TIA-1005-1 (May 2012) Telecommunications Infrastructure Standard for Industrial Premises; Addendum 1 - Industrial Pathways and Spaces
bb. TIA-1179 (July 2010) Healthcare Facility Telecommunications Infrastructure Standard.

2. ISO/IEC
   a. ISO 11801 (November 2010) - Generic Cabling for Customer Premises
   b. ISO/IEC TR 14763-2-1:2012 - Information technology -- Implementation and operation of customer premises cabling -- Part 2-1: Planning and installation - Identifiers within administration system.
3. National Electric Codes
   a. National Electrical Code (2017)
   b. ANSI/NFPA 70-2017, National Electrical Code© (NEC©)
   c. ANSI/IEEE C2-207, National Electrical Safety Code®
   d. National Electrical Code (NEC) (NFPA 70)
4. OSHA Standards and Regulations – all applicable
5. Local Codes and Standards – all applicable
6. BICSI
   a. Telecommunications Distribution Methods Manual, 13th Edition
   b. BICSI 004-2012, Information Technology Systems Design and Implementation Best Practices for Healthcare Institutions and Facilities
   c. Information Technology Systems Installation Methods Manual (ITSIMM), 6th Edition
   d. ANSI/BICSI 002-2014, Data Center Design and Implementation Best Practices
   e. Network Systems and Commissioning (NSC) reference, 1st Edition
   f. ANSI/NECA/BICSI 568-2006, Standard for Installing Commercial Building Telecommunications Cabling
   g. NECA/BICSI 607-2011, Standard for Telecommunications Bonding and Grounding Planning and Installation Methods for Commercial Buildings
   h. ANSI/BICSI 001-2009, Information Transport Systems Design Standard for K-12 Educational Institutions
   i. AV Design Reference Manual, 1st Edition
   j. Network Design Reference Manual, 7th Edition
   k. Outside Plant Design Reference Manual, 5th Edition
   l. Wireless Design Reference Manual, 3rd Edition
   m. Electronic Safety and Security Design Reference Manual, 3rd Edition.
7. Anywhere cabling Standards conflict with electrical or safety Codes, Sub-contractor shall defer to NEC and any applicable local codes or ordinances, or default to the most stringent requirements listed by either.

8. Knowledge and execution of applicable codes is the sole responsibility of the Sub-contractor.
9. Any code violations committed at the time of installation shall be remedied at the Sub-contractor's expense.

1.06 SCOPE OF WORK

A. General project information:
1. These Specifications and associated drawings are the governing document for the installation of the telecommunications infrastructure and includes project descriptions, specified and recommended products, installation and project management methods, the scope of work and elevation drawing specifications.
2. Through this division specification document, Palomar College will be referred to as the owner.
3. Owner wishes to contract with a General Contractor, who will sub-tier the supplier/sub-contractor ("ICT-Information and Communication Technology and AV-Audio Visual") to provide, install, test and warranty a complete turn-key Cable Infrastructure System and PA System for Owner's new North Education Center (NEC) the "Project" per the scope of work and specifications stated herein. This inquiry implies no obligation on the part of Owner. Sub-contractor shall bear all costs and expenses incurred in preparing a response a Request For Proposal ("RFP") and subsequent award of project, it being understood and agreed that Owner accepts no responsibility for any costs and/or expenses incurred by winning sub-contractor in preparing and submitting such response.
4. The Owner is developing a new multi-building Classroom village located at 35090 Horse Ranch Creek Road, Fallbrook, CA 92028. The NEC will be a newly developed site with 3 phasesn Phase 2, 3 and 4. Phase 2 will include site utilities/systems and parking lots. Phase 3 and 4 will include four (4) banks of multiple modular buildings. The (4) banks includes modulars consisting of the following:

    a. Phase 3 - Administration modular building with College office space and student shared areas. The Administration Building will house the NEC MPOE/Server Room, supporting the NEC network requirements.
    b. Phase 3 - General Classroom Modulars which will include one of the two village IDF's.
    c. Phase 3 – Lecture, Computer Lab, Library and General Classroom modular buildings. These areas will consist of multiple double wide and single wide modular buildings. This area will include the second of the two village IDF's.
    d. Phase 4 – Science Lab modular buildings with include two science labs and one lab prep room. All cabling from these modular buildings will be ran to IDF located with-in the General Classroom bank of modular buildings. See design drawings for reference.
5. The scope of work will include a complete AFL Dura-Line fiber optic air blown fiber system and category backbone between each of the IDF's and the main server room. Each building will have a Category 6A cable infrastructure and specialized PA cabling as required.
6. Contractor shall build out each MDF, IDF as shown on drawings. Administration Building will consist of a Main Server Room. Total of 3 communication rooms.
7. Station cable pathway will consist of cable J-hook in accessible ceilings areas or conduit to accessible ceiling areas.

8. Communication Outlet (Split delta) =In areas where cable will be installed in non-exposed format, electrical contractor shall provide 5" square deep junction box inside wall with single gang plaster ring and 1.25" conduit routed to accessible ceiling space. Cabling shall be run to the nearest TR. Outlet shall be mounted + 18" AFF (U.N.O.). Each outlet location shall have three (2) Category 6A, 4-pair cables and three (2) Category 6A, RJ-45 jacks (U.N.O.). Jacks shall be housed in a standard angled four port single gang wall faceplate with matching blanks for used ports. Color to match the wall paint color as close as possible. Wall plate color will be approved by architect prior to installation of faceplate.
9. Communication Outlet (Split delta) w/# =In areas where cable will be installed in non-exposed format, electrical contractor shall provide 5" square deep junction box inside wall with single gang plaster ring and 1.25" conduit routed to accessible ceiling space. Cabling shall be run to the nearest TR. Outlet shall be mounted + 18" AFF (U.N.O.) Each outlet shall have a category 6A, 4-pair cables and a category 6, RJ-45 jacks per the number indicated on the drawings. (#6=6 cables/Jacks) Jacks shall be housed in a standard angled four port single gang wall faceplate with matching blanks for used ports. Color to match the wall paint color as close as possible. Wall plate color will be approved by architect prior to installation of faceplate
10. Flush floor mounted outlet (split delta with-in square) = electrical contractor shall provide two 1-1/4" conduit routed to accessible ceiling space Electrical contractor shall provide floor box with cover flush in the floor, fire sealing, conduit pathway and pull string. Communication contractor shall provide all cable and connectivity hardware. Cabling shall be run to the TR location as indicated on the drawings. Each outlet shall have a category 6A, 4-pair cables and a category 6, RJ-45 jacks per the number indicated on the drawings. For conference room, office locations, or any floor boxes not showing a number next to the symbol, Communication contractor shall provide four (2) Category 6A MTP cables and four (2) Category 6A RJ-45 jacks mounted inside the floor box. Blank off all unused ports. Communication contractor is responsible to provide faceplate inside floor box.
11. Installation of Copper UTP Category 6A cabling as indicated on drawings.
12. Provide fiber optic, category patch cables and copper cross connections for both ends of communication link. Patch cable installation will be part of this scope of work.
13. Install 6 strand Single-Mode optical fiber air-blown backbone cabling backbone cable between MDF and each Building IDF room as indicated on drawings. MDF will act as MPOE.
14. Install Category 6 OSP backbone cabling between MDF and each Building IDF room as indicated on drawings.
15. Sub-contractor shall provide proper slack loops in each communication vault, minimum of 50' and a minimum of 15' in pull boxes, slack loops required only if they will meet manufacturer bend radii requirements.
16. Sub-contractor shall provide/install fire caulk in all conduits with cable as required, UL listed rated fire system where applicable.
17. Sub-contractor shall label all new cable at both termination points, within all communication vaults and/or pull boxes. Cable bundles shall be labeled where ever it is accessible including origin/destination and system information.

B. Purpose:
   1. This specification defines quality standards and practices common to all network cabling for NEC project. In addition, said project will have Requests for Proposals

(RFP), associated drawings and requirements pertaining to their specific environments. Such collateral will be referred to in this document as "Project Specific Documentation" or simply "Construction Documents".

2. Voice and Data Networks encompass a broad spectrum of technologies and are distributed into project internal spaces. Installed cables will be used for Ethernet, high and low speed data applications, used in analog and digital voice, not to exclude other future Voice/Data technologies. This specification will include indoor/outdoor cable installations, and backbone cabling, telecommunications closet and equipment cabling, equipment hardware as well as routing and support infrastructure.
3. It is the responsibility of the installing sub-contractor to evaluate these general recommendations and adapt them effectively to actual projects. Sub-contractor is responsible for identifying and bringing to the attention of any design directions that may be in conflict or otherwise improved. All such conflict resolutions shall be in writing from A/E or owner.
4. Note that while many portions of this global specification are addressed to "The Sub-contractor", these requirements apply equally to anyone doing the network cabling and infrastructure work within, whether those persons are outside sub-contractors or persons directly employed by the owner.
5. Sub-contractor shall be solely responsible for all parts, labor, testing, documentation and all other associated processes and physical apparatus necessary to turn-over the completed system fully warranted and operational for acceptance by A/E.
6. This specification includes structured cabling design considerations, product specifications and installation guidelines for low-voltage network systems and associated infrastructure including, but not limited to:
   a. Cabling Sub-system 1 – Horizontal
      1) Category 6A cable
      2) Work area (equipment outlet) appliances and configuration
      3) Horizontal Pathways
      4) Copper Patching
   b. Fiber Backbone Cabling
      1) Interbuilding backbone
      2) Fiber Patching
   c. Telecommunications Spaces
      1) Telecommunications Room Requirements
      2) Racks and Cabinets
      3) Overhead Pathways
   d. Communications Grounding Systems
   e. Communications Labeling and Administration

C. Scheduling:
   1. Contract Documents and the overall construction schedule must be carefully reviewed to determine all required interfacing and timing of the work. All such documents shall be available through the General Contractor or Construction Manager.
   2. New NEC project schedule will include, but are not limited to, the following task sequence:

a. Conduit infrastructure; including vaults/pullbox install and conduit duct banks.
b. New MDF, IDF Construction and buildout.
c. Service provider cabling and equipment installation.
d. Service provider completion and commissioning.
e. Individual Building Pathway Installation.
f. New backbone fiber optic cabling installations; includes install, termination, labeling, testing, as-built and warranty documentation.
g. Building Category and AV Cable installations; includes install, termination, labeling, testing, as-built and warranty documentation.
h. Audio Equipment installation.

1.07 SUB-CONTRACTOR QUALIFICATIONS

A. General:
1. Sub-contractor shall have at least 5 years of experience installing and testing structured cabling systems.
2. Sub-contractor shall employ at least one BICSI Registered Communication Distribution Designer (RCDD), and the RCDD shall sign-off on all designs offered, including stamping the design with their current BICSI/RCDD stamp.
3. Sub-contractor shall have the responsibility to obtain any of the necessary permits, licenses, and inspections required for the performance of data, voice, and fiber optic cable installations.
4. Contactor shall be a current manufacturer Certified Installer certificate. A copy of corporate certificate must be included with quote.
5. Sub-contractor shall have service facilities within 50 miles of project location.
6. At least 75 percent of the technicians on the job must have a current manufacturer Certified Copper Technicians certificate to install manufacturer Copper Distribution Systems.
7. At least 75 percent of the technicians installing any Fiber Distribution Systems must have a current manufacturer Certified Fiber Technicians certificate to install Fiber Distribution Systems.
8. The Telecommunications sub-contractor must provide a project manager to serve as the single point of contact to manage the installation, speak for the sub-contractor and provide the following functions:
a. Initiate and coordinate tasks with the Construction Manager and others as specified by the project schedule.
b. Provide day to day direction and on-site supervision of Sub-contractor personnel.
c. Ensure conformance with all contract and warranty provisions.
d. Participate in weekly site project meetings.
e. This individual will remain project manager for the duration of the project. The sub-contractor may change Project Manager only with the written approval of A/E.

B. References:
1. Communications Sub-contractor shall provide with bid a list of three reference accounts where similar Data, Voice, Fiber Optic Cable, and related migration/cutover equipment installation work was performed within the last year or twelve-month period.

C. Insurance Requirements:
   1. Sub-contractor must be insured and shall provide with bid a Certificate of Indemnification, Certificate of Insurance, and meet all required insurance and licensing policies as specified by A/E Risk Management Division and any Federal, State, and local organization pertaining to data, voice and fiber optic cable installation.
   2. Sub-contractor's vehicles brought onto project properties, shall comply with all requirements of all Federal, State, and local agencies. Vehicles shall meet current DOT, state and local, safety inspections where required.

D. Termination of Services:
   1. Owner or A/E reserves the right to terminate the Communication Sub-contractor's services if at any time the A/E determines the Communication Sub-contractor is not fulfilling their responsibilities as defined within this document.
   2. Sub-contractor's appearance and work ethics shall be of a professional manner, dress shall be commensurate with work being performed.
   3. Dress displaying lewd or controversial innuendos will strictly be prohibited.
   4. Conduct on project property will be professional in nature.
   5. Any person in the Sub-contractor's employ working on a project considered by to be incompetent or disorderly, or for any other reason unsatisfactory or undesirable, such person shall be removed from work on the project.
   6. The Communications Sub-contractor shall be restricted from the premises and compensated for the percentage of work completed satisfactorily.

E. Other Sub-Contractor Responsibilities
   1. Sub-contractor is responsible for the removal and disposal of all installation and construction debris created in the process of the job. All work areas will be cleaned at the conclusion of the workday and no tools or materials shall be left in a manner as to pose a safety hazard.
   2. Sub-contractor must remove all abandoned cable per Article 800 of the National Electrical Code and per TIA and BICSI standards, recycling these materials where possible. This is mandatory; Sub-contractors must consider this when placing bids.
   3. Sub-contractor shall abide by the regulations set by A/E or Owner Security Department pertaining to access to and conduct while on project property and shall obey speed limits and parking regulations.

1.08 SYSTEM PERFORMANCE WARRANTY

A. General
   1. Sub-contractor shall provide a manufacturer System Warranty on all copper and fiber permanent cabling links.
   2. This is a system performance warranty guaranteeing for a minimum of 20 years from acceptance that the installed system shall support all data link protocols for which that copper Category or fiber OS designation is engineered to support according to IEEE and TIA standards.
   3. The manufacturer System Warranty may be invoked only if the cabling channel links are comprised of manufacturer connectivity and approved by the manufacturer. Patch cords must be same manufacturer of cable.
   4. Upon acceptance of Warranty, manufacturer will mail a notification letter to the installer and a notification letter and warranty certificate to A/E.

B. Sub-Contractor Warranty Obligations
1. Installation firm must be a current manufacturer Certified Installer in good standing and shall include a copy of the company certification with the bid.
2. Sub-contractor shall name a supervisor to serve on site as a liaison responsible to inspect and assure all terminations are compliant to factory methods taught in manufacturer Technician Certification Training and according to all Standards cited in the Regulatory References section of this document.
3. Sub-contractor liaison shall have a current, up-to-date manufacturer Certified Technician certificate in both copper and fiber. Copies of the copper and fiber certificates of the manufacturer liaison shall be submitted with the bid.
4. Sub-contractor agrees all components comprising active links shall be of the same copper Category or fiber OS/OM designation as the system being installed. Sub-contractor shall under no circumstances mix different Categories or OS classes of cable or termination devices (connectors) within the same link or system.
5. Sub-contractor shall install all racking and support structures according to cited TIA Standards in such fashion as to maintain both Standards and Manufacturer recommendations for uniform support and protection, segregation of different cable types, maintenance of maximum pulling tensions, minimum bend radius, approved termination methods as well as adhering to industry accepted practices of good workmanship.
6. Sub-contractor is responsible for understanding and submitting to manufacturer all documents required prior to project start to apply for this warranty. These include but are not limited to the project information form and SCS warranty agreement.
7. Sub-contractor is responsible for understanding and submitting to manufacturer all documents required at project end. These include completed warranty forms, passing test reports and drawings of floor plans showing locations of links tested.
8. Test results shall be delivered in the tester native format (not Excel) and represent the full test report. Summaries shall not be accepted. Contact manufacturer for a current list of approved testers, test leads and latest operating systems.
9. The Communications Sub-contractor will correct any problems and malfunctions that are warranty-related issues without additional charge for the entire warranty period. The warranty period shall commence following the acceptance of the project by A/E and written confirmation of Warranty from manufacturer.

1.09 SAFETY

A. General
1. All cabling work being performed on project property or under contract to Technology Department must comply with Rules for safe operations, any state or local safety regulations and meet the requirements of OSHA Safety and Health Standards. The sub-contractor Project Manager will maintain a copy of Rules for Safe Operations for reference. It is the responsibility of the Communications Sub-contractor to immediately correct any unsafe working practices on the part of sub-contractor personnel. Unsafe working environments or conditions created by sub-contractor personnel will be reported immediately to the Construction Manager.
2. Any liability for correction of conditions created by the sub-contractor's personnel rests with the sub-contractor.
3. The Communications Sub-contractor shall be solely and completely responsible for conditions of the job site (as pertaining to the materials and equipment specified), including safety of persons and property during performance of work.

4. No act, service, drawing review or construction observance by any employee, representative or engineer may be construed as a review or approval of the adequacy of the Sub-contractor(s) safety measures, in, on, or near the construction site.

1.10 WORKING CONDITIONS

A. Site Access
1. All cable installations must be pre-approved by the Construction Manager to ensure that the necessary arrangements have been made for proper access to project sites.
2. A twenty-four-hour prior notice shall be submitted to the Construction Manager for any work schedule changes.
3. Communications Sub-contractor shall display badges or passes as mandated by project property Security Department Rules and Regulations.

B. Scheduling
1. Coordination of site surveys and the issue of project owner owned materials and equipment will be the responsibility of the Construction Manager. Once said equipment and materials are in the Sub-contractor's possession, it is the Sub-contractor's to safeguard the material and equipment from damage or theft.
2. Information required by the Sub-contractor to price and complete a defined scope of work will be furnished to the Communications Sub-contractor by the A/E Project Manager in a Scope of Work document and at the time of the site survey (if necessary) and will be maintained by the Communications Sub-contractor until the completion of the job.
3. It is the Sub-contractor's responsibility to begin work promptly according to the Start Dates and to complete work by the Proposed Completion Date listed on the Cable Run Request Form.
4. The Sub-contractor must notify the Construction Manager in writing of any delays; at that time, they shall come up with a mutually agreeable project schedule.
5. The Communications Sub-contractor will coordinate with the Construction Manager working hours and job site access issues.
6. The Communications Sub-contractor will coordinate with the Construction Manager to minimize outages to the existing systems.
7. Any service interruption required by the Communications Sub-contractor must be requested in writing, and scheduled with the Construction Manager.
8. The Communications Sub-contractor shall not proceed with the requested service interruption until written approval is granted by the Construction Manager.
9. All problems, and questions relating to a particular job, will be referred to the Construction Manager and no changes shall be made without his/her written approval.

C. Harmony Clause
1. Sub-contractor shall coordinate and work in harmony with other trades on the project as well as with A/E personnel.

1.11 COORDINATION

A. Coordinate layout and installation of voice, data, and video communication cabling with other sub-contractors and equipment suppliers.

1. Meet jointly with other sub-contractors, equipment suppliers, and representatives to exchange information and agree on details of equipment arrangements and installation interfaces.
2. Record agreements reached in meetings and distribute to other participants.
3. Adjust arrangements and locations of distribution frames, cross-connect and patch panels in equipment rooms and telecommunications rooms to accommodate and optimize arrangement and space requirements of voice and LAN equipment.
4. When indicated on drawings, sub-contractor shall reuse existing copper and fiber optic backbone cables.
5. Provide weekly progress reports and crew schedules to project representatives by 5:00 PM, Thursday of each project work week.

1.12 ACTION SUBMITTALS

A. Product Data: For each product indicated.
1. Submit all product data in accordance with general requirements of the construction documents.
2. Submit product cut sheets and a detailed list of components a minimum of two (2) weeks prior to commencement of Division-27 work for A/E review and action.
3. Alternate and "Or Equal" designated products must be submitted for review and judgment to the A/E prior to installation. The sub-contractor-proposed alternate products or components must be verified by two (2) independent sources within the past 6 months. This request shall include the two (2) independent sources, the original Product's specification sheet, the proposed substitute product cut sheet, and a written request to review the substitute product.
4. Any request of an alternate or substitution must be submitted to the A/E for action no later than fourteen (14) calendar days after release of the original telecommunications bid documents.

1.13 Information & COmmunication Technology (ICT) components

A. The Contract Documents generally outline industry standard components to be installed as part of the project ICT installation requirements. Such identification is intended to be general in nature rather than exhaustive. All stated quantities are subject to validation by ICT Sub-contractor. ICT Sub-contractor is reminded that differences between estimated quantities and those reasonably derived based from the Contract Documents (as well as through bid conferences, job walks, addendums, and other distribution of information) shall be the responsibility of the ICT Sub-contractor. There shall be no additional cost incurred by Palomar College NEC project for not complying with the specifications and requirements of the Contract Documents.

B. Any variance from those components identified on the drawings and/or below shall be submitted to Palomar College NEC project representatives for approval prior to ordering and installation; the risk for all costs incurred by the ICT Sub-contractor for materials ordered prior to such written approval shall be borne entirely by the ICT Sub-contractor. Nonetheless, it is imperative that the ICT Sub-contractor determine the availability of necessary materials and propose equivalent substitutes as necessary to meet all installation milestones. Delays in ICT installations due to lack of product availability are unacceptable. As catalog numbers change frequently, the ICT Sub-contractor must verify all part numbers prior to ordering materials. Clarifications will be issued in response to written Requests for Information (RFI).

C. All new fiber optic cabling, will be Air-Blown Fiber indoor/outdoor rated. Any unrated cable (such as filled ASP) shall not be installed within the structure except when placed within IMT, PVC or RGS conduit.

D. Throughout this specification, Dura-Line, Berk-Tek, Leviton, Chatsworth Products, Inc. and other manufacturers are cited. These citations are for the purpose of establishing quality, performance, warranty certification criteria and are campus standards.

1.14 DELIVERY AND STORAGE

A. ICT Sub-contractor shall provide a materials schedule prior to the start date of cable installation. Material schedule shall specify all material quantities and their delivery date for this project.

B. ICT Sub-contractor shall provide protection from weather, moisture, dirt, dust and other contaminants for telecommunications cabling and pathway equipment placed in storage.

1.15 INFORMATIONAL SUBMITTALS

A. Coordination Drawings:
1. Submit all shop drawings in accordance with the general requirements of the construction documents.
2. Submit shop drawings a minimum of two (2) weeks prior to commencement of Division-27 work for A/E review and action.
3. Shop drawings shall include evidence of grounding and bonding components are coordinated with field conditions and the work of other trades.
4. This submittal may have a written component and a visual, drawn component for review and action by the A/E prior to installation.

B. Certificates:
1. Submit management and installation team reference documentation verifying:
   a. The project manager is a RCDD in good standing with BICSI and is qualified to manage the scope of work described in the contract documents and has five (5) years of experience managing similar projects in size and scope. The documentation shall include the RCDD registration number.
   b. The field supervisor is a BICSI trained technician that is qualified to perform and oversee the work described in the contract documents.

C. Qualification Statements:
1. The sub-contractor shall submit documentation that within the past 12 months, a minimum of 75% of all installation personnel have been trained or certified by the manufacturer of the products they are installing.

1.16 CLOSEOUT SUBMITTALS

A. As-Built Drawings:
1. Submit all as-built drawings in accordance with the general requirements of the construction documents.
2. Submit as-built drawings a minimum of two (2) weeks after completion of all Division- 27 work for A/E and Owner reference.
3. Communication sub-contractor to print, frame and mount approved as-built drawings in MPOE. Coordinate location with A/E.

1.17 QUALITY ASSURANCE

A. Qualifications – Manufacturer
   1. Component manufactures shall be ISO 9001:2000 and offer products that are RoHS compliant.

B. Qualifications – Installer:
   1. At a minimum, seventy-five percent (75%) of the onsite sub-contractor provided field technicians shall be factory certified within 12 months by the manufacturer of the selected telecommunications system components being installed. Proof of certification shall be available on site for review at all times for each field technician.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 EXAMINATION

A. Check actual site conditions prior to start of any work. Ensure all preceding trade work associated with the telecommunications system is accurate and complete before proceeding with installation or use of products specified in this section.

3.02 RE-INSTALLATION

A. No additional burden to the owner regarding costs, network down-time, and end user interruption shall result from the re-installation of specified components. Scheduling for re- installation work shall be coordinated, in writing, with the owner prior to beginning any re- installation work

3.03 CLOSEOUT ACTIVITIES

A. Sub-contractor shall provide documentation of all telecommunications system components under this section utilized throughout the site for review and reference by the Owner and A/E team.

B. Sub-contractor to submit all as-built drawings and any test documentation required prior to acceptance by the Owner

END OF SECTION

SECTION 27 05 33

CONDUITS AND BOXES FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Provides specifications for conduit pathways, back boxes and pull box enclosures utilized for the distribution and housing of telecommunications cabling and components:
   2. Telecom EMT conduit and boxes

1.02 RELATED DOCUMENTS

A. All divisions of the specification and general provisions of the Construction Documents.

B. Architectural, mechanical, electrical, and all technology drawings.

C. Refer to Structural Seismic Requirement design documents Specifications, if available, for Non-Structural Components for all structural bracing and support of telecommunications equipment.

1.03 REFERENCES

A. Abbreviations and Acronyms:
   1. A/E: Architect / Engineer (designer)
   2. ANSI: American National Standards Institute
   3. AHJ: Authority Having Jurisdiction
   4. BICSI: Building Industry Consulting Service International
   5. EIA: Electronics Industry Alliance
   6. TDMM: Telecommunications Distribution Methods Manual
   7. TIA: Telecommunications Industry Association
   8. UL: Underwriters Laboratory

B. Codes and Regulations: (Note: Reference Division One for specific code versions governing the work in addition to the information noted below.
   1. National Electric Safety Code (NESC) – 2017
   2. National Fire Protection Association (NFPA)
   3. 2017 California Electrical Code
   4. 2017 California Building Code
   5. Local Municipal Codes

1.04 APPLICABLE REGULATORY REFERENCES

A. Sub-contractor is responsible for knowledge and application of current versions of all applicable Standards and Codes. In cases where listed Standards and Codes have been updated, Sub-contractor shall adhere to the most recent revisions, including all relevant changes or addenda at the time of installation.

1. ANSI/TIA:
   a. TIA-526-7 (OFSTP-7) (July 2015) Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant
   b. TIA-526-14-B (April 2015) (OFSTP-14) Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant
   c. ANSI/TIA/EIA-598-C (July 2014) Optical Fiber Cable Color Coding
   d. ANSI/TIA-568-C.0 (December 2015) Generic Telecommunications Cabling for Customer Premises
   e. TIA-568-C.0-1 (September 2012) Generic Telecommunications Cabling for Customer Premises-Addendum 1, Updated Reference for Balanced Twisted-Pair Cabling
   f. ANSI/TIA-568-C.1 (February 2012) Commercial Building Telecommunications Cabling Standards
   g. TIA-568-C.1-2 (November 2014) Commercial Building Telecommunications Cabling Standard, Addendum 2 General Updates
   h. ANSI/TIA-568-C.2 (June 2016) Balanced Twisted Pair Communications Cabling and Components Standards
   i. ANSI/TIA-568-C.3 (June 2011) Optical Fiber Cabling Components Standard
   j. ANSI/TIA-568-C.3-1 (December 2011) Optical Fiber Cabling Component Standard- Addendum 1, Addition of OM4 Cabled Optical Fiber and array connectors
   k. ANSI/TIA-1183 (August 2012) Test Fixtures for Balun-Less Measurements of Balanced Components and Systems
   l. ANSI/TIA-1183-1 (January 2016) Test Fixtures for Balun-Less Measurements of Balanced Components and Systems, Addendum 1 – Extending Frequency Capabilities to 2 GHz.
   m. ANSI/TIA-568-C.4 (July 2011) Broadband Coaxial Cabling Components Standard
   n. ANSI/TIA-942-A (August 2012) Telecommunications Infrastructure Standard for Data Centers
   o. ANSI/TIA-942-A-1 (March 2013) Telecommunications Infrastructure Standard for Data Centers, Addendum 1 - Cabling Guidelines for Data Center Fabrics
   p. TIA-569-D (April 2015) Telecommunications Pathways and Spaces
   q. TIA-569-D-1 (October 2016) Telecommunications Pathways and Spaces Addendum 1- Revised Temperature and Humidity Requirements for Telecommunications Spaces
   r. ANSI/TIA-606-B (December 2015) Administration Standard for Telecommunications Infrastructure
   s. TIA-607-B (November 2015) Generic Telecommunications Grounding (Earthing) and Bonding for Customer Premises
   t. TIA-607-B-1 (January 2017) Generic Telecommunications Grounding (Earthing) and Bonding for Customer Premises - External Grounding Addendum
   u. TIA-758-B (April 2012) Customer-Owned Outside Plant Telecommunication Infrastructure Standard
   v. TIA-1152 (November 2016) Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling
   w. ANSI/TIA-862-B (February 2016) Structured Cabling Infrastructure Standard for Intelligent Building Systems.

x. TIA-570-C (August 2012) Residential Telecommunications Infrastructure Standard
y. TIA-1005-A (June 2012) Industrial Telecommunications Infrastructure Standard for Manufacturing, Process & Refining
z. ANSI/TIA-1005 (January 2015) Telecommunications Infrastructure Standard for Industrial Premises
aa. TIA-1005-1 (May 2012) Telecommunications Infrastructure Standard for Industrial Premises; Addendum 1 - Industrial Pathways and Spaces
bb. TIA-1179 (July 2010) Healthcare Facility Telecommunications Infrastructure Standard.

2. ISO/IEC
   a. ISO 11801 (November 2010) - Generic Cabling for Customer Premises
   b. ISO/IEC TR 14763-2-1:2012 - Information technology -- Implementation and operation of customer premises cabling -- Part 2-1: Planning and installation - Identifiers within administration system.
3. National Electric Codes
   a. National Electrical Code (2017)
   b. ANSI/NFPA 70-2017, National Electrical Code© (NEC©)
   c. ANSI/IEEE C2-207, National Electrical Safety Code®
   d. National Electrical Code (NEC) (NFPA 70)
4. OSHA Standards and Regulations – all applicable
5. Local Codes and Standards – all applicable
6. BICSI
   a. Telecommunications Distribution Methods Manual, 13th Edition
   b. BICSI 004-2012, Information Technology Systems Design and Implementation Best Practices for Healthcare Institutions and Facilities
   c. Information Technology Systems Installation Methods Manual (ITSIMM), 6th Edition
   d. ANSI/BICSI 002-2014, Data Center Design and Implementation Best Practices
   e. Network Systems and Commissioning (NSC) reference, 1st Edition
   f. ANSI/NECA/BICSI 568-2006, Standard for Installing Commercial Building Telecommunications Cabling
   g. NECA/BICSI 607-2011, Standard for Telecommunications Bonding and Grounding Planning and Installation Methods for Commercial Buildings
   h. ANSI/BICSI 001-2009, Information Transport Systems Design Standard for K-12 Educational Institutions
   i. AV Design Reference Manual, 1st Edition
   j. Network Design Reference Manual, 7th Edition
   k. Outside Plant Design Reference Manual, 5th Edition
   l. Wireless Design Reference Manual, 3rd Edition
   m. Electronic Safety and Security Design Reference Manual, 3rd Edition.
7. Anywhere cabling Standards conflict with electrical or safety Codes, Sub-contractor shall defer to NEC and any applicable local codes or ordinances, or default to the most stringent requirements listed by either.
8. Knowledge and execution of applicable codes is the sole responsibility of the Sub-contractor.
9. Any code violations committed at the time of installation shall be remedied at the Sub-contractor's expense.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Install and coordinate the telecommunications cabling work in cooperation with other trades installing interrelated work. Before installation, make proper provisions to avoid interference in a manner accepted by the architect. Any repairs or changes made necessary in the contract work, caused by the sub-contractor's neglect, shall be made by the sub-contractor at their own expense.

B. Scheduling:
1. Contract Documents and the overall construction schedule must be carefully reviewed to determine all required interfacing and timing of the work. All such documents shall be available through the General Contractor or Construction Manager.

1.06 ACTION SUBMITTALS

A. Product Data: For each product indicated.
1. Submit all product data in accordance with general requirements of the construction documents.
2. Submit product cut sheets and a detailed list of components a minimum of six (2) weeks prior to commencement of Division-27 work for A/E review and action.
3. Alternate and "Or Equal" designated products must be submitted for review and judgment to the A/E prior to installation. The sub-contractor-proposed alternate products or components must be verified by two (2) independent sources within the past 6 months. This request shall include the two (2) independent sources, the original Product's specification sheet, the proposed substitute product cut sheet, and a written request to review the substitute product.
4. Any request of an alternate or substitution must be submitted to the A/E for action no later than fourteen (14) calendar days after release of the original telecommunications bid documents.

1.07 INFORMATIONAL SUBMITTALS

A. Coordination Drawings:
1. Submit all shop drawings in accordance with the general requirements of the construction documents.
2. Submit shop drawings a minimum of six (2) weeks prior to commencement of Division-27 work for A/E review and action.
3. Shop drawings shall include evidence of grounding and bonding components are coordinated with field conditions and the work of other trades.
4. This submittal may have a written component and a visual, drawn component for review and action by the A/E prior to installation.

1.08 CLOSEOUT SUBMITTALS

A. As-Built Drawings:
1. Submit all as-built drawings in accordance with the general requirements of the construction documents.
2. Submit as-built drawings a minimum of two (2) weeks after completion of all Division- 27 work for A/E and Owner reference:

PART 2 - PRODUCTS

2.01 CONDUIT AND BACKBOXES

A. EMT conduit
   1. Wheatland Tube
   2. Appleton
   3. Crouse-Hinds
   4. Or equal.

B. PVC conduit
   1. JM Eagle
   2. Electro Flex
   3. Or equal

C. Pull boxes
   1. Hoffman Engineering Co,
   2. Or equal.

D. Back Boxes
   1. Randl Industries – 5 Square Outlet Box- 2.875 Deep with Management
      a. Part Number T-55017

2.02 TELECOMMUNICATIONS CONDUIT AND BACKBOXES

A. Electrical Metallic Galvanized Tubing and Fittings with natural finish for all conduits not exposed: ANSI C80.3 with compression-type fittings.

B. Indoor Pull boxes: Galvanized steel, screw cover pull box. Grey polyester powder coat finish inside and out. NEMA Type 1. Pull boxes to be sized per NEC code to accommodate the number of EMT conduits as shown on Telecom drawings with adequate clearances, access and cable management space.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Check actual site conditions prior to start of any work. Ensure all preceding trade work associated with the telecommunications system is accurate and complete before proceeding with installation or use of products specified in this section.

3.02 INSTALLATION

A. Pull boxes:
   1. Install Pull boxes in easily accessible locations.
   2. Install Horizontal cabling boxes immediately above suspended ceilings.
   3. A pull box should not be used in lieu of a bend.
   4. Conduits that enter the pull box from opposite ends with each other should be aligned.

5. For direct access to a box located above inaccessible ceilings provide a suitable,

Conduit Trade Size	Pull box Width (in.)	Pull box Length (in.)	Pull box Depth (in.)	Pull box Width for Additional Conduit
1	4	16	3	2
1	6	20	3	3
1	8	27	4	4
2	8	36	4	5
2	10	42	5	6
3	12	48	5	6
3	12	54	6	6
4	15	60	8	8

marked, hinged access panel (or equivalent) in the ceiling. This access panel can also serve as the cover for the box.

6. Pull box sizing table:

B. Back Boxes
1. Provide 4-11/16" H X 4-11/16" W X 2-1/8" D outlet back boxes at all telecom outlet locations shown on drawings. Provide (1) 1-1/4" conduit from back box to telecom room or pull box except as otherwise noted. All connectors and couplings shall be zinc-plated steel set screw type. Die cast zinc fittings are not to be used. Provide bushing on ends of all conduits. Provide pull string in all conduits.
2. Provide single gang plaster ring on all communications outlet back boxes, unless indicated otherwise.
3. Provide bonding to cable tray pathways.

C. Conduit support and bracing:
1. Coordinate layout and installation of conduits and pull boxes with other trade conditions to ensure adequate clearances, access and cable management.
2. Install and provide support for EMT conduits and pull boxes in accordance with the latest edition of the NEC code, as well as all state and local codes and requirements. Coordinate installation and location with existing conditions. Notify and get the Owners Representative approval before installing conduits and pull boxes where the location need to deviate from the contract documents.
3. Install conduits above ceilings at height to provide access to pull. Install conduits and pull boxes level and square and at proper elevations. Ensure adequate clearances, access and cable management.
4. Use fittings and support devices compatible with conduits and pull boxes and suitable for use and location. Strength of each support shall be adequate to carry present and future load multiplied by a safety factor of at least four.
5. Install individual and multiple trapeze hangers and riser clamps as necessary to support the conduits. Provide U-bolts, clamp attachments and other necessary hardware for hanger assemblies and for securing hanger rods and conduits. Space supports for conduits on maximum 10-foot centers.
6. Provide and install expansion or deflection fittings for conduits runs at all instances at seismic or expansion joints to allow for movement in any direction.

D. Conduit routing, bends and radius guidelines:
1. If the conduit has an internal diameter of 2 inches or less the bend radius must be at least 6 times the internal conduit diameter.

2. If the conduit has an internal diameter of more than 2 inches the bend radius must be at least 10 times the internal conduit diameter.
3. Conduit bends should be smooth, even, and free of kinks or other discontinuities that may have detrimental effects on pulling tension or cable integrity during or after installation.
4. If a conduit run requires more than two 90 degree bends then provide a pull box between sections with two bends or less.
5. If a conduit run requires a reverse bend (between 100 degrees and 180 degrees) then insert a pull point or pull box at each bend having an angle from 100 degrees to 180 degrees.
6. Consider an offset as equivalent to a 90 degree bend.
7. A pullbox shall not be used as a 90 degree bend.
8. Achieve the best direct route with no bend greater than 90 degrees or an aggregate of bends in excess of 180 degrees between pull points or pull boxes.
9. Contain no continuous sections longer than 100 ft.
10. For runs that total more than 100 ft. in length, pull points or pull boxes should be inserted so that no segment between points/boxes exceeds the 100 ft. limit.
11. Withstand the environment to which they will be exposed.
12. Conduits should not be routed through areas in which flammable material may be stored or over or adjacent to boilers, incinerators, hot-water lines and steam lines.
13. Keep conduits at least 6' away from parallel runs of steam, hot water pipes or mechanical ductwork.

E. Conduit Terminations
1. Join conduits with fittings designed and approved for the purpose. Make the joints tight without protruding lips that can snag cable pulling inside the conduits.
2. Where conduits are terminated with locknuts and bushings align the conduit to enter squarely and install the locknuts with dished part against the box. Use two locknuts, one inside and one outside the box.
3. Ream all conduit ends and fit them with an insulated bushing to eliminate sharp edges that can damage cables during installation or service.
4. Conduits that enter a telecom room should terminate near the corners to allow for proper cable racking.
5. Terminate conduits that protrude through the structural floor 3 inches above the surface.
6. Maintain the integrity of all fire stop barriers for all floor or wall penetrations.

F. Provide grounding and bonding for conduits and pull boxes as indicated by NEC code and instructed by manufacturer.

G. Conduits shall be clearly labeled at both ends designating the opposite locations(s) served. The numbering scheme shall be room number plus a suffix to guarantee uniqueness, e.g., 143-1. Labeling must be machine generated.

H. Conduit Protection:
1. Remove burrs, dirt and construction debris from conduits and pull boxes.
2. Conduits should be left capped for protection.
3. Provide final protection and maintain conditions in a manner acceptable to the Owners Representative to ensure that coatings, finishes and pull boxes are without damage or deterioration at completion. Repair damage to galvanized finishes with zinc-rich paint recommended by the manufacturer.

3.03 ACCEPTANCE

A. All specified conduits and pull boxes indicated on the drawings and specifications shall be complete.

B. Specified shop drawings and product submittals shall have been submitted for review and all review comments and deficiencies shall have been resolved. Final shop drawings and product submittals shall have been submitted, reviewed and found to meet the requirements of the specifications.

C. Issues and deficiencies identified in field reports and punch lists shall have been resolved. Final as-built drawings shall have been submitted, reviewed and found to meet the requirements of the specifications.

D. Sub-contractor shall provide written notice of final completion of the telecom infrastructure. Upon receipt, the Owner's Representative will review/observe the completed installation. Once the Owner's Representative is satisfied that all work is in accordance with the Contract Documents, the Sub-contractor will be notified in writing.

3.04 RE-INSTALLATION

A. No additional burden to the owner regarding costs, network down-time, and end user interruption shall result from the re-installation of specified components. Scheduling for re- installation work shall be coordinated, in writing, with the owner prior to beginning any re- installation work

B. CLOSEOUT ACTIVITIES

C. Sub-contractor shall provide documentation of all telecommunications system components under this section utilized throughout the site for review and reference by the Owner and A/E team.

D. Sub-contractor to submit all as-built drawings and any test documentation required prior to acceptance by the Owner

END OF SECTION

SECTION 27 05 53

IDENTIFICATION FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Provides specifications information for identification of the various components of the telecommunications infrastructure and pathway system.
   2. Labeling and identification.

1.02 RELATED DOCUMENTS

A. All divisions of the specification and general provisions of the Construction Documents.

B. Architectural, mechanical, electrical, and all technology drawings.

C. Refer to Structural Seismic Requirement design documents Specifications, if available, for Non-Structural Components for all structural bracing and support of telecommunications equipment.

1.03 REFERENCES

A. Abbreviations and Acronyms:
   1. ANSI American National Standards Institute
   2. BICSI: Building Industry Consulting Service International
   3. EIA: Electronics Industry Alliance
   4. IDF: Intermediate Distribution Facility
   5. MDF Main Distribution Facility
   6. RCDD: Registered Communications Distribution Designer
   7. TCIM: Telecommunication Cabling Installation Manual
   8. TDMM: Telecommunications Distribution Methods Manual
   9. TIA: Telecommunications Industry Association

B. Codes and Regulations: (Note: Reference Division One for specific code versions governing the work in addition to the information noted below.
   1. National Electric Safety Code (NESC) – 2017
   2. National Fire Protection Association (NFPA)
   3. 2017 California Electrical Code
   4. 2017 California Building Code
   5. Local Municipal Codes.

1.04 APPLICABLE REGULATORY REFERENCES

A. Sub-contractor is responsible for knowledge and application of current versions of all applicable Standards and Codes. In cases where listed Standards and Codes have been updated, Sub-contractor shall adhere to the most recent revisions, including all relevant changes or addenda at the time of installation.

1. ANSI/TIA:
   a. TIA-526-7 (OFSTP-7) (July 2015) Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant
   b. TIA-526-14-B (April 2015) (OFSTP-14) Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant
   c. ANSI/TIA/EIA-598-C (July 2014) Optical Fiber Cable Color Coding
   d. ANSI/TIA-568-C.0 (December 2015) Generic Telecommunications Cabling for Customer Premises
   e. TIA-568-C.0-1 (September 2012) Generic Telecommunications Cabling for Customer Premises-Addendum 1, Updated Reference for Balanced Twisted-Pair Cabling
   f. ANSI/TIA-568-C.1 (February 2012) Commercial Building Telecommunications Cabling Standards
   g. TIA-568-C.1-2 (November 2014) Commercial Building Telecommunications Cabling Standard, Addendum 2 General Updates
   h. ANSI/TIA-568-C.2 (June 2016) Balanced Twisted Pair Communications Cabling and Components Standards
   i. ANSI/TIA-568-C.3 (June 2011) Optical Fiber Cabling Components Standard
   j. ANSI/TIA-568-C.3-1 (December 2011) Optical Fiber Cabling Component Standard- Addendum 1, Addition of OM4 Cabled Optical Fiber and array connectors
   k. ANSI/TIA-1183 (August 2012) Test Fixtures for Balun-Less Measurements of Balanced Components and Systems
   l. ANSI/TIA-1183-1 (January 2016) Test Fixtures for Balun-Less Measurements of Balanced Components and Systems, Addendum 1 – Extending Frequency Capabilities to 2 GHz.
   m. ANSI/TIA-568-C.4 (July 2011) Broadband Coaxial Cabling Components Standard
   n. ANSI/TIA-942-A (August 2012) Telecommunications Infrastructure Standard for Data Centers
   o. ANSI/TIA-942-A-1 (March 2013) Telecommunications Infrastructure Standard for Data Centers, Addendum 1 - Cabling Guidelines for Data Center Fabrics
   p. TIA-569-D (April 2015) Telecommunications Pathways and Spaces
   q. TIA-569-D-1 (October 2016) Telecommunications Pathways and Spaces Addendum 1- Revised Temperature and Humidity Requirements for Telecommunications Spaces
   r. ANSI/TIA-606-B (December 2015) Administration Standard for Telecommunications Infrastructure
   s. TIA-607-B (November 2015) Generic Telecommunications Grounding (Earthing) and Bonding for Customer Premises
   t. TIA-607-B-1 (January 2017) Generic Telecommunications Grounding (Earthing) and Bonding for Customer Premises - External Grounding Addendum
   u. TIA-758-B (April 2012) Customer-Owned Outside Plant Telecommunication Infrastructure Standard
   v. TIA-1152 (November 2016) Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling
   w. ANSI/TIA-862-B (February 2016) Structured Cabling Infrastructure Standard for Intelligent Building Systems.

x. TIA-570-C (August 2012) Residential Telecommunications Infrastructure Standard
y. TIA-1005-A (June 2012) Industrial Telecommunications Infrastructure Standard for Manufacturing, Process & Refining
z. ANSI/TIA-1005 (January 2015) Telecommunications Infrastructure Standard for Industrial Premises
aa. TIA-1005-1 (May 2012) Telecommunications Infrastructure Standard for Industrial Premises; Addendum 1 - Industrial Pathways and Spaces
bb. TIA-1179 (July 2010) Healthcare Facility Telecommunications Infrastructure Standard.

2. ISO/IEC
   a. ISO 11801 (November 2010) - Generic Cabling for Customer Premises
   b. ISO/IEC TR 14763-2-1:2012 - Information technology -- Implementation and operation of customer premises cabling -- Part 2-1: Planning and installation - Identifiers within administration system.
3. National Electric Codes
   a. National Electrical Safety Code (2017)
   b. ANSI/NFPA 70-2017, National Electrical Code© (NEC©)
   c. ANSI/IEEE C2-207, National Electrical Safety Code®
   d. National Electrical Code (NEC) (NFPA 70)
4. OSHA Standards and Regulations – all applicable
5. Local Codes and Standards – all applicable
6. BICSI
   a. Telecommunications Distribution Methods Manual, 13th Edition
   b. BICSI 004-2012, Information Technology Systems Design and Implementation Best Practices for Healthcare Institutions and Facilities
   c. Information Technology Systems Installation Methods Manual (ITSIMM), 6th Edition
   d. ANSI/BICSI 002-2014, Data Center Design and Implementation Best Practices
   e. Network Systems and Commissioning (NSC) reference, 1st Edition
   f. ANSI/NECA/BICSI 568-2006, Standard for Installing Commercial Building Telecommunications Cabling
   g. NECA/BICSI 607-2011, Standard for Telecommunications Bonding and Grounding Planning and Installation Methods for Commercial Buildings
   h. ANSI/BICSI 001-2009, Information Transport Systems Design Standard for K-12 Educational Institutions
   i. AV Design Reference Manual, 1st Edition
   j. Network Design Reference Manual, 7th Edition
   k. Outside Plant Design Reference Manual, 5th Edition
   l. Wireless Design Reference Manual, 3rd Edition
   m. Electronic Safety and Security Design Reference Manual, 3rd Edition.
7. Anywhere cabling Standards conflict with electrical or safety Codes, Sub-contractor shall defer to NEC and any applicable local codes or ordinances, or default to the most stringent requirements listed by either.
8. Knowledge and execution of applicable codes is the sole responsibility of the Sub-contractor.
9. Any code violations committed at the time of installation shall be remedied at the Sub-contractor's expense.

1.05 AMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Install and coordinate the telecommunications cabling work in cooperation with other trades installing interrelated work. Before installation, make proper provisions to avoid interference in a manner accepted by the architect. Any repairs or changes made necessary in the contract work, caused by the sub-contractor's neglect, shall be made by the sub-contractor at their own expense.

B. Scheduling:
   1. Contract Documents and the overall construction schedule must be carefully reviewed to determine all required interfacing and timing of the work. All such documents shall be available through the General Contractor or Construction Manager.

1.06 ACTION SUBMITTALS

A. Product Data: For each product indicated.
   1. Submit all product data in accordance with general requirements of the construction documents.
   2. Submit product cut sheets and a detailed list of components a minimum of two (2) weeks prior to commencement of Division-27 work for A/E review and action.
   3. Alternate and "Or Equal" designated products must be submitted for review and judgment to the A/E prior to installation. The sub-contractor-proposed alternate products or components must be verified by two (2) independent sources within the past 6 months. This request shall include the two (2) independent sources, the original Product's specification sheet, the proposed substitute product cut sheet, and a written request to review the substitute product.
   4. Any request of an alternate or substitution must be submitted to the A/E for action no later than fourteen (14) calendar days after release of the original telecommunications bid documents.

1.07 INFORMATIONAL SUBMITTALS

A. Coordination Drawings:
   1. Submit all shop drawings in accordance with the general requirements of the construction documents.
   2. Submit shop drawings a minimum of two (2) weeks prior to commencement of Division-27 work for A/E review and action.
   3. Shop drawings shall include evidence of grounding and bonding components are coordinated with field conditions and the work of other trades.
   4. This submittal may have a written component and a visual, drawn component for review and action by the A/E prior to installation.

B. Certificates:
   1. Submit management and installation team reference documentation verifying:
      a. The project manager is a RCDD in good standing with BICSI and is qualified to manage the scope of work described in the contract documents and has five (5) years of experience managing similar projects in size and scope. The documentation shall include the RCDD registration number.

b. The field supervisor is a BICSI trained technician that is qualified to perform and oversee the work described in the contract documents.

C. Qualification Statements:
1. The sub-contractor shall submit documentation that within the past 12 months, a minimum of 75% of all installation personnel have been trained or certified by the manufacturer of the products they are installing.

1.08 CLOSEOUT SUBMITTALS

A. As-Built Drawings:
1. Submit all as-built drawings in accordance with the general requirements of the construction documents.
2. Submit as-built drawings a minimum of two (2) weeks after completion of all Division- 27 work for A/E and Owner reference:
3. Communication sub-contractor to print, frame and mount approved as-built drawings in MPOE. Coordinate location with A/E.

1.09 QUALITY ASSURANCE

A. Qualifications – Manufacturer
1. Component manufactures shall be ISO 9001:2000 and offer products that are RoHS compliant.

B. Qualifications – Installer:
1. At a minimum, seventy-five percent (75%) of the onsite sub-contractor provided field technicians shall be factory certified within 12 months by the manufacturer of the selected telecommunications system components being installed. Proof of certification shall be available on site for review at all times for each field technician.

PART 2 - PRODUCTS

2.01 IDENTIFICATION LABELS

A. Basis-of-Design Product: Subject to compliance with requirements:
1. Leviton – System
2. Brady Label System
3. Brother Label System
4. Or Equal

B. Product Options:
1. The indicated manufacturers shall be the basis of the design and each component selected shall address the particular infrastructure requirements.

C. Description:
1. In new installations (Greenfield), Sub-contractor shall develop and submit for approval a labeling strategy based on the TIA 606-B Circuit Designation and Labeling Standard.
2. All labels shall be machine-manufactured by a labeling machine. Handwritten labels will not be accepted for final labeling.
3. The intention of the labeling scheme is to be TIA/EIA 606-B compliant.

4. It is the responsibility of the sub-contractor to acquire, understand, and utilize the owner's labeling scheme for all component of the voice data communications system.
5. It is the responsibility of the sub-contractor to provide labels sized to show the Owner's labeling scheme in readable font size while still matching the specified hardware identification dimensions.
6. All labeling information shall be recorded on the as-built drawings and all test documents shall reflect the appropriate labeling scheme.

D. Indoor Copper and Fiber optic cables and grounding conductors:
1. The cable sheaths shall be labeled with laser-printed polyester self-laminating wrap around labels sized to fit the Owner's labeling scheme in readable font size.

E. Horizontal cable outlet housings and faceplates:
1. Cable termination connectors at each position on the outlet housing shall be labeled with laser-printed polyester labels inserted into the outlet housing labeling window.

F. Copper patch panels:
1. The patch panels shall be labeled on the front and rear top left corner with a laser-printed polyester self-laminating label sequentially identifying the patch panel.

G. Copper patch termination blocks:
1. The termination blocks shall be labeled on the front rows with the termination block designation strip colored per the BICSI requirements identifying the copper cable pairs.

H. Fiber optic termination panels and housings:
1. The panels and housings shall be labeled on the outside front and rear top left corner with a laser-printed polyester self-laminating label sequentially identifying the panel.
2. Cable termination identifier and fiber positions inside the termination panels shall be made using the manufacturer's provided label card behind the plastic panel.

I. Equipment racks:
1. Bakelite plastic label engraved with rack label scheme attached to front and rear facing top angle bracket.
2. Label shall be adhesive backed for secure placement. Optional mounting with self tapping screws will be at the discretion of owner.

J. Equipment cabinets:
1. Bakelite plastic label engraved with cabinet label scheme attached to top front and rear facing frame of cabinet.
2. Label shall be adhesive backed for secure placement. Optional mounting with self tapping screws will be at the discretion of owner.

K. Indoor Conduits and pullboxes:
1. Each section of conduit shall be labeled on the outside facing and unobstructed view with a laser-printed polyester self-laminating label sequentially identifying the conduit and its origin and termination end (to and from).

2. Each pullbox shall be labeled on the outside door panel facing and unobstructed view with a laser-printed polyester self-laminating label sequentially identifying the pullbox and building location.

PART 3 - EXECUTIONEXAMINATION

A. Check actual site conditions prior to start of any work. Ensure all preceding trade work associated with the telecommunications system is accurate and complete before proceeding with installation or use of products specified in this section.

3.02 INSTALLATION

A. Process:
1. The Owner-provided labeling scheme is intended to comply with TIA/EIA 606-B standard for labeling and administration of a cable plant. It is the responsibility of the sub-contractor to acquire, understand, and utilize the owner's labeling scheme for all component of the voice data communications system including, but not limited to:
2. Indoor Horizontal copper and fiber optic cables (Identify at both ends within 6-inches of termination).
3. Indoor copper and fiber optic backbone cables (Identify at both ends within 12-inches of the point that the cable enters termination panels/blocks, within 12- of the point that the cable enters or exits pullboxes, wall and floor sleeves.
4. Workstation outlets, faceplates and individual outlet connectors.
5. Termination panels.
6. Termination blocks.
7. Racks, cabinets, and equipment enclosures. (front and rear).
8. Indoor conduit pathways and pullboxes.
9. Grounding conductors and ground bars.
10. Label each component with a specified label at an unobstructed view location and where it is accessible for administration.

3.03 RE-INSTALLATION

A. No additional burden to the owner regarding costs, network down-time, and end user interruption shall result from the re-installation of specified components. Scheduling for re- installation work shall be coordinated, in writing, with the owner prior to beginning any re- installation work.

3.04 CLOSEOUT ACTIVITIES

A. Sub-contractor shall provide documentation of all telecommunications system components under this section utilized throughout the site for review and reference by the Owner and A/E team.

B. Sub-contractor to submit all as-built drawings and any test documentation required prior to acceptance by the Owner.

END OF SECTION

SECTION 27 11 19

TERMINATION BLOCKS AND PATCH PANELS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Provides specifications for wall and rack/cabinet-mounted blocks, termination panels and patch panel components utilized to terminate various telecommunications infrastructure cabling and connectivity.
2. Optical Fiber Termination panels.
3. Copper horizontal cabling Patch Panels.

1.02 RELATED DOCUMENTS

A. All divisions of the specification and general provisions of the Construction Documents.

B. Architectural, mechanical, electrical, and all technology drawings.

1.03 REFERENCES

A. Abbreviations and Acronyms:
1. ANSI: American National Standards Institute
2. A/E: Architect / Engineer (designer)
3. BICSI: Building Industry Consulting Service International
4. EIA: Electronics Industry Alliance
5. IDF: Intermediate Distribution Facility
6. MDF Main Distribution Facility
7. RCDD: Registered Communications Distribution Designer
8. TCIM: Telecommunication Cabling Installation Manual
9. TDMM: Telecommunications Distribution Methods Manual
10. TIA: Telecommunications Industry Association

B. Codes and Regulations: (Note: Reference Division One for specific code versions governing the work in addition to the information noted below.)
1. National Electric Code (2017)
2. National Fire Protection Association (NFPA)
3. 2016 California Electrical Code
4. 2016 California Building Code
5. Local Municipal Codes

1.04 APPLICABLE REGULATORY REFERENCES

A. Sub-contractor is responsible for knowledge and application of current versions of all applicable Standards and Codes. In cases where listed Standards and Codes have been updated, Sub-contractor shall adhere to the most recent revisions, including all relevant changes or addenda at the time of installation.
1. ANSI/TIA:

a. TIA-526-7 (OFSTP-7) (July 2015) Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant
b. TIA-526-14-B (April 2015) (OFSTP-14) Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant
c. ANSI/TIA/EIA-598-C (July 2014) Optical Fiber Cable Color Coding
d. ANSI/TIA-568-C.0 (December 2015) Generic Telecommunications Cabling for Customer Premises
e. TIA-568-C.0-1 (September 2012) Generic Telecommunications Cabling for Customer Premises-Addendum 1, Updated Reference for Balanced Twisted-Pair Cabling
f. ANSI/TIA-568-C.1 (February 2012) Commercial Building Telecommunications Cabling Standards
g. TIA-568-C.1-2 (November 2014) Commercial Building Telecommunications Cabling Standard, Addendum 2 General Updates
h. ANSI/TIA-568-C.2 (June 2016) Balanced Twisted Pair Communications Cabling and Components Standards
i. ANSI/TIA-568-C.3 (June 2011) Optical Fiber Cabling Components Standard
j. ANSI/TIA-568-C.3-1 (December 2011) Optical Fiber Cabling Component Standard- Addendum 1, Addition of OM4 Cabled Optical Fiber and array connectors
k. ANSI/TIA-1183 (August 2012) Test Fixtures for Balun-Less Measurements of Balanced Components and Systems
l. ANSI/TIA-1183-1 (January 2016) Test Fixtures for Balun-Less Measurements of Balanced Components and Systems, Addendum 1 – Extending Frequency Capabilities to 2 GHz.
m. ANSI/TIA-568-C.4 (July 2011) Broadband Coaxial Cabling Components Standard
n. ANSI/TIA-942-A (August 2012) Telecommunications Infrastructure Standard for Data Centers
o. ANSI/TIA-942-A-1 (March 2013) Telecommunications Infrastructure Standard for Data Centers, Addendum 1 - Cabling Guidelines for Data Center Fabrics
p. TIA-569-D (April 2015) Telecommunications Pathways and Spaces
q. TIA-569-D-1 (October 2016) Telecommunications Pathways and Spaces Addendum 1- Revised Temperature and Humidity Requirements for Telecommunications Spaces
r. ANSI/TIA-606-B (December 2015) Administration Standard for Telecommunications Infrastructure
s. TIA-607-B (November 2015) Generic Telecommunications Grounding (Earthing) and Bonding for Customer Premises
t. TIA-607-B-1 (January 2017) Generic Telecommunications Grounding (Earthing) and Bonding for Customer Premises - External Grounding Addendum
u. TIA-758-B (April 2012) Customer-Owned Outside Plant Telecommunication Infrastructure Standard
v. TIA-1152 (November 2016) Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling
w. ANSI/TIA-862-B (February 2016) Structured Cabling Infrastructure Standard for Intelligent Building Systems.

x. TIA-570-C (August 2012) Residential Telecommunications Infrastructure Standard
y. TIA-1005-A (June 2012) Industrial Telecommunications Infrastructure Standard for Manufacturing, Process & Refining
z. ANSI/TIA-1005 (January 2015) Telecommunications Infrastructure Standard for Industrial Premises
aa. TIA-1005-1 (May 2012) Telecommunications Infrastructure Standard for Industrial Premises; Addendum 1 - Industrial Pathways and Spaces
bb. TIA-1179 (July 2010) Healthcare Facility Telecommunications Infrastructure Standard.

2. ISO/IEC
   a. ISO 11801 (November 2010) - Generic Cabling for Customer Premises
   b. ISO/IEC TR 14763-2-1:2012 - Information technology -- Implementation and operation of customer premises cabling -- Part 2-1: Planning and installation - Identifiers within administration system.
3. National Electric Codes
   a. National Electrical Code (2017)
   b. ANSI/NFPA 70-2017, National Electrical Code© (NEC©)
   c. ANSI/IEEE C2-207, National Electrical Safety Code®
   d. National Electrical Code (NEC) (NFPA 70)
4. OSHA Standards and Regulations – all applicable
5. Local Codes and Standards – all applicable
6. BICSI
   a. Telecommunications Distribution Methods Manual, 13th Edition
   b. BICSI 004-2012, Information Technology Systems Design and Implementation Best Practices for Healthcare Institutions and Facilities
   c. Information Technology Systems Installation Methods Manual (ITSIMM), 6th Edition
   d. ANSI/BICSI 002-2014, Data Center Design and Implementation Best Practices
   e. Network Systems and Commissioning (NSC) reference, 1st Edition
   f. ANSI/NECA/BICSI 568-2006, Standard for Installing Commercial Building Telecommunications Cabling
   g. NECA/BICSI 607-2011, Standard for Telecommunications Bonding and Grounding Planning and Installation Methods for Commercial Buildings
   h. ANSI/BICSI 001-2009, Information Transport Systems Design Standard for K-12 Educational Institutions
   i. AV Design Reference Manual, 1st Edition
   j. Network Design Reference Manual, 7th Edition
   k. Outside Plant Design Reference Manual, 5th Edition
   l. Wireless Design Reference Manual, 3rd Edition
   m. Electronic Safety and Security Design Reference Manual, 3rd Edition.
7. Anywhere cabling Standards conflict with electrical or safety Codes, Sub-contractor shall defer to NEC and any applicable local codes or ordinances, or default to the most stringent requirements listed by either.
8. Knowledge and execution of applicable codes is the sole responsibility of the Sub-contractor.
9. Any code violations committed at the time of installation shall be remedied at the Sub-contractor's expense.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Install and coordinate the telecommunications cabling work in cooperation with other trades installing interrelated work. Before installation, make proper provisions to avoid interference in a manner accepted by the architect. Any repairs or changes made necessary in the contract work, caused by the sub-contractor's neglect, shall be made by the sub-contractor at their own expense.

B. Scheduling:
   1. Contract Documents and the overall construction schedule must be carefully reviewed to determine all required interfacing and timing of the work. All such documents shall be available through the General Contractor or Construction Manager.

1.06 ACTION SUBMITTALS

A. Product Data: For each product indicated.
   1. Submit all product data in accordance with general requirements of the construction documents.
   2. Submit product cut sheets and a detailed list of components a minimum of two (2) weeks prior to commencement of Division-27 work for A/E review and action.
   3. Alternate and "Or Equal" designated products must be submitted for review and judgment to the A/E prior to installation. The sub-contractor-proposed alternate products or components must be verified by two (2) independent sources within the past 6 months. This request shall include the two (2) independent sources, the original Product's specification sheet, the proposed substitute product cut sheet, and a written request to review the substitute product.
   4. Any request of an alternate or substitution must be submitted to the A/E for action no later than fourteen (14) calendar days after release of the original telecommunications bid documents.

1.07 INFORMATIONAL SUBMITTALS

A. Coordination Drawings:
   1. Submit all shop drawings in accordance with the general requirements of the construction documents.
   2. Submit shop drawings a minimum of two (2) weeks prior to commencement of Division-27 work for A/E review and action.
   3. Shop drawings shall include evidence of grounding and bonding components are coordinated with field conditions and the work of other trades.
   4. This submittal may have a written component and a visual, drawn component for review and action by the A/E prior to installation.

B. Certificates:
   1. Submit management and installation team reference documentation verifying:
      a. The project manager is a RCDD in good standing with BICSI and is qualified to manage the scope of work described in the contract documents and has five (5) years of experience managing similar projects in size and scope. The documentation shall include the RCDD registration number.

b. The field supervisor is a BICSI trained technician that is qualified to perform and oversee the work described in the contract documents

C. Qualification Statements:
1. The sub-contractor shall submit documentation that within the past 12 months, a minimum of 75% of all installation personnel have been trained or certified by the manufacturer of the products they are installing.

1.08 CLOSEOUT SUBMITTALS

A. As-Built Drawings:
1. Submit all as-built drawings in accordance with the general requirements of the construction documents.
2. Submit as-built drawings a minimum of two (2) weeks after completion of all Division- 27 work for A/E and Owner reference:

1.09 QUALITY ASSURANCE

A. Qualifications – Manufacturer
1. Component manufactures shall be ISO 9001:2000 and offer products that are RoHS compliant.

B. Qualifications – Installer:
1. At a minimum, seventy-five percent (75%) of the onsite sub-contractor provided field technicians shall be factory certified within 12 months by the manufacturer of the selected telecommunications system components being installed. Proof of certification shall be available on site for review at all times for each field technician.

PART 2 - PRODUCTS

2.01 OPTICAL FIBER TERMINATION PANELS

A. Basis-of-Design Product: Subject to compliance with requirements:

1. AFL / Dura-Line

B. Product Options:
1. The indicated manufacturers shall be the basis of the design and each component selected shall address the particular infrastructure requirements.

C. Description:
1. 19-inch Rack mountable fiber optic termination shelf with maximum 144-positions with integrated splicing for termination inside Telecom rooms.
2. Minimum 2U rack units' height.
3. Optical fiber termination panel housings shall be provided for cross-connecting or inter-connecting purposes between OSP, Indoor riser backbone, and/or distribution cables and the active network electronic switches, as noted in drawings.

4. Single mode termination: Fusion splice both ends of each single mode fiber optic strand onto factory connectorized single mode pigtails mounted in connector housings assembled by the manufacturer of the single mode fiber optic cable.
   a. Single-Mode splice-on Connector is acceptable.
5. All optical fiber housings shall be complete factory-provided assemblies that contain all components including LC duplex connector adapter panels and internal/external bend radius, strain relief and cable clamp components that are provided in a housing which includes an accessible rear access hatch.
6. All optical fiber patch panel trays and associated bulkhead inserts shall have factory numerical labeling included in the design and presentation to the user side of the panel.
7. The optical fiber patch panel bulkheads that house the terminating modules for the fiber backbone cabling and any horizontal optical fiber cabling shall accept TIA 568-C standard-compliant LC-connectors compatible with the optical fiber strands being terminated.

D. Accessory Products:
   1. Provide any accessory products related to the optical fiber termination panels to provide a complete and functional infrastructure system.

2.02 COPPER HORIZONTAL CABLING PATCH PANELS

A. Manufacturer List:

   1. Leviton
      a. Angled Category 6A 48 Port
         1) Part Number 6A587-U48

B. Product Options:
   1. The indicated manufacturers shall be the basis of the design and each component selected shall address the particular requirements for each situation.

C. Description:
   1. All angled patch panels are to be rack/cabinet mountable within industry standard TIA/EIA 19" mounting rails unless otherwise noted.
   2. All angled patch panels are to provide adequate space for individual port labeling on the front and cable/connector labeling on the back.
   3. All installed station cable patch panels shall be Category 6A twenty-four (24) or forty-eight (48) port flat patch panels
   4. All multi-pair backbone OSP cables terminated in a TR will be terminated on a BEC protection block. Reference Division 270526 specification.
   5. The performance criteria for the patch panels must meet or exceed the performance parameters for frequency, attenuation, near end cross-talk (NEXT), attenuation to cross-talk ratio (ACR), power sum NEXT (PS-NEXT), power sum ACR (PS-ACR), equal level far end cross-talk (ELFEXT), power sum far end cross-talk (PS-FEXT), and return loss (RL) as set forth in TIA/EIA 568-C category standards.

D. Accessory Products:
   1. Provide any accessory products related to the patch panels to provide a complete and functional infrastructure system.

2. Port RJ-45 jack block out device to safely secure access to unused ports and deter vandalism to jacks.
3. Provide complete with all required mounting hardware and fittings and cables needed.

PART 3 - EXECUTIONEXAMINATION

A. Check actual site conditions prior to start of any work. Ensure all preceding trade work associated with the telecommunications system is accurate and complete before proceeding with installation or use of products specified in this section. Examples of work which must be checked include, but are not limited to:
   1. Electrical requirements (conduit installation and capacity)
   2. The telecommunications rooms are the size shown on the project drawings.
   3. Adequate clearances of doors, riser spaces and ceilings for all component of the telecommunications system.
   4. Examine and compare the telecommunications drawings and specifications with the drawings and specifications of other trades. Report any discrepancies between them to the A/E and obtain written instructions for changes or revisions.

3.02 INSTALLATION

A. Process:
   1. Install all optical fiber and category copper termination panels/panels under the guidelines of the manufacturer's recommended instructions and per all TIA/EIA 568-C standards and manufacturer-approved industry practices as shown in the drawings.
   2. The installation and performance parameters of all installed cable termination panels shall be verified by the sub-contractor through TIA/EIA 568-C testing procedures.
   3. Label all cable termination panels to identify each port and each specific panel in accordance with the TIA/EIA 606 labeling scheme approved by the Owner.

B. Installation description:
   1. Sub-contractor shall use existing cabling management pathways and take care to place cable like with like, maintaining original segregation strategies for separating fiber and copper cables as well as any separation necessary between different types of copper cables.
   2. Cables shall be dressed neatly within patch management pathways with care taken to maintain minimum bend radius of not less than 1 times the cord outer diameter for copper and not less than a 1" bend radius for fiber jumpers as per ANSI/TIA 568-C.0
   3. The installation and performance parameters of all installed cable termination panels shall be verified by the sub-contractor through TIA/EIA 568-C testing procedures.
   4. Label all cable termination panels to identify each port and each specific panel in accordance with the TIA/EIA 606 labeling scheme approved by the Owner.

3.03 RE-INSTALLATION

A. No additional burden to the owner regarding costs, network down-time, and end user interruption shall result from the re-installation of specified components due to

manufacturer defects or sub-contractor poor performance. Scheduling for re-installation work shall be coordinated, in writing, with the owner prior to beginning any re- installation work.

3.04 CLOSEOUT ACTIVITIES

A. Sub-contractor shall provide documentation of all telecommunications system components under this section utilized throughout the site for review and reference by the Owner and A/E team.

B. Sub-contractor to submit all as-built drawings and any test documentation required prior to acceptance by the Owner

END OF SECTION

SECTION 27 13 23

OPTICAL FIBER BACKBONE CABLING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Provides specifications for optical fiber backbone cabling to distribute optical network signals between telecommunications distribution spaces
   2. Backbone Air-Blown Single-mode Optical Fiber Cable

1.02 RELATED DOCUMENTS

A. All divisions of the specification and general provisions of the Construction Documents.

B. Architectural, mechanical, electrical, and all technology drawings.

1.03 REFERENCES

A. Abbreviations and Acronyms:
   1. ANSI: American National Standards Institute
   2. A/E: Architect / Engineer (designer)
   3. BICSI: Building Industry Consulting Service International
   4. EIA: Electronics Industry Alliance
   5. IDF: Intermediate Distribution Facility
   6. MDF Main Distribution Facility
   7. RCDD: Registered Communications Distribution Designer
   8. SMF: Single-Mode Fiber
   9. MM: Multi-Mode Fiber
   10. TCIM: Telecommunication Cabling Installation Manual
   11. TDMM: Telecommunications Distribution Methods Manual
   12. TIA: Telecommunications Industry Association

B. Codes and Regulations: (Note: Reference Division One for specific code versions governing the work in addition to the information noted below.)
   1. National Electric Code (2017)
   2. National Fire Protection Association (NFPA)
   3. 2016 California Electrical Code
   4. 2016 California Building Code
   5. Local Municipal Codes

1.04 APPLICABLE REGULATORY REFERENCES

A. Sub-contractor is responsible for knowledge and application of current versions of all applicable Standards and Codes. In cases where listed Standards and Codes have been updated, Sub-contractor shall adhere to the most recent revisions, including all relevant changes or addenda at the time of installation.

1. ANSI/TIA:
   a. TIA-526-7 (OFSTP-7) (July 2015) Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant
   b. TIA-526-14-B (April 2015) (OFSTP-14) Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant
   c. ANSI/TIA/EIA-598-C (July 2014) Optical Fiber Cable Color Coding
   d. ANSI/TIA-568-C.0 (December 2015) Generic Telecommunications Cabling for Customer Premises
   e. TIA-568-C.0-1 (September 2012) Generic Telecommunications Cabling for Customer Premises-Addendum 1, Updated Reference for Balanced Twisted-Pair Cabling
   f. ANSI/TIA-568-C.1 (February 2012) Commercial Building Telecommunications Cabling Standards
   g. TIA-568-C.1-2 (November 2014) Commercial Building Telecommunications Cabling Standard, Addendum 2 General Updates
   h. ANSI/TIA-568-C.2 (June 2016) Balanced Twisted Pair Communications Cabling and Components Standards
   i. ANSI/TIA-568-C.3 (June 2011) Optical Fiber Cabling Components Standard
   j. ANSI/TIA-568-C.3-1 (December 2011) Optical Fiber Cabling Component Standard- Addendum 1, Addition of OM4 Cabled Optical Fiber and array connectors
   k. ANSI/TIA-1183 (August 2012) Test Fixtures for Balun-Less Measurements of Balanced Components and Systems
   l. ANSI/TIA-1183-1 (January 2016) Test Fixtures for Balun-Less Measurements of Balanced Components and Systems, Addendum 1 – Extending Frequency Capabilities to 2 GHz.
   m. ANSI/TIA-568-C.4 (July 2011) Broadband Coaxial Cabling Components Standard
   n. ANSI/TIA-942-A (August 2012) Telecommunications Infrastructure Standard for Data Centers
   o. ANSI/TIA-942-A-1 (March 2013) Telecommunications Infrastructure Standard for Data Centers, Addendum 1 - Cabling Guidelines for Data Center Fabrics
   p. TIA-569-D (April 2015) Telecommunications Pathways and Spaces
   q. TIA-569-D-1 (October 2016) Telecommunications Pathways and Spaces Addendum 1- Revised Temperature and Humidity Requirements for Telecommunications Spaces
   r. ANSI/TIA-606-B (December 2015) Administration Standard for Telecommunications Infrastructure
   s. TIA-607-B (November 2015) Generic Telecommunications Grounding (Earthing) and Bonding for Customer Premises
   t. TIA-607-B-1 (January 2017) Generic Telecommunications Grounding (Earthing) and Bonding for Customer Premises - External Grounding Addendum
   u. TIA-758-B (April 2012) Customer-Owned Outside Plant Telecommunication Infrastructure Standard
   v. TIA-1152 (November 2016) Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling
   w. ANSI/TIA-862-B (February 2016) Structured Cabling Infrastructure Standard for Intelligent Building Systems.

x. TIA-570-C (August 2012) Residential Telecommunications Infrastructure Standard
y. TIA-1005-A (June 2012) Industrial Telecommunications Infrastructure Standard for Manufacturing, Process & Refining
z. ANSI/TIA-1005 (January 2015) Telecommunications Infrastructure Standard for Industrial Premises
aa. TIA-1005-1 (May 2012) Telecommunications Infrastructure Standard for Industrial Premises; Addendum 1 - Industrial Pathways and Spaces
bb. TIA-1179 (July 2010) Healthcare Facility Telecommunications Infrastructure Standard.

2. ISO/IEC
   a. ISO 11801 (November 2010)- Generic Cabling for Customer Premises
   b. ISO/IEC TR 14763-2-1:2012 - Information technology -- Implementation and operation of customer premises cabling -- Part 2-1: Planning and installation - Identifiers within administration system.
3. National Electric Codes
   a. National Electrical Code (2017)
   b. ANSI/NFPA 70-2017, National Electrical Code© (NEC©)
   c. ANSI/IEEE C2-207, National Electrical Safety Code®
   d. National Electrical Code (NEC) (NFPA 70)
4. OSHA Standards and Regulations – all applicable
5. Local Codes and Standards – all applicable
6. BICSI
   a. Telecommunications Distribution Methods Manual, 13th Edition
   b. BICSI 004-2012, Information Technology Systems Design and Implementation Best Practices for Healthcare Institutions and Facilities
   c. Information Technology Systems Installation Methods Manual (ITSIMM), 6th Edition
   d. ANSI/BICSI 002-2014, Data Center Design and Implementation Best Practices
   e. Network Systems and Commissioning (NSC) reference, 1st Edition
   f. ANSI/NECA/BICSI 568-2006, Standard for Installing Commercial Building Telecommunications Cabling
   g. NECA/BICSI 607-2011, Standard for Telecommunications Bonding and Grounding Planning and Installation Methods for Commercial Buildings
   h. ANSI/BICSI 001-2009, Information Transport Systems Design Standard for K-12 Educational Institutions
   i. AV Design Reference Manual, 1st Edition
   j. Network Design Reference Manual, 7th Edition
   k. Outside Plant Design Reference Manual, 5th Edition
   l. Wireless Design Reference Manual, 3rd Edition
   m. Electronic Safety and Security Design Reference Manual, 3rd Edition.
7. Anywhere cabling Standards conflict with electrical or safety Codes, Sub-contractor shall defer to NEC and any applicable local codes or ordinances, or default to the most stringent requirements listed by either.
8. Knowledge and execution of applicable codes is the sole responsibility of the Sub-contractor.
9. Any code violations committed at the time of installation shall be remedied at the Sub-contractor's expense.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Install and coordinate the telecommunications cabling work in cooperation with other trades installing interrelated work. Before installation, make proper provisions to avoid interference in a manner accepted by the architect. Any repairs or changes made necessary in the contract work, caused by the sub-contractor's neglect, shall be made by the sub-contractor at their own expense.

B. Scheduling:
1. Contract Documents and the overall construction schedule must be carefully reviewed to determine all required interfacing and timing of the work. All such documents shall be available through the General Contractor or Construction Manager.

1.06 ACTION SUBMITTALS

A. Product Data: For each product indicated.
1. Submit all product data in accordance with general requirements of the construction documents.
2. Submit product cut sheets and a detailed list of components a minimum of two (2) weeks prior to commencement of Division-27 work for A/E review and action.
3. Alternate and "Or Equal" designated products must be submitted for review and judgment to the A/E prior to installation. The sub-contractor-proposed alternate products or components must be verified by two (2) independent sources within the past 6 months. This request shall include the two (2) independent sources, the original Product's specification sheet, the proposed substitute product cut sheet, and a written request to review the substitute product.
4. Any request of an alternate or substitution must be submitted to the A/E for action no later than fourteen (14) calendar days after release of the original telecommunications bid documents.

1.07 INFORMATIONAL SUBMITTALS

A. Coordination Drawings:
1. Submit all shop drawings in accordance with the general requirements of the construction documents.
2. Submit shop drawings a minimum of two (2) weeks prior to commencement of Division-27 work for A/E review and action.
3. Shop drawings shall include evidence of grounding and bonding components are coordinated with field conditions and the work of other trades.
4. This submittal may have a written component and a visual, drawn component for review and action by the A/E prior to installation.

B. Certificates:
1. Submit management and installation team reference documentation verifying:
a. The project manager is a RCDD in good standing with BICSI and is qualified to manage the scope of work described in the contract documents and has five (5) years of experience managing similar projects in size and scope. The documentation shall include the RCDD registration number.
b. The field supervisor is a BICSI trained technician that is qualified to perform

and oversee the work described in the contract documents

C. Qualification Statements:
1. The sub-contractor shall submit documentation that within the past 12 months, a minimum of 75% of all installation personnel have been trained or certified by the manufacturer of the products they are installing.

1.08 CLOSEOUT SUBMITTALS

A. As-Built Drawings:
1. Submit all as-built documentation in accordance with the general requirements of the construction documents.
2. Cabling as-built drawings must contain detailed location and identification information coordinated with the as-built cable schedules.
3. All cabling must meet or exceed applicable TIA/EIA testing requirements and any additional parameters outlined in the Commissioning of Communications specification section 27 08 00.
4. Test results must be submitted for owner review and approval adhering to the General Contractor schedule milestones related to the projects active systems integration.

1.09 QUALITY ASSURANCE

A. Qualifications – Manufacturer
1. Component manufactures shall be ISO 9001:2000 and offer products that are RoHS compliant.

B. Qualifications – Installer:
1. At a minimum, seventy-five percent (75%) of the onsite sub-contractor provided field technicians shall be factory certified within 12 months by the manufacturer of the selected telecommunications system components being installed. Proof of certification shall be available on site for review at all times for each field technician.

PART 2 - PRODUCTS

2.01 BACKBONE SINGLE-MODE OPTICAL CABLING

A. Basis-of-Design Product: Subject to compliance with requirements:
1. AFL/Dura-Line - Air-Blown Fiber (MDF to IDF)
2. Berk-Tek – Conventional Single Mode Fiber (Phase 2 Remote Cameras and Emergency Phones)

B. Product Options:
1. The manufacturers noted above shall be the only manufacturers acceptable to the Owner and A/E. Cable construction shall be a hybrid multi-mode and single-mode fiber stands combined in a single protection jacket as indicated on the project drawings.

C. Description:
1. All backbone single-mode optical fiber cable shall be capable of 10 Gb/s Ethernet

signal transmission to 10,000 meters in the 1310nm operating window. Maximum attenuation for a single-mode cable shall be no greater than 0.4dB per kilometer using 1310nm and 0.3dB per kilometer using 1550nm wavelengths respectively.

2. Each optical fiber strand shall be sufficiently free of surface imperfections and inclusions to meet the optical, mechanical, and environmental requirements of this specification and all EIA/TIA 568-C.3 and 568-C.3-1 performance parameters.
3. All optical fibers inside each individual cable shall be provided in counts indicated in the drawings and usable to the fullest capacity specified by the manufacturer and meet required specifications at all times.
4. Air-Blown backbone single-mode optical fiber cables shall be:
   a. Individual jacketed, tight buffered fiber type.
   b. Cable construction shall be a single-mode in a single protective outer sheath.
   c. The individual fibers are grouped in jacketed subunits color coded per TIA-598.
5. The optical fiber cables shall be rated per the installation environment as required by the local Authority Having Jurisdiction and/or National Fire Codes. Select an appropriate cable construction, including external jacket properties, when installing optical fiber cables in aerial, outdoor, underground and corrosive environments.
6. All SMF shall meet or exceed TIA compliant network cable-testing device certification by an independent laboratory, such as ETL, for verification of high speed, TIA/EIA T568C-compliant performance.

D. Cable sizes defined in Contract Documents.
   1. 6-strand Single-mode – AFL/Dura-Line eABF (IDF Locations)
   2. 6-strand Single-mode – Conventional Indoor/Outdoor (Pole Cameras and Emergency Phone Locations)

E. Accessory Products:
   1. Provide any accessory products related to the optical fiber backbone cabling required to provide a complete and functional infrastructure system.

2.2 EXTERIOR TUBE-CELL SYSTEMS

A. Description:
   1. All tube cable sheath openings that are created for connecting tube cable cells in underground manholes or pull boxes shall be encased in an outside plant splice case designed for copper cables.
   2. The water-proof splice enclosure must be approved by the manufacturer for connecting tube cables.
   3. All tube cables shall have the proper end plate adapter to provide the necessary watertight seal in the splice enclosure.
   4. Tube cable sizes shall be 4- or 2-cell depending on the design on the drawings. The standard tube in conduit shall be eABF DuraLine.
   5. All unterminated or unoccupied tubes shall be plugged / capped on both ends with manufacturer specific tube sealing components.
   6. All MDF tube cable will transition to 5mm OD clear tubing for routing to the FTU.

B. Products:
   1. AFL/Dura-Line
      a. OSP 4-Cell eABF Futurepath Enterprise
         • Part Number 10004655

PART 3 - EXECUTIONEXAMINATION

A. Check actual site conditions prior to start of any work. Ensure all preceding trade work associated with the telecommunications system is accurate and complete before proceeding with installation or use of products specified in this section. Examples of work which must be checked include, but are not limited to:
   1. Electrical requirements (conduit installation and capacity)
   2. The telecommunications rooms are the size shown on the project drawings.
   3. Adequate clearances of doors, riser spaces and ceilings for all component of the telecommunications system.
   4. Examine and compare the telecommunications drawings and specifications with the drawings and specifications of other trades. Report any discrepancies between them to the A/E and obtain written instructions for changes or revisions.

3.02 INSTALLATION

A. Process:
   1. Install all backbone cable per the manufacturer's recommended installation instructions, under the guidelines of TIA/EIA 568C and BICSI, and in quantities indicated in the drawings.
   2. Install all cables with proper attention paid to bend radii, pulling method, attachment method, and pulling forces. The cable manufacturer's specifications for each particular cable type shall be followed exactly.
   3. Backbone cable shall be visually inspected for insufficient bend radius during and after pulling. Damaged cables, or those installed under questionable methods and/or circumstances shall be replaced at no additional cost to the owner.
   4. All cable shall be pulled using an appropriate measuring device to ensure that the specified force is not exceeded as noted in BICSI guidelines.
   5. Install backbone cables with attention paid to aesthetic means and methods when routing cabling within IT spaces. No backbone cable shall be left unsupported for more than three (3) feet vertically or horizontally at any time.
   6. Fiber optic cables shall be placed in neat bundles separated from other communications cabling. Fiber optic cables shall be neatly placed and lashed with Velcro ties to the horizontal and vertical cable management and runways at minimum 4-foot intervals, not to exceed every 4th rung, plus all locations where the cables change direction.
   7. Provide radius drop out fittings at all locations where fiber optic cables transition from vertical to horizontal cable management systems.
   8. All backbone cable shall be securely fastened to the termination shelf with a manufacturers strain relief bracket and termination panel cable clamp in a way that does not damage the optical fiber strands or impede the performance of the media. This secure fastening method shall also serve to insure a secure termination environment.
   9. A minimum of three feet (3'-0") of each optical fiber strand shall be left protected within the termination shelf for any future re-termination of a particular optical fiber strand.

10. All backbone cables shall be clearly labeled on both ends and in an accessible location no more than one (1) foot from each cable end.

3.03 RE-INSTALLATION

A. No additional burden to the owner regarding costs, network down-time, and end user interruption shall result from the re-installation of specified components. Scheduling for re- installation work shall be coordinated, in writing, with the owner prior to beginning any re- installation work

3.04 CLOSEOUT ACTIVITIES

A. Sub-contractor shall provide documentation of all telecommunications system components under this section utilized throughout the site for review and reference by the Owner and A/E team.

B. Sub-contractor to submit all as-built drawings and any test documentation required prior to acceptance by the Owner

END OF SECTION

SECTION 27 15 43

FACEPLATES AND CONNECTORS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Provides specifications for horizontal workstation cable termination components and outlet housing component. Includes wall-mount, floor-mount, and ceiling-mount components to support the various workstation outlets throughout the cabling plant.
2. Copper Category 6A Connectors
3. Single-Mode Optical Fiber Pigtail Connector Assemblies/Splice-On Connectors
4. Outlet Housing Components (faceplates etc.)

1.02 RELATED DOCUMENTS

A. All divisions of the specification and general provisions of the Construction Documents.

B. Architectural, mechanical, electrical, and all technology drawings.

1.03 REFERENCES

A. Abbreviations and Acronyms:

1.	ANSI:	American National Standards Institute
2.	A/E:	Architect / Engineer (designer)
3.	BICSI:	Building Industry Consulting Service International
4.	EIA:	Electronics Industry Alliance
5.	IDF:	Intermediate Distribution Facility
6.	LOMMF:	Laser Optimized Multi-Mode Fiber
7.	MDF	Main Distribution Facility
8.	NEXT:	Near End Cross Talk
9.	PSELFEXT:	Power Sum Equal Level Far End Cross Talk
10.	PSNEXT:	Power Sum Near End Cross Talk
11.	RCDD:	Registered Communications Distribution Designer
12.	SMF:	Single-Mode Fiber
13.	TCIM:	Telecommunication Cabling Installation Manual
14.	TDMM:	Telecommunications Distribution Methods Manual
15.	TIA:	Telecommunications Industry Association

B. Codes and Regulations: (Note: Reference Division One for specific code versions governing the work in addition to the information noted below.)
1. National Electric Safety Code (2017)
2. National Fire Protection Association (NFPA)
3. 2017 California Electrical Code
4. 2017 California Building Code
5. Local Municipal Codes

1.04 APPLICABLE REGULATORY REFERENCES

A. Sub-contractor is responsible for knowledge and application of current versions of all applicable Standards and Codes. In cases where listed Standards and Codes have been updated, Sub-contractor shall adhere to the most recent revisions, including all relevant changes or addenda at the time of installation.

1. ANSI/TIA:
   a. TIA-526-7 (OFSTP-7) (July 2015) Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant
   b. TIA-526-14-B (April 2015) (OFSTP-14) Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant
   c. ANSI/TIA/EIA-598-C (July 2014) Optical Fiber Cable Color Coding
   d. ANSI/TIA-568-C.0 (December 2015) Generic Telecommunications Cabling for Customer Premises
   e. TIA-568-C.0-1 (September 2012) Generic Telecommunications Cabling for Customer Premises-Addendum 1, Updated Reference for Balanced Twisted-Pair Cabling
   f. ANSI/TIA-568-C.1 (February 2012) Commercial Building Telecommunications Cabling Standards
   g. TIA-568-C.1-2 (November 2014) Commercial Building Telecommunications Cabling Standard, Addendum 2 General Updates
   h. ANSI/TIA-568-C.2 (June 2016) Balanced Twisted Pair Communications Cabling and Components Standards
   i. ANSI/TIA-568-C.3 (June 2011) Optical Fiber Cabling Components Standard
   j. ANSI/TIA-568-C.3-1 (December 2011) Optical Fiber Cabling Component Standard- Addendum 1, Addition of OM4 Cabled Optical Fiber and array connectors
   k. ANSI/TIA-1183 (August 2012) Test Fixtures for Balun-Less Measurements of Balanced Components and Systems
   l. ANSI/TIA-1183-1 (January 2016) Test Fixtures for Balun-Less Measurements of Balanced Components and Systems, Addendum 1 – Extending Frequency Capabilities to 2 GHz.
   m. ANSI/TIA-568-C.4 (July 2011) Broadband Coaxial Cabling Components Standard
   n. ANSI/TIA-942-A (August 2012) Telecommunications Infrastructure Standard for Data Centers
   o. ANSI/TIA-942-A-1 (March 2013) Telecommunications Infrastructure Standard for Data Centers, Addendum 1 - Cabling Guidelines for Data Center Fabrics
   p. TIA-569-D (April 2015) Telecommunications Pathways and Spaces
   q. TIA-569-D-1 (October 2016) Telecommunications Pathways and Spaces Addendum 1- Revised Temperature and Humidity Requirements for Telecommunications Spaces
   r. ANSI/TIA-606-B (December 2015) Administration Standard for Telecommunications Infrastructure
   s. TIA-607-B (November 2015) Generic Telecommunications Grounding (Earthing) and Bonding for Customer Premises
   t. TIA-607-B-1 (January 2017) Generic Telecommunications Grounding (Earthing) and Bonding for Customer Premises - External Grounding Addendum

u. TIA-758-B (April 2012) Customer-Owned Outside Plant Telecommunication Infrastructure Standard
v. TIA-1152 (November 2016) Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling
w. ANSI/TIA-862-B (February 2016) Structured Cabling Infrastructure Standard for Intelligent Building Systems.
x. TIA-570-C (August 2012) Residential Telecommunications Infrastructure Standard
y. TIA-1005-A (June 2012) Industrial Telecommunications Infrastructure Standard for Manufacturing, Process & Refining
z. ANSI/TIA-1005 (January 2015) Telecommunications Infrastructure Standard for Industrial Premises
aa. TIA-1005-1 (May 2012) Telecommunications Infrastructure Standard for Industrial Premises; Addendum 1 - Industrial Pathways and Spaces
bb. TIA-1179 (July 2010) Healthcare Facility Telecommunications Infrastructure Standard.

2. ISO/IEC
   a. ISO 11801 (November 2010) - Generic Cabling for Customer Premises
   b. ISO/IEC TR 14763-2-1:2012 - Information technology -- Implementation and operation of customer premises cabling -- Part 2-1: Planning and installation - Identifiers within administration system.
3. National Electric Codes
   a. National Electrical Code (2017)
   b. ANSI/NFPA 70-2017, National Electrical Code© (NEC©)
   c. ANSI/IEEE C2-207, National Electrical Safety Code®
   d. National Electrical Code (NEC) (NFPA 70)
4. OSHA Standards and Regulations – all applicable
5. Local Codes and Standards – all applicable
6. BICSI
   a. Telecommunications Distribution Methods Manual, 13th Edition
   b. BICSI 004-2012, Information Technology Systems Design and Implementation Best Practices for Healthcare Institutions and Facilities
   c. Information Technology Systems Installation Methods Manual (ITSIMM), 6th Edition
   d. ANSI/BICSI 002-2014, Data Center Design and Implementation Best Practices
   e. Network Systems and Commissioning (NSC) reference, 1st Edition
   f. ANSI/NECA/BICSI 568-2006, Standard for Installing Commercial Building Telecommunications Cabling
   g. NECA/BICSI 607-2011, Standard for Telecommunications Bonding and Grounding Planning and Installation Methods for Commercial Buildings
   h. ANSI/BICSI 001-2009, Information Transport Systems Design Standard for K-12 Educational Institutions
   i. AV Design Reference Manual, 1st Edition
   j. Network Design Reference Manual, 7th Edition
   k. Outside Plant Design Reference Manual, 5th Edition
   l. Wireless Design Reference Manual, 3rd Edition
   m. Electronic Safety and Security Design Reference Manual, 3rd Edition.
7. Anywhere cabling Standards conflict with electrical or safety Codes, Contractor shall defer to NEC and any applicable local codes or ordinances, or default to the most stringent requirements listed by either.

8. Knowledge and execution of applicable codes is the sole responsibility of the Sub-contractor.
9. Any code violations committed at the time of installation shall be remedied at the Sub-contractor's expense.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Install and coordinate the telecommunications cabling work in cooperation with other trades installing interrelated work. Before installation, make proper provisions to avoid interference in a manner accepted by the architect. Any repairs or changes made necessary in the contract work, caused by the sub-contractor's neglect, shall be made by the sub-contractor at their own expense.

B. Scheduling:
1. Contract Documents and the overall construction schedule must be carefully reviewed to determine all required interfacing and timing of the work. All such documents shall be available through the General Contractor or Construction Manager.

1.06 ACTION SUBMITTALS

A. Product Data: For each product indicated.
1. Submit all product data in accordance with general requirements of the construction documents.
2. Submit product cut sheets and a detailed list of components a minimum of two (2) weeks prior to commencement of Division-27 work for A/E review and action.
3. Alternate and "Or Equal" designated products must be submitted for review and judgment to the A/E prior to installation. The sub-contractor-proposed alternate products or components must be verified by two (2) independent sources within the past 6 months. This request shall include the two (2) independent sources, the original Product's specification sheet, the proposed substitute product cut sheet, and a written request to review the substitute product.
4. Any request of an alternate or substitution must be submitted to the A/E for action no later than fourteen (14) calendar days after release of the original telecommunications bid documents.

1.07 INFORMATIONAL SUBMITTALS

A. Coordination Drawings:
1. Submit all shop drawings in accordance with the general requirements of the construction documents.
2. Submit shop drawings a minimum of two (2) weeks prior to commencement of Division-27 work for A/E review and action.
3. Shop drawings shall include evidence of grounding and bonding components are coordinated with field conditions and the work of other trades.
4. This submittal may have a written component and a visual, drawn component for review and action by the A/E prior to installation.

B. Certificates:
1. Submit management and installation team reference documentation verifying:

a. The project manager is a RCDD in good standing with BICSI and is qualified to manage the scope of work described in the contract documents and has five (5) years of experience managing similar projects in size and scope. The documentation shall include the RCDD registration number.
b. The field supervisor is a BICSI trained technician that is qualified to perform and oversee the work described in the contract documents

C. Qualification Statements:
1. The sub-contractor shall submit documentation that within the past 12 months, a minimum of 75% of all installation personnel have been trained or certified by the manufacturer of the products they are installing.

1.08 CLOSEOUT SUBMITTALS

A. As-Built Drawings:
1. Submit all as-built drawings in accordance with the general requirements of the construction documents.
2. Submit as-built drawings a minimum of two (2) weeks after completion of all Division- 27 work for A/E and Owner reference:

1.09 QUALITY ASSURANCE

A. Qualifications – Manufacturer
1. Component manufactures shall be ISO 9001:2000 and offer products that are RoHS compliant.

B. Qualifications – Installer:
1. At a minimum, seventy-five percent (75%) of the onsite sub-contractor provided field technicians shall be factory certified within 12 months by the manufacturer of the selected telecommunications system components being installed. Proof of certification shall be available on site for review at all times for each field technician.

PART 2 - PRODUCTS

2.01 COPPER UTP CONNECTORS

A. Basis-of-Design Product: Subject to compliance with requirements:
1. Leviton: Category UTP Category 6A Connectors.

B. Product Options:
1. The manufacturers noted above shall be the only manufacturers acceptable to the Owner and A/E.

C. Description:
1. All UTP connectors shall be rated to perform at or above current TIA/EIA performance parameters of the UTP cabling it is terminating within the communications system.
2. All UTP connectors shall have an eight (8) position, eight (8)-conductor module that accepts RJ-45 plugs.
3. When utilized as part of a channel or permanent link, all high performance

modular outlet connectors shall not decrease the horizontal cable elevated performance transmission requirements before and after installation as specified in ANSI/TIA/EIA 568-C Commercial Building Telecommunications Cabling Standard (horizontal cable section) in all noted performance parameters.

D. Accessory Products:
1. Provide any accessory products related to the UTP connectors required to provide a complete and functional infrastructure system.
2. Port RJ-45 jack block out device to safely secure access to unused ports and deter vandalism to jacks.
3. Provide complete with all required mounting hardware and fittings and cables needed.

2.02 SINGLE MODE OPTICAL FIBER PIGTAIL CONNECTORS ASSEMBLIES

A. Manufacturer List:
1. AFL

B. Product Options:
1. The manufacturers noted above shall be the only manufacturers acceptable to the Owner and A/E.

C. Description:
1. Singlemode Optical fiber pigtail connector assemblies housed in manufacturers connector panels.
2. AFL FUSEConnect Splice On Connector is acceptable.
3. Duplex LC style connectors.
4. Maximum insertion loss across mated pair shall be less than 0.3 dB, tested per FOTP-171 Method A. Typical Insertion loss should be maximum of 0.15 dB. Minimum return loss shall be less than 60.5 dB, tested per FOTP-171. Typical return loss should be 60 dB.
5. Pigtails shall have minimum 2 meters of attached cordage.
6. Pigtails shall be assembled and tested by the connector manufacturer.

D. Accessory Products:
1. Provide any accessory products and tool kits related to the termination of the optical fiber connectors to provide a complete and functional infrastructure system.

2.03 OUTLET HOUSING COMPONENTS

A. Manufacturer List:
1. Leviton
   a. Cat6A Connectors Atlas-X1
      1) Part Number 6AUJK-RL6 (L=Blue)
   b. Wall Plates 4-Port Angled Single Gang
      1) Part Number 42081-4Xs (x-Color)

B. Product Options:
1. The manufacturers noted above shall be the only manufacturers acceptable to the Owner and A/E.

C. Description:
1. All outlet housings at the various technology outlet locations shall provide the designated number modular insert ports as indicated in the drawings.
2. All flush-mounted faceplates shall be provided per the port configurations shown on the telecom drawings.
3. Faceplates for wall-mounted phones shall be one (1) port single gang faceplates that have wall-mount lugs allowing vertical phone mounting.
4. Faceplates for flush floor mounted outlets shall be coordinated with the floor box or poke thru device that will be selected and installed outside the scope of this section.
5. System furniture faceplates shall be capable of fitting in the furniture system selected by the Owner. Furniture faceplates shall be provided per the port configurations shown on the telecom drawings. Furniture faceplate extenders shall be used (if required) to maintain proper bend radii within the furniture raceway/pathway.
6. Surface mounted boxes shall be capable of the quantity of outlet jack requirements at each outlet locations indicted in the drawings.
7. All outlet-housings shall provide a clear TIA/EIA 606-A labeling location for both the individual outlet port and the entire outlet housing location, unless otherwise indicated in the project drawings.

D. Accessory Products:
1. Provide any accessory products related to the workstation outlet housing components required to provide a complete and functional infrastructure system.

PART 3 - EXECUTIONEXAMINATION

A. Check actual site conditions prior to start of any work. Ensure all preceding trade work associated with the telecommunications system is accurate and complete before proceeding with installation or use of products specified in this section. Examples of work which must be checked include, but are not limited to:
1. Electrical requirements (conduit installation and capacity)
2. The telecommunications rooms are the size shown on the project drawings.
3. Adequate clearances of doors, riser spaces and ceilings for all component of the telecommunications system.
4. Examine and compare the telecommunications drawings and specifications with the drawings and specifications of other trades. Report any discrepancies between them to the A/E and obtain written instructions for changes or revisions.

3.02 INSTALLATION

A. Process:
1. Install all connectors and couplers under the guidelines of the manufacturers' recommended instructions and per all TIA/EIA 568C standards, BICSI guidelines, and manufacturer approved industry practices.
2. The installation and performance parameters of all installed couplers and connectors shall be verified by the trade sub-contractor through TIA/EIA 568C testing procedures.
3. Color of all outlet housing components shall be coordinated with the Owner before purchase and installation.
4. All technology outlets located on walls shall be flush mounted, level and plumb.

5. All technology outlets shall be mounted at right angles and parallel to the floor, unless installation requirements or design dictate otherwise.
6. Install blank inserts in outlet housing spaces that are not being filled with cable termination modules. Blank inserts shall match the workstation housing color, unless otherwise indicated in the drawings.
7. All outlets located in systems furniture may be served from a wall adjacent to the furniture cluster or a floor box. If the cable is exposed prior to entering furniture raceway, install spiral wrap tubing to protect the cable per the manufacturer's recommendations.
8. All outlet housings as well as each individual utilized port must be labeled in accordance with the Owner-approved labeling scheme.

3.03 RE-INSTALLATION

A. No additional burden to the owner regarding costs, network down-time, and end user interruption shall result from the re-installation of specified components. Scheduling for re- installation work shall be coordinated, in writing, with the owner prior to beginning any re- installation work

3.04 CLOSEOUT ACTIVITIES

A. Sub-contractor shall provide documentation of all telecommunications system components under this section utilized throughout the site for review and reference by the Owner and A/E team.

B. Sub-contractor to submit all as-built drawings and any test documentation required prior to acceptance by the Owner

END OF SECTION

SECTION 27 16 19

COMMUNICATION PATCH CORDS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Provides specifications for Category 6 and optical fiber horizontal cable patching to distribute network signals.
   2. Copper Category 6A Patch Cords.
   3. Optical Fiber Patch Cords.

1.02 RELATED DOCUMENTS

A. All divisions of the specification and general provisions of the Construction Documents.

B. Architectural, mechanical, electrical, and all technology drawings.

1.03 REFERENCES

A. Abbreviations and Acronyms:

1.	ANSI:	American National Standards Institute
2.	A/E:	Architect / Engineer (designer)
3.	BICSI:	Building Industry Consulting Service International
4.	EIA:	Electronics Industry Alliance
5.	IDF:	Intermediate Distribution Facility
6.	LOMMF:	Laser Optimized Multi-Mode Fiber
7.	MDF	Main Distribution Facility
8.	NEXT:	Near End Cross Talk
9.	RCDD:	Registered Communications Distribution Designer
10.	SMF:	Single-Mode Fiber
11.	TCIM:	Telecommunication Cabling Installation Manual
12.	TDMM:	Telecommunications Distribution Methods Manual
13.	TIA:	Telecommunications Industry Association

B. Codes and Regulations: (Note: Reference Division One for specific code versions governing the work in addition to the information noted below.)
   1. National Electric Safety Code (NESC) – 2017
   2. National Fire Protection Association (NFPA)
   3. 2016 California Electrical Code
   4. 2016 California Building Code
   5. Local Municipal Codes

1.04 APPLICABLE REGULATORY REFERENCES

A. Sub-contractor is responsible for knowledge and application of current versions of all applicable Standards and Codes. In cases where listed Standards and Codes have

been updated, Sub-contractor shall adhere to the most recent revisions, including all relevant changes or addenda at the time of installation.

1. ANSI/TIA:
   a. TIA-526-7 (OFSTP-7) (July 2015) Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant
   b. TIA-526-14-B (April 2015) (OFSTP-14) Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant
   c. ANSI/TIA/EIA-598-C (July 2014) Optical Fiber Cable Color Coding
   d. ANSI/TIA-568-C.0 (December 2015) Generic Telecommunications Cabling for Customer Premises
   e. TIA-568-C.0-1 (September 2012) Generic Telecommunications Cabling for Customer Premises-Addendum 1, Updated Reference for Balanced Twisted-Pair Cabling
   f. ANSI/TIA-568-C.1 (February 2012) Commercial Building Telecommunications Cabling Standards
   g. TIA-568-C.1-2 (November 2014) Commercial Building Telecommunications Cabling Standard, Addendum 2 General Updates
   h. ANSI/TIA-568-C.2 (June 2016) Balanced Twisted Pair Communications Cabling and Components Standards
   i. ANSI/TIA-568-C.3 (June 2011) Optical Fiber Cabling Components Standard
   j. ANSI/TIA-568-C.3-1 (December 2011) Optical Fiber Cabling Component Standard- Addendum 1, Addition of OM4 Cabled Optical Fiber and array connectors
   k. ANSI/TIA-1183 (August 2012) Test Fixtures for Balun-Less Measurements of Balanced Components and Systems
   l. ANSI/TIA-1183-1 (January 2016) Test Fixtures for Balun-Less Measurements of Balanced Components and Systems, Addendum 1 – Extending Frequency Capabilities to 2 GHz.
   m. ANSI/TIA-568-C.4 (July 2011) Broadband Coaxial Cabling Components Standard
   n. ANSI/TIA-942-A (August 2012) Telecommunications Infrastructure Standard for Data Centers
   o. ANSI/TIA-942-A-1 (March 2013) Telecommunications Infrastructure Standard for Data Centers, Addendum 1 - Cabling Guidelines for Data Center Fabrics
   p. TIA-569-D (April 2015) Telecommunications Pathways and Spaces
   q. TIA-569-D-1 (October 2016) Telecommunications Pathways and Spaces Addendum 1- Revised Temperature and Humidity Requirements for Telecommunications Spaces
   r. ANSI/TIA-606-B (December 2015) Administration Standard for Telecommunications Infrastructure
   s. TIA-607-B (November 2015) Generic Telecommunications Grounding (Earthing) and Bonding for Customer Premises
   t. TIA-607-B-1 (January 2017) Generic Telecommunications Grounding (Earthing) and Bonding for Customer Premises - External Grounding Addendum
   u. TIA-758-B (April 2012) Customer-Owned Outside Plant Telecommunication Infrastructure Standard
   v. TIA-1152 (November 2016) Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling

w. ANSI/TIA-862-B (February 2016) Structured Cabling Infrastructure Standard for Intelligent Building Systems.
x. TIA-570-C (August 2012) Residential Telecommunications Infrastructure Standard
y. TIA-1005-A (June 2012) Industrial Telecommunications Infrastructure Standard for Manufacturing, Process & Refining
z. ANSI/TIA-1005 (January 2015) Telecommunications Infrastructure Standard for Industrial Premises
aa. TIA-1005-1 (May 2012) Telecommunications Infrastructure Standard for Industrial Premises; Addendum 1 - Industrial Pathways and Spaces
bb. TIA-1179 (July 2010) Healthcare Facility Telecommunications Infrastructure Standard.

2. ISO/IEC
   a. ISO 11801 (November 2010) - Generic Cabling for Customer Premises
   b. ISO/IEC TR 14763-2-1:2012 - Information technology -- Implementation and operation of customer premises cabling -- Part 2-1: Planning and installation - Identifiers within administration system.
3. National Electric Codes
   a. National Electrical Safety Code (2017)
   b. ANSI/NFPA 70-2017, National Electrical Code© (NEC©)
   c. ANSI/IEEE C2-207, National Electrical Safety Code®
   d. National Electrical Code (NEC) (NFPA 70)
4. OSHA Standards and Regulations – all applicable
5. Local Codes and Standards – all applicable
6. BICSI
   a. Telecommunications Distribution Methods Manual, 13th Edition
   b. BICSI 004-2012, Information Technology Systems Design and Implementation Best Practices for Healthcare Institutions and Facilities
   c. Information Technology Systems Installation Methods Manual (ITSIMM), 6th Edition
   d. ANSI/BICSI 002-2014, Data Center Design and Implementation Best Practices
   e. Network Systems and Commissioning (NSC) reference, 1st Edition
   f. ANSI/NECA/BICSI 568-2006, Standard for Installing Commercial Building Telecommunications Cabling
   g. NECA/BICSI 607-2011, Standard for Telecommunications Bonding and Grounding Planning and Installation Methods for Commercial Buildings
   h. ANSI/BICSI 001-2009, Information Transport Systems Design Standard for K-12 Educational Institutions
   i. AV Design Reference Manual, 1st Edition
   j. Network Design Reference Manual, 7th Edition
   k. Outside Plant Design Reference Manual, 5th Edition
   l. Wireless Design Reference Manual, 3rd Edition
   m. Electronic Safety and Security Design Reference Manual, 3rd Edition.
7. Anywhere cabling Standards conflict with electrical or safety Codes, Sub-contractor shall defer to NEC and any applicable local codes or ordinances, or default to the most stringent requirements listed by either.
8. Knowledge and execution of applicable codes is the sole responsibility of the Sub-contractor.
9. Any code violations committed at the time of installation shall be remedied at the Sub-contractor's expense.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Install and coordinate the telecommunications cabling work in cooperation with other trades installing interrelated work. Before installation, make proper provisions to avoid interference in a manner accepted by the architect. Any repairs or changes made necessary in the contract work, caused by the sub-contractor's neglect, shall be made by the sub-contractor at their own expense.

B. Scheduling:
   1. Contract Documents and the overall construction schedule must be carefully reviewed to determine all required interfacing and timing of the work. All such documents shall be available through the General Contractor or Construction Manager.

1.06 ACTION SUBMITTALS

A. Product Data: For each product indicated.
   1. Submit all product data in accordance with general requirements of the construction documents.
   2. Submit product cut sheets and a detailed list of components a minimum of six (2) weeks prior to commencement of Division-27 work for A/E review and action.
   3. Alternate and "Or Equal" designated products must be submitted for review and judgment to the A/E prior to installation. The sub-contractor-proposed alternate products or components must be verified by two (2) independent sources within the past 6 months. This request shall include the two (2) independent sources, the original Product's specification sheet, the proposed substitute product cut sheet, and a written request to review the substitute product.
   4. Any request of an alternate or substitution must be submitted to the A/E for action no later than fourteen (14) calendar days after release of the original telecommunications bid documents.

B. Samples:

1.07 INFORMATIONAL SUBMITTALS

A. Coordination Drawings:
   1. Submit all shop drawings in accordance with the general requirements of the construction documents.
   2. Submit shop drawings a minimum of six (2) weeks prior to commencement of Division-27 work for A/E review and action.
   3. Shop drawings shall include evidence of grounding and bonding components are coordinated with field conditions and the work of other trades.
   4. This submittal may have a written component and a visual, drawn component for review and action by the A/E prior to installation.

B. Certificates:
   1. Submit management and installation team reference documentation verifying:
      a. The project manager is a RCDD in good standing with BICSI and is qualified to manage the scope of work described in the contract documents

and has five (5) years of experience managing similar projects in size and scope. The documentation shall include the RCDD registration number.

b. The field supervisor is a BICSI trained technician that is qualified to perform and oversee the work described in the contract documents

C. Qualification Statements:

1. The sub-contractor shall submit documentation that within the past 12 months, a minimum of 75% of all installation personnel have been trained or certified by the manufacturer of the products they are installing.

1.08 CLOSEOUT SUBMITTALS

A. As-Built Drawings:

1. Submit all as-built drawings in accordance with the general requirements of the construction documents.
2. Submit as-built drawings a minimum of two (2) weeks after completion of all Division- 27 work for A/E and Owner reference:

1.09 QUALITY ASSURANCE

A. Qualifications – Manufacturer

1. Component manufactures shall be ISO 9001:2000 and offer products that are RoHS compliant.

B. Qualifications – Installer:

1. At a minimum, seventy-five percent (75%) of the onsite sub-contractor provided field technicians shall be factory certified within 12 months by the manufacturer of the selected telecommunications system components being installed. Proof of certification shall be available on site for review at all times for each field technician.

PART 2 - PRODUCTS

2.01 COPPER UTP PATCH CORDS

A. Basis-of-Design Product: Subject to compliance with requirements:

1. Leviton:
   a. TR Patch Cords - Atlas-X1 Cat6A Slimline Black
      1) Part Number 6AS10-05E (5') (E=Black)
      2) Part Number 6AS10-07E (7') (E=Black)
   b. Station Patch Cords - Atlas-X1 Cat6A Slimline Blue
      1) Part Number 6AS10-xxL (xx=3,5,7,10,15,20 Feet) (L=Black)

B. Product Options:

1. The indicated manufacturers shall be the basis of the design and each assembly selected shall address the particular infrastructure requirements.

C. Description:

1. Category UTP Copper patch cords for equipment patching (RJ-45 to RJ-45 Cords): Modular RJ45 male plug connector's equipped with (8) eight gold anodized pins shall be factory terminated at each end of the patch cords.

Modular plug connectors will be snag free in design or will utilize a molded plastic boot to cover the modular plug tab. Category 6A UTP cords shall be 26 AWG.

2. All patch cords shall conform to the requirements of the EIA/TIA 568C.2 standard performance parameters and shall also guarantee headroom margin above the minimum EIA/TIA 568C standard NEXT and PSNEXT requirements; and shall provide positive ACR to 5000 MHz-km as part of the connectivity system.
3. All copper UTP patch cords shall have stranded conductors that match the EIA/TIA 568-C performance characteristics of the category cable specified.
4. Patch cord performance levels shall be equal to or greater than the performance level of the installed UTP cabling system.
5. All copper patch cord lengths for patching inside the telecom rooms are to be provided appropriate to patching from network equipment ports to the copper patch panels ports within the Data Center and IDF.

D. Accessory Products:
1. Provide any accessory products related to the UTP connectors required to provide a complete and functional infrastructure system.
2. Port RJ-45 patch cord lock-in device to safely secure access to patched cords and deter accidental removal to network connection.
3. Provide complete with all required mounting hardware and fittings and cables needed.

2.02 OPTICAL FIBER PATCH CORDS

A. Basis-of-Design Product: Subject to compliance with requirements:
1. AFL/Dura-Line

B. Product Options:
1. The indicated manufacturers shall be the basis of the design and each assembly selected shall address the particular infrastructure requirements.

C. Description:
1. All optical fiber patch cords shall conform to the requirements of the EIA/TIA 568C.3- 1 standard performance parameters for the multimode or single-mode optical fiber and shall have the same manufacturer, cable type, connector and polish as noted for the backbone fiber.
2. All optical patch cords shall have push-pull strain relief boot and duplex clip.
3. All optical fiber patch cord lengths are to be provided appropriate to patching from network equipment ports to the optical fiber patch panels ports within the MDF and IDF.
4. It is the responsibility of the Sub-contractor to verify lengths and counts of optical fiber patch cords with the owner prior to purchase.
5. All single-mode patch cord colors are to be industry standard yellow and provided in a duplex configuration.
6. All multi-mode patch cord colors are to be industry standard aqua and provided in a duplex configuration.
7. Any optical fiber patch cords purchased without written authorization by the Owner are purchased at the sub-contractors own risk.

D. Accessory Products:

1. Provide any accessory products related to the optical fiber connectors required to provide a complete and functional infrastructure system.

PART 3 - EXECUTIONEXAMINATION

A. Check actual site conditions prior to start of any work. Ensure all preceding trade work associated with the telecommunications system is accurate and complete before proceeding with installation or use of products specified in this section. Examples of work which must be checked include, but are not limited to:
   1. Electrical requirements (conduit installation and capacity)
   2. The telecommunications rooms are the size shown on the project drawings.
   3. Adequate clearances of doors, riser spaces and ceilings for all component of the telecommunications system.
   4. Examine and compare the telecommunications drawings and specifications with the drawings and specifications of other trades. Report any discrepancies between them to the A/E and obtain written instructions for changes or revisions.

3.02 INSTALLATION

A. Process:
   1. Install all horizontal cable per the manufacturer's recommended installation instructions, under the guidelines of TIA/EIA 568 C and BICSI.
   2. Category 6A equipment Patch cords: Provide (2) copper patch cords (one for each end of the cable termination) for every Category cable installed.
   3. Fiber Optic equipment Patch cords: Provide (2) fiber optic LC duplex patch cords (one for each end of fiber termination) for every pair of fiber strands installed.
   4. All patch cord lengths are to be provided appropriate to patch from rack mounted network equipment ports to the rack mounted horizontal station outlet patch panel ports within the Data Center/IDF and from the workstation outlet to the computer/or other IP end device NIC card/RJ45 port.
   5. Provide new, sealed patch cords in lengths, colors and counts approved in writing by the owner.
   6. It will be the responsibility of the communication sub-contractor to provide install all Category 6A and Fiber patch cords per direction and coordination of owner IT dept.

3.03 RE-INSTALLATION

A. No additional burden to the owner regarding costs, network down-time, and end user interruption shall result from the re-installation of specified components. Scheduling for re- installation work shall be coordinated, in writing, with the owner prior to beginning any re- installation work.

3.04 CLOSEOUT ACTIVITIES

A. Sub-contractor shall provide documentation of all telecommunications system components under this section utilized throughout the site for review and reference by the Owner and A/E team.

B. Sub-contractor to submit all as-built drawings and any test documentation required prior to acceptance by the Owner.

END OF SECTION

SECTION 28 20 00

VIDEO SURVEILLANCE SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included:
1. Under this Section, the Contractor is to provide Video Surveillance System, including procuring, installing, and rendering fully operational all necessary surveillance system components required for a complete and workable installation which meets or exceeds the project performance specifications.
2. Equipment to be provided and installed includes, but is not limited to:
   a. Fixed Pole Mount Mini-dome Type Megapixel Cameras
   b. Fixed Pole Mount ALPR Cameras
   c. Power and Data Cabling, Conduit, and Infrastructure to be provided, installed and terminated by the communications contractor
3. The work includes providing all labor, materials, tools, equipment, and documentation required for a complete and working surveillance system as specified in this document, unless some portion is specifically noted otherwise.

B. Related Work Provided by Owner:
1. The Contractor shall coordinate the work with the related work provided by the Owner including but not limited to the following:
   a. Network from local patch panel / switch serving as termination point for the cameras back to the VMS server
   b. All cabling, cabling terminations, and conduit/boxes/fittings

C. Abbreviations and Acronyms
1. ACS = Access Control System
2. ALPR = Automatic License Plate Reader
3. CCD = Charge Coupled Device
4. CMOS = Complimentary Metal-Oxide Semi-Conductor
5. CPU = Central Processing Unit
6. DSP = Digital Signal Processor
7. DVD = Digital Video Disc
8. DVRMS = Digital Video Recording and Management System
9. GB = Gigabyte
10. GUI = Graphical User Interface
11. HDD = Hard Disk Drive
12. IR = Infrared
13. IPS = Images per Second
14. JPEG = Joint Photographic Experts Group
15. MB = Megabyte
16. MPEG = Moving Pictures Experts Group
17. NAS = Network Attached Storage
18. LAN = Local Area Network
19. LED = Light Emitting Diode
20. RAID = Redundant Array of Independent Disks

21. RAM = Random Access Memory
22. TCP/IP = Transport Control Protocol / Internet Protocol
23. UPS = Uninterruptable Power Supply
24. POE = Power Over Ethernet
25. PVT = Performance Verification Testing
26. V-LAN = Virtual Local Area Network
27. VMS = See DVRMS
28. VSS = Video Surveillance System
29. WAN = Wide Area Network
30. WDR = Wide Dynamic Range

D. Definitions
1. Surveillance System – IP-based electronic system which provides visual surveillance and recording of selected areas.

1.02 RELATED DOCUMENTS

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

B. The Specifications and Drawings are intended to be complementary. A specific section, paragraph or heading in a Division may not describe all details concerning work to be done and materials to be furnished. The Drawings are diagrammatic and may not show all of the work required or all construction details. Dimensions are shown for critical areas only; all dimensions and actual placements are to be verified in the field. It is to be understood that the best trade practices of the Division will prevail. It remains the responsibility of the Contractor or Subcontractor to provide all items, equipment, construction, and services required to the proper execution and completion of the Work.

C. Reference listings are provided as a convenience to the Contractor or Subcontractor providing the Work of this Section and may not contain all the requirements affecting this Section. It remains the responsibility of the Contractor or Subcontractor to locate and comply with all requirements of the Contract Documents.

D. All related specification sections shall be used in conjunction with this section.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: The manufacturer of all equipment installed as a part of this contract shall meet the following criteria:
1. Shall be regularly engaged in the manufacture and assembly of similar type equipment for a minimum of five (5) continuous years preceding the date of this document.
2. Shall have an office staffed with factory trained technicians, fully capable of engineering, supervising installation, system start-up, providing Owner training and supervising of both hardware and software for the all systems installed as a part of this project.

B. Contractor Qualifications: The Contractor shall meet the following qualifications at a minimum:

1. Shall be an authorized factory trained and certified reseller of all system components installed or interfaced with as a part of this contract.
2. Contractor shall be regularly engaged in installing similar equipment, and shall have successfully completed 3 systems of a comparable size and scope within the preceding 3 years of the date of this document. These systems must be currently in operation, and the contractor shall supply the following reference information with their proposal:
   a. Name of Client
   b. Type of Facility
   c. System Installed
   d. Date of Substantial Completion
   e. Names of Contractor's Key Personnel on Project
   f. Contact Name, Title, Phone, and Email
3. It is expected by the Owner that the same key personnel will execute this project as completed the referenced work. This would include the Project Manager, the Project Engineer, and the Lead Installer. Resumes will be provided for these personnel. If different key personnel are executing this project than executed the reference projects, resumes for these personnel shall be provided for the Owner's approval with the Contractor's bid package.
4. Sub-contractors shall provide resumes showing qualification for the specific system that the sub-contractor will be installing / configuring.
5. In order to assure system cable plant is warrantied for 20-Years, Contractor shall be certified in the installation of BerkTek Cabling systems. Project installation staff shall be similarly and independently certified as required by the manufacturer..

1.04 SUBMITTALS

A. General:
   1. Prior to installing any material related to or required by this section, submit the following information for review.
      a. Block diagrams of the proposed system and interconnection wiring diagrams showing all connections required between system components.
      b. A materials list with names of manufacturers, model numbers, and technical information on all equipment proposed. Product technical information sheets for each principal component in the proposed system. Where the data sheet covers a range of material, the specific part number shall be highlighted
      c. 6 complete sets of operations and maintenance manual for the system products being supplied, provided in 3-ring binders, and 1 complete set submitted in electronic format on DVD. Include complete sets of the equipment operating instructions, installation instructions, and troubleshooting guides.

B. Testing:
   1. PVT Plan to be submitted a minimum of 20 working days prior to planned start of PVT procedure.

C. Close Out:
   1. Within 10 working days of substantial completion and prior to project closeout, the Contractor shall provide to the Owner a complete set of As-Built drawings, showing any deviation from the original plans and specifications, in mounting location, infrastructure pathway, or any other substantive change.

1.05 WARRANTY

A. General:
1. All equipment and system shall be warranted against defects in material and workmanship for a period of one (1) year from the date of startup. Warranty coverage shall include parts, labor, travel, expenses, and labor to remove/reinstall all products. The warranty document shall be submitted with the Contractor's submittals and shall include details on inclusions and exclusions, deductibles, and availability of extended coverage options, priced for extended coverage in years 2, 3, and 4 past expiration of the original warranty period.
2. Warranty service shall be separated into 2 classes of service, critical item service and non-critical item service.
3. Critical items shall be described as any part or device, included as a part of this contract which if fails would cause major parts of the system to be inoperable. Critical failures are to be corrected within 24 hours of notification to the Contractor, 7 days per week. Non-critical failures are to be corrected within 7 days of notification to the Contractor.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Video Surveillance System Equipment:
1. WV-SF481 Exterior Rated 4K Resolution Dome Camera as manufactured by Panasonic. This device is being installed as part of an expansion to an existing District system, and in order to assure compatibility as well as simplify maintenance procedures and spare parts procurement, camera shall be as specified with no equivalent.
2. PPM484S Wall/Pole Mount Assembly as manufactured by Panasonic. This device is being installed as part of an expansion to an existing District system, and in order to assure compatibility as well as simplify maintenance procedures and spare parts procurement, camera shall be as specified with no equivalent.
3. IZA500W ALPR Camera as manufactured by Inex. This device is being installed as part of an expansion to an existing District system, and in order to assure compatibility as well as simplify maintenance procedures and spare parts procurement, camera shall be as specified with no equivalent.
4. MNT-W3X-PMA Pole Mount Adapter Kit as manufactured by Inex. This device is being installed as part of an expansion to an existing District system, and in order to assure compatibility as well as simplify maintenance procedures and spare parts procurement, camera shall be as specified with no equivalent.
5. All servers, workstations, and storage hardware shall be provided by the Owner. All software shall be provided, installed, and configured by the Contractor.
6. Network Switch / Patch Panel at termination point shall be provided by the Owner.
7. All cabling and cabling terminations shall be provided by the communications contractor.

PART 3 - EXECUTION

3.01 General Intent – It is the intent of the owner to have a qualified contractor install a complete and fully operational Video Surveillance System, as shown on the project

drawings provides the ability to remotely view and record select areas of the campus as indicated on the project drawings.

3.02 The contractor shall procure, provide, install, and make fully operational the system as described in this specification and shown on the project drawings. Specific scope items include, but are not limited to:

A. Provision, installation, and configuration of surveillance system components as shown on project drawings

B. Provision and installation of surveillance system software (Owner to provide workstations and servers)

3.03 DELIVERY, STORAGE AND HANDLING:

A. Product Acceptance, Storage, and Handling Requirements
   1. Acceptance – Upon delivery to the project site, Contractor shall inspect all products and materials to assure that all products and material have been received in a new and undamaged state. Acceptance of the shipment, by the Contractor, shall constitute acknowledgement that the Contractor has reviewed the products and material and has found no discrepancies in quantity or condition, and that any products or materials subsequently found to be missing or damaged will be the sole responsibility of the Contractor.
   2. Storage and Handling - Store products and materials in the original manufacturer's sealed packaging, in an environmentally controlled area per the manufacturer's specifications.

B. Before Beginning Work
   1. Verification of Conditions – Security Contractor shall coordinate with Communications Contractor to assure all installed copper and fiber optic cabling being utilized as a part of the surveillance system is tested and completely operational and that cabling is free from interference, opens, grounds, or short circuits. Any unsatisfactory cabling shall be reported to the Owner.
   2. Proceed with installation only after all unsatisfactory issues have been corrected or resolved.

C. General Installation Requirements:
   1. Maintain strict site security throughout the course of the project. Rooms housing the equipment and workstations shall be locked up and secure during periods when Contractor personnel are not present.
   2. Utilize protective cover, fenders, and barriers to ensure all equipment remains in an undamaged and new condition until notice of substantial completion.
   3. Install system per the manufacturer's instructions.
   4. The installed system must meet all local, state, and federal codes.
   5. Contractor shall verify that all IDF outlets used for powering video surveillance system components are connected to the buildings emergency power UPS.
   6. Camera locations shown on drawings are preliminary in nature and Contractor shall verify final placement of all cameras with the Owner before any installation takes place.

D. Coordination

1. Contractor shall coordinate all work with any other trades present on the project which will be directly affected by the execution of this contract.
2. Contractor shall coordinate all work with the Owner as to avoid impacting any student activities or classes to the greatest extent possible.

E. Testing and Commissioning:
1. The Contractor shall be responsible for final system hardware installation, configuration and checkout prior to performance verification testing being conducted with the Owner.
2. The Contractor shall develop a Performance Verification Testing (PVT) plan. The PVT plan shall identify each new system component included in the project, the intent of testing it, methods and tools required for the testing, and expected result. Each component shall be individually listed with space for noting PASS or FAIL, Contractor / Owner Sign-off, time and date of test, and related comments. The PVT plan shall be submitted to the Owner a minimum of 20 (TWENTY) working days prior to the scheduled beginning of PVT. No testing shall take place until Owner has approved the PVT.
3. As a part of the final system commissioning, Contractor shall submit a listing of all enabled passwords within the system, and shall provide instruction specific to changing the password after the Contractor's departure from the site.
4. Following satisfactory completion of PVT plan, the system shall be operated at normal facility load for a period of 30 calendar days as a burn-in period. If any item or system fails during the burn-in period, the burn-in period shall be suspended until such item or system has been corrected, at which time the test period will recommence. Notice of final System Acceptance will be withheld until burn-in period has been successfully completed.
5. Notice of Final System Completion will not be issued until the following requirements have all been met:
   a. All required submittals accepted.
   b. Delivery of final documentation, including but not limited to As-Builts drawings.
   c. Successful PVT & burn-in period
   d. Completion of all required training activities.
   e. Purging of all Contractor passwords and removal of all Contractor access to the systems.

F. Training and Instruction:
1. Before the system is turned over to the owner, the manufacturer shall provide 16 hours of system operations and maintenance training at the project site using the customer's equipment for up to 10 of the owner's representatives. The Owner shall determine hours to be allocated to each training type.
2. This training shall be conducted during normal business hours of the equipment supplier at a date and time of mutual convenience.
3. This training shall be conducted by a manufacturer certified trainer.
4. Training materials shall not be generic, and shall be specific to the project.

G. Warranty:
1. The system shall be warrantied for a period of 1 year from date of acceptance. Written notification shall be sent to the owner stating the date this warranty period has started.

2. The equipment manufacturer shall provide with their bid package to the owner a maintenance contract proposal to provide a minimum of two inspections and preventative tests per year.
3. The Contractor shall provide with their bid package to the Owner a proposal for an extended parts and labor warranty service, priced for the 1st, 2nd, and 3rd years of post-warranty period operation.

H. Site Clean-up
1. Upon completion of the contract, Contractor shall be responsible for project site cleanup. All installed materials shall be clean, enclosures free of dust and debris, and surfaces wiped free of smudges and fingerprints. The Contractor shall remove all project associated debris and rubbish occasioned by the work from the site. The contractor shall clean all interior spaces dirtied by the work. Remove all temporary protective covers and shrouds from all equipment.

END OF SECTION

2. The equipment manufacturer shall provide with their bid package to the owner a maintenance contract proposal to provide a minimum of two inspections and preventative tests per year.
3. The Contractor shall provide with their bid package to the Owner a proposal for an extended parts and labor warranty service, priced for the 1st, 2nd, and 3rd years of post-warranty period operation.

H. Site Clean-up
1. Upon completion of the contract, Contractor shall be responsible for project site cleanup. All installed materials shall be clean, enclosures free of dust and debris, and surfaces wiped free of smudges and fingerprints. The Contractor shall remove all project associated debris and rubbish occasioned by the work from the site. The contractor shall clean all interior spaces dirtied by the work. Remove all temporary protective covers and shrouds from all equipment.

END OF SECTION

SECTION 31 10 00

SITE CLEARING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Remove surface debris.

B. Remove paving, curbs, foundations and surface improvements.

C. Clear site of plant life and grass.

D. Remove trees and shrubs.

E. Remove root system of trees and shrubs.

F. Temporary Erosion and Sedimentation Control

G. Post Construction Stormwater Management.

H. Related Section
   1. Section 01 35 43, Special Environmental Requirements.

1.02 SUBMITTALS

A. Photographs or videotape, sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.

1.03 REGULATORY REQUIREMENTS

A. Conform to applicable codes for disposal of debris. Burning debris on site not permitted.

B. Coordinate clearing work with utility companies.

C. No site clearing may take place without required Biological, Cultural and Paleological monitors notified and present if required.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

A. Satisfactory Soil Materials: Requirements for satisfactory soil materials are specified in Division 31 Section "Earthwork."
   1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.

B. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of subsoil and weeds, roots, toxic materials, or other non-soil materials.

PART 3 - EXECUTION

3.01 PREPARATION

A. Verify that existing plant life and features designated to remain are tagged or identified.

3.02 PROTECTION

A. Protect utilities that are designated to remain from damage.

B. Protect trees, plant growth and features designated to remain as final landscaping.

C. Protect bench marks and designated existing structures from damage or displacement.

D. Erect barricades in accordance with Title 8, Subchapter 4, Construction Safety Orders, California Code of Regulations.

E. Protect existing items not indicated to be altered.

3.03 CLEARING

A. Clear areas required for access to site and execution of Work.

B. Remove paving, curbs, foundations and surface improvements. Patch and repair surfaces not indicated to be removed.

C. Remove trees and shrubs indicated. Remove stumps, main root ball, root system to full depth.

D. Grind stumps and remove roots, obstructions, and debris extending to a depth of 18 inches below exposed subgrade.

E. Clear undergrowth, grass and deadwood. Protect plant material not scheduled for removal.

F. Keep site free of dust by sprinkling with water. Maintain adequate water trucks, hoses and water supply.

G. The limits of clearing and grubbing shall be the area of new construction

H. Remove all trash, rubbish and all other material not suitable for construction operations.

I. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.

J. Use only hand methods for grubbing within tree protection zone.

K. Chip removed tree branches and [stockpile in areas approved by Owner dispose of off-site.

L. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
   1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground or compact to 90 percent of maximum dry density per ASTM D1557. Bring grade to match surrounding surfaces.

3.04 REMOVAL

A. Remove debris, rock and extracted plant life from site as work progresses. Dispose legally.

B. Burial of removed materials not permitted.

C. Use of Owner's disposal system not permitted. Do not use disposal system belonging to any other property Owner.

D. Loose fill material, buried trash, abandoned underground structures or deleterious materials of any kind encountered shall be identified and removed to expose natural earth.

END OF SECTION

SECTION 31 22 00.10

EARTHWORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Earth preparation outside building areas.

1.02 REFERENCE STANDARDS

A. Conform to reference standards by date of issue current on date of Contract Documents.

B. California Code of Regulations, Title 8, Industrial Relations, Construction Safety Orders, Division 1, Chapter 4, Subchapter 4, Article 6 Excavations.

C. 2016 California Building Code Chapter 18 "Soils and Foundation"

D. Cal-OSHA: California Occupational Safety and Health Act, Title 8, Division 1, Chapter 3.2.

E. ASTM D 1557 Laboratory compaction characteristics of soil using modified effort.

1.03 SUBMITTALS

A. Compaction Report indicating requirements per ASTM D1556.

B.

1.04 GENERAL REQUIREMENTS

A. Existing Conditions: Contractor shall examine site of Work and verify existing conditions under which work will be performed, including subsurface conditions.

B. Repair or replace property damaged by Work of this Section immediately.

C. Drainage and Pumping: Maintain excavations and site free from water throughout work. Run surface water or seepage to sumps with float-switch controlled pumps. Pump to temporary desilting basins.

D. Protection: Provide and maintain protection to retain earth banks and protect adjoining existing monuments, grades and structures from caving, sliding, erosions or other damage and suitable forms of protection against bodily injury or property damage.

E. Bulkheads and shoring shall conform to Occupational Safety and Health Act Construction Safety Orders, Title 8, Industrial Relations, California Code of Regulations.

F. Provide barricades and berms at top of slopes to prevent water from flowing over top.

G. Geotechnical Investigation Report has been prepared under direction of Owner. Geotechnical Investigation Report is hereby referenced as information for Work of this Section. Architect assumes no responsibility for conclusions Contractor may draw from information provided. Contract Documents take precedence over recommendations that may be contained in the Investigation Report and Contractor must obtain approval for deviations from Contract Documents. Copy of Geotechnical Investigation Report is available at Architect's office.

H. Borrow. Fill, backfill, aggregate base, and other soil materials obtained from off-site sources shall be sampled and tested in compliance with California EPA Department of Toxic Substances Control recommendations to prevent the importation of contaminated materials to the Site.
   1. Testing Frequency
      a. For borrow up to 1,000-cu.yd, conduct 1 test for each 250-cu.yrds.
      b. For borrow between 1,001- and 5,000-cu.yd; conduct 4 tests for first 1,000-cu.yd., if material tests acceptable, conduct 1 test for each additional 500-cu.yrds.
      c. For borrow over 5,000-cu.yds, conduct 12 tests during import of first 5,000-cu.yd, if material tests acceptable, conduct 1 test for each additional 1,000-cu.yds.
   2. Owner's Testing Laboratory shall take samples at source, conduct testing and evaluate test results prior to delivery.
   3. Conduct tests for lead and other heavy metals, asbestos, PCB's, pesticides, herbicides, VOCs, and semi-VOCs.
   4. When detectable quantities of hazardous materials are found, determine the risk to human health, the environment, or both using the DTSC Preliminary Endangerment Assessment Guidance Manual.
   5. Do not import soils that exhibit a known risk to human health, the environment, or both.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Excavated material, Imported Fill and Backfill: As specified in Section 31 23 23 and as approved by Geotechnical Engineer prior to placement on site.

PART 3 - EXECUTION

3.01 PRE-CONSTRUCTION INSPECTION

A. Inspection of Site: Inspect entire site prior to commencing work and determine character of materials to be encountered and all conditions affecting Work.

B. Existing Site Conditions: Verify location of existing underground structures and utility facilities (if any) and take adequate precautions to avoid damage to any active service or structure.

C. Piping and conduit encountered shall be adequately supported and protected until permanent support is provided or removal of same is approved by Architect.

D. Existing Utilities: After approval of Architect, totally remove abandoned pipes and utilities found in excavations.

E. Support and protect existing pipes and conduits where required during construction.

F. Site Clearing: Conform to Section 31 10 00.

G. Loose fill and natural on-site soils that are approved by Geotechnical Engineer may be, processed, stock-piled and used as fill material.

H. After clearing and removal of loose fill, exposed surfaces shall be processed, inspected and approved by Geotechnical Engineer prior to placing fill.

I. Backfilling: Conform to Section 31 23 23.

3.02 STAKING AND GRADES

A. Refer to Section 01 70 00 Field Engineering.

OR

B. Lay out work, establish necessary control markers, bench marks, grading stakes, and other stakes as required.

C. Existing and finish elevations are shown on the drawings, and unless inconsistencies therein are brought to the attention of the Architect in writing prior to commencement of the construction, the Contractor will be held responsible for the proper location and elevation of all work.

3.03 EXECUTION

A. Building areas shall be those areas indicated on grading plan that includes building area and distance of 5 feet minimum beyond footing lines, including covered walks. Excavation for building areas shall be as specified in Section 31 23 16 In both cut and fill areas, over-excavate and remove loose existing soils to depths required by the Geotechnical Investigation Report or Geotechnical Engineer's recommendations as needed.

B. Geotechnical Engineer shall inspect all over-excavated areas prior to completion of area processing and before moving on to other areas..

C. After approval has been received from Geotechnical Engineer to proceed, bring soil mix to optimum moisture content and re-compact to 90 percent of maximum dry density per ASTM D 1557. Geotechnical Engineer shall test and approve results.
Bring grade to sub-grades indicated or to interim working conditions, if needed, in 8 inches maximum loose lifts for materials compacted by heavy equipment and not more than 4 inches loose depth for materials compacted by hand equipment to sub-grades indicated as follows:
1. Structural Fill: Use under foundations, slabs on grade in layers as indicated.

2. Drainage Fill: Use under designated building slabs, at foundation drainage and elsewhere as indicated.
3. Common Fill: Use under unpaved areas.
4. Subbase Material: Use under pavement, walks, steps, piping and conduit.

D. . Compact to 90 percent of maximum dry density per ASTM D1557.

E. Grading at Asphaltic Concrete Areas: Rough grade soil to elevation to conform to specified depth of base and pavement.

F. Place necessary fill to bring sub-grade to proper elevations. Fill shall be placed as Compacted Fill.

G. No jetting or flooding permitted.

3.04 INSPECTION

A. Grading operations shall be inspected by Geotechnical Engineer. No fill shall be placed on any prepared surface until that surface has been inspected and approved by Geotechnical Engineer.

B. Completed earthwork including cuts, fills, and earth bank slopes (cut or fill) shall be inspected by Geotechnical Engineer to determine suitability of exposed soils.

3.05 SEASONAL LIMITS

A. No fill material shall be placed, spread or rolled while it is frozen or thawing or during unfavorable weather conditions. When Work is interrupted by heavy rain, fill operations shall not be resumed until field tests by Geotechnical Engineer indicate that moisture content and density of fill are as previously specified.

3.06 EXCAVATION FOR FOUNDATIONS

A. Conform to Section 31 23 16.

3.07 EARTH SLOPES

A. Earth slopes shall be sloped to 2 (horizontal) to 1 (vertical) maximum. Tops of slopes shall be bermed to prevent surfaces water from running off over slopes. Tops of earth slopes shall be level to distance of 5 feet minimum from existing structures and 5 feet minimum behind construction barricades adjacent to driveways.

B. Earth slopes shall maintain a minimum clearance from existing or proposed foundations as illustrated in Figure 1808.7.1 of 2016 CBC.

3.08 TOLERANCES

A. Perform rough grading to grades indicated, plus or minus 0.1 foot. Where grades are not indicated, grade uniformly level or slope between points for which elevations are

given or from such points to existing grades with due allowance for adequate drainage and subsequent materials.

3.09 TRENCHING FOR UTILITIES

A. Conform to Section 31 23 17.

3.010 STOCKPILING OF FILL MATERIAL

A. Fill: Soil removed that is suitable for fill shall be temporarily stockpiled separately on site.

B. Stockpile Locations: Materials shall be stockpiled in locations approved by Architect and convenient for future placing, causing least disturbance to site and away from areas of actual building construction.

C. Stockpiles to remain on site longer than 15 days without use shall be covered to prevent any form of erosion.

3.011 FIELD QUALITY CONTROL

A. Testing and Inspection: Owner will engage a qualified independent Geotechnical Engineer to perform field quality-control testing and inspections. Do not proceed with concrete placement without approval of Geotechnical Engineer.

B. Testing agency will test compaction of soils in place according to ASTM D1556, and ASTM D2937 as applicable. Tests will be performed at the following locations and frequencies:
   1. Paved Areas: At sub-grade and at each compacted fill and backfill layer, at least 1 test for every 2000 sq. ft. or less of paved area, but in no case fewer than 3 tests.
   2. Foundation Wall Backfill: At each compacted backfill layer, at least 1 test for each 100 feet or less of wall length, but no fewer than 2 tests.

C. Frequency of Tests: Geotechnical Engineer may make as many tests as are necessary to ensure specified results.

D. When testing agency reports that sub-grades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; re-compact and retest until specified compaction is obtained.

3.012 DISPOSAL OF EXCESS MATERIAL

A. Legally dispose off excess materials. Disposal shall be in areas off Owner's property, unless otherwise approved by Architect.

END OF SECTION

SECTION 31 22 01

LANDSCAPE FINISH GRADING

PART 1: GENERAL

1.01 EXISTING CONDITIONS

A. Known underground, surface and aerial utility lines, and buried objects are indicated on the Drawings. The contractor is responsible for verifying the locations of all underground utilities prior to beginning work on the project.

B. Verify site conditions and note irregularities affecting work of this Section.

C. Do not hold Owner liable for extra charges for conditions uncovered and not shown or described in the Contract Documents, without acceptance of Landscape Architect.

D. Beginning work of this Section means acceptance of existing conditions.

1.02 PROTECTION

A. Protect trees, shrubs and lawn areas to remain and other features remaining as part of final landscaping.

B. Protect bench marks, existing structures, fences, roads, sidewalks, paving and curbs against damage from equipment and vehicular traffic.

C. Protect aerial, surface, or underground utility lines or appurtenances that are to remain.

D. Provide all necessary barricades.

E. Repair any damage at no cost to owner.

F. Prevent soil and debris from entering any streams, ditches, or sewers.

PART 2: PRODUCTS

2.01 SOIL AMENDMENTS

A. Soil amendments shall be as specified in sections 32 93 00.

PART 3 – EXECUTION

3.01 ESTABLISH AND IDENTIFY REQUIRED LINES, LEVELS, CONTOURS, AND DATUM

3.02 SUBSOIL PREPARATION

A. Prior to beginning finish grading, assure that subsoil elevations are to a reasonable true and even plane at the required elevations, with due allowance for seed and planting beds.

B. Adjust discrepancies in elevations of subsoil to required levels, profiles and contours. Make changes in grade gradual. Blend slopes into level areas.

C. Clear subgrade surface of stones in excess of 1/2 inch, debris, and rubbish. Remove subsoil contaminated with petroleum products.

D. Cultivate or scarify subgrade to a depth as noted in sections 32 93 00. Repeat cultivation in areas where equipment has compacted subsoil.

E. Finish grade to contours and spot elevations shown on the plans. Smoothly transition all breaks in grades. Establish final drainage flow lines and gradients for uniform water drainage from high points to drainage outlets or inlet structures.

F. Finish grade for planter areas shall be 2" below sidewalk elevations, except at locations that drainage water will flow onto or across hardscape, curbs or paving. At these conditions the grades shall be flush or no more than 1/2" below hardscaping. Finish grades shall be of uniform slope and grade between points of fixed elevations or elevation controls. Finish grades shall be established from such points.

G. All finish grades shall be floated to assure a uniform surface without irregular dips or ridges.

H. All fill areas and constructed berms or mounds in future planting areas shall be compacted in even levels to a maximum compaction of 80%, with allowance for settlement.

3.03 RESTORATION OF ADJACENT AREAS

A. Where adjacent lawn or surface areas within project site, but outside grading limits, are disturbed as a result of building operations or storage of materials under this contract, clean these areas of all debris and restore to original grades and to a condition equal or better than originally received.

3.04 CLEAN-UP

A. Remove excess soil from site.

B. Leave stockpile areas clean, raked and ready to receive landscaping.

C. Remove any soil which may have been brought onto paved surfaces by hauling and grading operations.

3.05 MAINTENANCE OF GRADES

A. Protect newly graded areas from traffic and erosion, and keep free of trash and debris.

B. The Contractor shall submit to the Architect for review, his plan of operation for accomplishing temporary and permanent erosion control. The plan shall include such items as:

1. Location and construction of temporary berms, dikes, dams, ditching or sediment basins.
2. Any temporary cover crops proposed.
3. Placement of permanent erosion control features relative to construction sequences and progress.

C. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

END OF SECTION

SECTION 31 23 15

EARTHWORK- PORTABLES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Earth preparation under portables building area. Extend 5 feet from building perimeter, all sides.

B. Related Sections:
1. Section 05 52 00, Handrails and Railings
2. Section 31 10 00, Site Clearing
3. Section 31 23 23, Backfilling
4. Section 32 12 17, Asphalt Concrete
5. Section 32 13 13, Sitework Concrete

1.02 REFERENCE STANDARDS

A. Conform to reference standards by date of issue current on date of Contract Documents.

B. ASTM D1557 - Moisture-Density Relations of Soils and Soil-Aggregate Mixtures using 10 lb. rammer and 18 inch drop.

1.03 GENERAL REQUIREMENTS

A. Existing Conditions: Contractor shall examine the site of the work and verify existing conditions under which work will be performed, including subsurface conditions.

B. Drainage and Pumping: Maintain excavations and site free from water throughout work. Run surface water or seepage to sumps with float-switch controlled pumps. Pump to drainage system as approved by Architect.

C. Protection: Provide and maintain protection to retain earthbanks and protect adjoining existing monuments, grades and structures from caving, sliding, erosions or other damage and suitable forms of protection against bodily injury or property damage.

D. Bulkheads and shoring shall conform to Occupational Safety and Health Act Construction Safety Orders, Title 8, Industrial Relations, California Code of Regulations.

E. Provide barricades and berms at top of slopes to prevent water from flowing over top.

1.04 QUALITY ASSURANCE

A. Borrow, Fill, and other soil materials obtained from off-site sources shall be sampled and tested in compliance with CA EPA Department of Toxic Substances Control recommendations to prevent the importation of contaminated materials to the Site.
   1. Testing Frequency
      a. For borrow conduct 1 test for each 250-cu.yrds.
   2. Owner's Testing Laboratory shall take samples at source, conduct testing and evaluate test results prior to delivery.
   3. Conduct tests for lead and other heavy metals, asbestos, PCB's pesticides, herbicides, VOC's, and semi-VOC's.
   4. When detectable quantities of hazardous materials are found, determine the risk to human health, the environment, or both using the DTSC Preliminary Endangerment Assessment Guidance Manual.
   5. Do not import soils that exhibit a known risk to human health, the environment, or both.

PART 2 - PRODUCTS

2.01 FILL MATERIALS

A. Imported Fill: Clean granular, free of debris, no rock larger than 3 inches in any dimension, non-expansive, approved by Geotechnical Engineer prior to placement on site.

B. Loose fill and natural on-site soils that are approved by the Geotechnical Engineer may be stock-piled and used as fill material.

PART 3 - EXECUTION

3.01 PRE-CONSTRUCTION INSPECTION

A. Inspection of the Site: Inspect the entire site prior to commencing work and determine the character of the materials to be encountered and all conditions affecting the work.

B. Existing Site Conditions: Verify the location of all existing underground structures and facilities and take adequate precautions to avoid damage to any active service or structure.

C. Repair or replace all property damaged by the work of this section immediately.

D. Piping and conduit encountered shall be adequately supported and protected until permanent support is provided or removal of same is approved by the Architect.

E. Existing Utilities: After approval of Architect, totally remove abandoned pipes and utilities found in excavations. Cap or plug at both ends all abandoned utility piping, conduit and lines encountered to provide a complete seal. Provide plugs or seals of concrete or threaded caps unless otherwise approved.

F. Support and protect existing pipes and conduits where required during construction.

G. Site Clearing: Conform to Section 31 10 00.

H. Loose fill and natural on-site soils that are approved by the Inspector may be stock-piled and used as fill material.

I. After clearing and removal of loose fill, the exposed surfaces shall be inspected and approved by Testing Laboratory prior to placing fill.

3.02 SITE PREPARATION

A. The building areas shall be those areas indicated on the site plan which include the building areas and a distance of 5 ft minimum beyond building lines, including covered walks and 6 ft in front of portable buildings for ramp installation.

B. Remove existing turf, scarify exposed soil to 6 inches below grade. After approval has been received from Inspector of Record to proceed, bring to optimum moisture content and re-compact to 90 percent of maximum dry density per ASTM D1557.

C. Bring to grades indicated on drawings in 6 inch lifts, compact to 90% of maximum dry density per ASTM D1557.
   1. Provide imported soils or approved stock-piled fill material to pad levels.

D. Geotechnical Engineer shall inspect scarified areas and compacted areas.

E. Bring building pad to elevations specified. Slopes of building pad shall not exceed 1/8 per foot diagonally.

F. Inspector shall inspect pad areas.

3.03 INSPECTION

A. Grading operations shall be inspected by the Inspector. No fill shall be placed on any prepared surface until that surface has been inspected and approved by the Inspector.

B. Completed earthwork including cuts, fills, and earth bank slopes (cut or fill) shall be inspected by the Inspector to determine suitability of exposed soils.

3.04 SEASONAL LIMITS

A. No fill material shall be placed, spread or rolled during unfavorable weather conditions. When the work is interrupted by heavy rain, fill operations shall not be resumed until field tests by the **Geotechnical Engineer** indicate that the moisture content and density of the fill are as previously specified.

3.05 TOLERANCES

A. Perform rough grading to grades indicated, plus or minus 0.1 foot. Where grades are not indicated, grade uniformly level or slope between points for which elevations are given or from such points to existing grades with due allowance for adequate drainage and subsequent materials.

B. Grading at Asphaltic Concrete Areas: Rough grade soil to an elevation to conform to specified depth of base and pavement.

3.06 TRENCHING FOR UTILITIES

A. Conform to Section 31 23 17.

3.07 STOCKPILING OF FILL MATERIAL

A. Fill: Soil removed that is suitable for fill shall be stockpiled separately on the site.

B. Stockpile Locations: Materials shall be stockpiled in locations approved by the Owner and convenient for future placing, causing the least disturbance to the site and away from areas of actual building construction.

3.08 DISPOSAL OF EXCESS MATERIAL

A. Legally dispose of excess materials. Disposal shall be in areas off the Owner's property, unless otherwise approved by the Architect.

END OF SECTION

SECTION 31 23 16

EXCAVATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Earth preparation within building area.

B. Excavation for building foundations.

1.02 REFERENCE STANDARDS

A. Conform to reference standards by date of issue current on date of Contract Documents.

B. ASTM D1557 – Laboratory Compaction Characteristics of Soil Using Modified Effort.

C. California Public Contract Code, Section 7104 - Public Works Contracts for Digging Trenches or Excavations; Notice on Discovery of Hazardous Waste or Other Unusual Conditions; Investigations; Change Orders; Effect on Contract.

D. California Labor Code, Section 6705 - Public Works Contracts requiring detailed plans for shoring, bracing, sloping, indicating protection from caving ground for trenching work in excess of 5' deep and contract amounts stipulated therein.

E. Standard Specification for Public Works Construction "Green Book", 2015 edition

1.03 SUBMITTALS

A. Compaction Report indicating requirements per ASTM D1556.

B.

1.04 QUALITY ASSURANCE

A. Verify that survey benchmark and intended elevations for the Work are as indicated.

B. Borrow. Fill, backfill, aggregate base, and other soil materials obtained from off-site sources shall be sampled and tested in compliance with CA EPA Department of Toxic Substances Control recommendations to prevent the importation of contaminated materials to the Site.

1. Testing Frequency
   a. For borrow up to 1,000-cu.yrd, conduct 1 test for each 250-cu.yrds.
   b. For borrow between 1,001- and 5,000-cu.yrd; conduct 4 tests for first 1,000- cu.yrd, if material tests acceptable, conduct 1 test for each additional 500-cu.yrds.

c. For borrow over 5,000-cu.yrds, conduct 12 tests during import of first 5,000-cu.yrd, if material tests acceptable, conduct 1 test for each additional 1,000-cu.yrds.

2. Owner's Testing Laboratory shall take samples at source, conduct testing and evaluate test results prior to delivery.
3. Conduct tests for lead and other heavy metals, asbestos, PCB's, pesticides, herbicides, VOCs, and semi-VOCs.
4. When detectable quantities of hazardous materials are found, determine the risk to human health, the environment, or both using the DTSC Preliminary Endangerment Assessment Guidance Manual.
5. Do not import soils that exhibit a known risk to human health, the environment, or both.]

1.05 SOILS INFORMATION

A. Geotechnical Investigation Report has been prepared under direction of Owner. The Geotechnical Investigation Report is hereby referenced as information for Work of this Section. Architect assumes no responsibility of, or conclusions Contractor may draw from information provided. Contract Documents take precedence over recommendations that may be contained in Geotechnical Investigation Report and Contractor must obtain approval for any and all deviations from Contract Documents. Copy of Geotechnical Investigation Report is available at Architect's office.

PART 2 - PRODUCTS

A. Structural Backfill material shall conform to Green Book section 217-3.

PART 3 - EXECUTION

3.01 PREPARATION

A. Identify required lines, levels, contours and datum.

B. Identify known underground, above ground and aerial utilities. Stake and flag locations.

C. Notify utility company to remove and relocate utilities where required for construction operations.

D. Protect above and below grade utilities that are to remain.

E. Protect plant life, lawns and other features remaining as portion of final landscaping.

F. Protect bench marks, existing structures, fences, sidewalks, paving and curbs from excavation equipment and vehicular traffic.

3.02 BUILDING AREA PREPARATION

A. Within building area and to distance of 5 feet beyond exterior footings or covered walks, remove existing fill or loose natural soils (sub excavate) to a depth recommended by Geotechnical Engineer or 12 inches below bottom of footing whichever is greater. Exposed surface shall be inspected by Geotechnical Engineer. Additional unsuitable soil, as directed by Geotechnical Engineer shall be removed.

B. Scarify exposed surface to depth of 6 inches. Bring to optimum moisture content and compact to 90-percent maximum ASTM D1557 laboratory density.

C. Add approved fill to required subgrade elevation in 8 inch maximum lifts. Bring to optimum moisture content and compact to minimum 90-percent of maximum ASTM D1557 laboratory density.

D. Structural Fill shall be used in foundation trenches as specified in Section 31 23 23 and as approved by Geotechnical Engineer.

3.03 EXCAVATION FOR FOUNDATIONS

A. Conform to Public Contract Code, Section 7104 for excavations that extend more than four feet below the surface.

B. Conform to Section 6705, Labor Code. Provide shoring and bracing plans or other provisions intended to prevent caving of ground.

C. Underpin adjacent structures which may be damaged by excavation work, including utilities and pipe chases. Protect existing monuments, grades and improvements of any kind. Remove all obstructions to the work.

D. Excavate subsoil to elevations required to accommodate building foundations, slabs-on-grade, construction operations, forms, forms removal and inspection.
   1. Side forms in foundation excavations may be omitted where earth remains firm with no cave-in providing one inch is added to footing width for each form removed.
   2. Finish subgrade to a tolerance of 0.05 foot of within required elevations for subgrade.

E. Machine slope banks. Earth banks shall be sloped to 2 (horizontal) to 1 (vertical). Tops of earth banks shall be level to a distance of 5 feet minimum from all existing structures, and 5 feet minimum behind all construction barricades adjacent to driveways.

F. Excavation cut shall not interfere with normal 45 degree bearing splay of foundation.

G. Grade top perimeter of excavation to prevent surface water from draining into excavation.

H. Hand trim excavation. Remove loose matter. Machine tamp bottom of excavation.

I. Remove lumped subsoil, boulders, and rock 3 inches in size or larger.

J. Notify Geotechnical Engineer of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.

K. Correct unauthorized excavation.

L. Correct areas over-excavated by error by filling with the specified concrete.

M. Stockpile approved excavated material in area designated on site and remove excess material not being reused from site.

N. Bulkheads and shoring shall conform to Title 8, Industrial Relations, California Code of Regulations, Construction Safety Orders.

3.04 FIELD QUALITY CONTROL

A. Testing and Inspection: Owner will engage a qualified independent Geotechnical Engineer to perform field quality-control testing and inspections. Do not proceed with concrete placement without approval of Geotechnical Engineer .

B. Testing agency will test compaction of soils in place according to ASTM D1556, and ASTM D2937 as applicable. Tests will be performed at the following locations and frequencies:
1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 2000 sq. ft. or less of building slab, but in no case fewer than 3 tests.
2. Foundation Wall Backfill: At each compacted backfill layer, at least 1 test for each 100 feet or less of wall length, but no fewer than 2 tests.

C. Frequency of Tests: Geotechnical Engineer may make as many tests as are necessary to ensure specified results.

D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.05 PROTECTION

A. Protect excavations by methods required to prevent cave-in or loose soil from falling into excavation.

B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing or excessive water inundation.

END OF SECTION

SECTION 31 23 17

TRENCHING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Excavate trenches for utilities.

B. Compacted bedding.

C. Backfilling and compaction to required elevations.

D. Slurry concrete.

1.02 REFERENCE STANDARDS

A. Conform to reference standards by date of issue current on date of Contract Documents.

B. ASTM C150 - Portland Cement.

C. ASTM C494 - Chemical Admixtures for Concrete.

D. ASTM D1557 - Laboratory compaction characteristics of soil using modified effort.

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

F. California Code of Regulations, Title 8, Industrial Relations, Construction Safety Orders, Division 1, Chapter 4, Subchapter 4, Article 6 Excavations.

G. Cal-OSHA: California Occupational Safety and Health Act, Title 8, Division 1, Chapter 3.2.

H. California Public Contract Code, Section 7104 - Public Works Contracts for Digging Trenches or Excavations; Notice on Discovery of Hazardous Waste or Other Unusual Conditions; Investigations; Change Orders; Effect on Contract.

I. California Labor Code, Section 6705 - Public Works Contracts requiring detailed plans for shoring, bracing, sloping, indicating protection from caving ground for trenching work in excess of 5' deep and contract amounts stipulated therein.

1.03 SUBMITTALS

A. The Contractor shall submit in advance of excavation, for acceptance by the Owner's civil or structural engineer, detailed plan(s) showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation of trenches more than 10 feet in depth. If such plan(s) varies from the shoring system standards, the plan shall be prepared by a registered civil or structural engineer.

1.04 QUALITY ASSURANCE

A. Verify survey benchmark and intended elevations for Work.

B. Borrow. Fill, backfill, aggregate base, and other soil materials obtained from off-site sources shall be sampled and tested in compliance with CA EPA Department of Toxic Substances Control recommendations to prevent the importation of contaminated materials to the Site.
   1. Testing Frequency
      a. For borrow up to 1,000-cu.yd, conduct 1 test for each 250-cu.yrds.
      b. For borrow between 1,001- and 5,000-cu.yrd; conduct 4 tests for first 1,000- cu.yrd, if material tests acceptable, conduct 1 test for each additional 500-cu.yrds.
      c. For borrow over 5,000-cu.yrds, conduct 12 tests during import of first 5,000-cu.yrd, if material tests acceptable, conduct 1 test for each additional 1,000-cu.yrds.
   2. Owner's Testing Laboratory shall take samples at source, conduct testing and evaluate test results prior to delivery.
   3. Conduct tests for lead and other heavy metals, asbestos, PCB's, pesticides, herbicides, VOCs, and semi-VOCs.
   4. When detectable quantities of hazardous materials are found, determine the risk to human health, the environment, or both using the DTSC Preliminary Endangerment Assessment Guidance Manual.
   5. Do not import soils, that exhibit a known risk to human health, the environment, or both.

1.05 SOILS INFORMATION

A. Geotechnical Investigation has been prepared under direction of Owner. Investigation is hereby referenced as information for Work of this Section. Architect assumes no responsibility for conclusions Contractor may draw from information provided. The Contract Documents take precedence over recommendations that may be contained in the Investigation and the contractor must obtain approval for any and all deviations from the Contract Documents. Copy of investigation is available at Architect's office.

PART 2 - PRODUCTS

2.01 FILL AND BEDDING MATERIALS

A. Sand: Sand shall consist of natural or manufactured granular material, or a combination thereof, free of deleterious amounts of organic material, mica, loam, clay and other substances not suitable for the purpose intended. Conform to Subsection 200-1.5.5, SSPWC, for gradation as required for Portland Cement Concrete, sand must achieve compaction of a minimum 90 percent.

B. Imported Fill: Granular, free of debris, no gravel larger than 3 inches in any dimension, non-expansive, approved by the Architect prior to placement on the site.

C. Slurry Concrete:

1. Slump: Between 4 inches and 6 inches.
2. Aggregate: 40 percent sand by weight, 60 percent pea gravel, minimum 1/4 inch, maximum 5/8 inch.
3. Portland Cement: ASTM C150, 2-sack mix (2 sacks of cement per cubic yard).
4. Admixture: Calcium Chloride free, in proportions not to exceed the manufacturer's recommendations.
5. Artificial Coloring: ASTM C494. Mix in Mapico Red pigment, proportions as recommended by the manufacturer, L.M. Scofield or equal.
6. Sufficient water shall be added to produce a fluid, workable mix that will flow and can be pumped without segregation of aggregate. Material shall be mechanically mixed until the cement and water are thoroughly dispersed.

D. Stockpiled Fill: Onsite soils, stored separately on the site, approved for re-use by the Architect.

2.02 ACCESSORIES

A. Underground Warning Tape: Metallic Detection Tape, aluminum core, 6 inches wide AASHTO specification colors, by Safety Sign Company, Cleveland, OH, or equal.

B. Color Coding and Lettering: as required for type of underground utility.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify fill material to be reused is acceptable to the Geotechnical Engineer .

3.02 PREPARATION

A. Identify required lines, levels, contours and datum.

B. Backfill with approved fill and compact to density equal to or greater than requirements for subsequent backfill material.

C. Prior to commencement of trenching operations, notify Underground Service Alert of Southern California (800) 422-4133,Monday through Friday, 7:00 A.M. to 5:00 P.M.

3.03 EXCAVATION

A. Conform to Construction Safety Orders, Title 8, CCR, For Sloping, Benching, Shoring, Bracing, Protective Systems, and Shafts.

B. Conform to Section 7104, Public Contract Code. Promptly notify Owner of any contact with hazardous materials or differing conditions.

C. Conform to Section 6705, Labor Code. Provide detailed plan showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation of trenches, as required.

D. Excavate subsoil required for utilities. Trenches shall be level or parallel to finish grade unless designated on drawings to be installed to specific gradient.

E. Cut trenches sufficiently wide to enable installation of utilities and allow inspection.

F. Water, storm drainage piping located in the same trench shall be separated by 24 inches horizontally and vertically, and water line shall be placed on a solid shelf excavated on one side of the common trench. Cross-over water lines shall also be separated 12 inches vertically from storm drainage pipe.

G. Water and sewer piping shall not be located in the same trench and they shall be separated by 12 inches horizontally and 12 inches vertically minimum.

H. Excavation shall not interfere with normal 45 degree bearing splay of foundations. Parallel trenches, no closer than 18 inches from building foundations.

I. Hand trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.

J. Remove lumped subsoil, boulders and rock.

K. Correct unauthorized excavation.

L. Stockpile approved excavated material in area designated on site and remove excess material not being used from site.

3.04 BEDDING

A. Support pipe and conduit during placement and compaction of bedding fill. Provide uniform bearing along entire length. Conform to Section 306-6, SSPWC.

B. Bedding: Place and compact materials in continuous layers not exceeding 6 inches compacted depth, ASTM D1557.

C. Bedding material shall conform to SSPW section 217 and 306-6.

3.05 BACKFILLING

A. Backfill trenches to contours and elevations with unfrozen materials.

B. Fill areas will be inspected, tested and approved by Geotechnical Engineer.

C. Soil Fill over Bedding: Place and compact material in continuous layers as scheduled, compacted to ASTM D1557.

D. Backfill material shall conform to SSPW section 217 and 306-12.

E. Employ placement method that does not disturb or damage conduit, ducts or piping in trench.

F. Maintain optimum moisture content of backfill materials to attain required compaction density. When operations are interrupted by rain, do not resume Work until field tests indicate that moisture content and density of fill are as previously specified.

G. Remove surplus backfill materials from site and dispose legally.

H. Leave fill material stockpile areas completely free of excess fill materials.

I. Minimum Cover Over Piping, Conduits or Duct Banks: 24 inches.

J. Lay out and install or otherwise confirm invert elevations of all gravity flow systems to avoid conflict with other sub-surface structures or utilities of any kind. Adjust elevations or layout of pipes, conduits or duct banks to permit the required gravity flow.

K. Jetting for utility trenching compaction may be used outside building perimeter and only when recommended by Geotechnical Engineer, in accordance with Section 306-12.4 SSPWC.

L. Pressurized piping shall be installed level, or shall be installed parallel to finish grades unless designated on the Drawings to be installed to specific gradients.

3.06 TOLERANCES

A. Top Surface of Backfilling Under Paved Areas: 0.2 ft from required elevations.

B. Top Surface of General Backfilling: Plus or minus 0.2 ft from required elevations.

3.07 FIELD QUALITY CONTROL

A. Backfill materials and operations will be inspected and approved by Geotechnical Engineer including earth bank slopes (cut or fill).

B. Tests, analysis and compaction of fill material will be performed in accordance with ASTM D1557.

C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

D. Frequency of Tests: Geotechnical Engineer may make as many tests as are necessary to ensure specified results.

3.08 PROTECTION OF FINISHED WORK

A. Protect finished Work.

B. Recompact fills subjected to vehicular traffic.

3.09 TEMPORARY PROTECTION OF UNFINISHED WORK

A. Trenching for placement of underground utilities shall be covered and protected with steel trench plates during non-work hours.Adequate warnings and protection indication of open trenches during work hours must be provided for project safety.

3.010 SCHEDULE

A. Storm and Sanitary Piping:
   1. Bedding Fill: Sand, minimum thickness below piping 0.4 times outside diameter of pipe but no less than 4 inches. Minimum thickness above top of piping, 12 inches, compacted to 90 percent.
   2. Cover with stockpiled fill in 8-inch lifts to specified subgrade elevations, compact to 90 percent or to 95 percent under vehicle traffic-supporting paved areas.
   3. Fill: Slurry concrete, 6" cover at top, bottom and sides of pipes at exterior paved areas (at vehicle traffic) where minimum fill cover is less than 12" below finished elevation of paving. Slurry per Section 32 13 13 Sitework concrete.
   4. Bury warning tape marked "Caution Sewer Line" 12 inches above all concrete-encased piping. Align tape parallel to and within 3 inches of the centerline of the piping.

B. Power Ducts: Concrete Encased
   1. Fill: Slurry concrete, 3 inches cover at top, bottom, between conduits and sides of duct bank.
   2. Fill: Slurry concrete, 6 inches cover at top, bottom and sides of duct bank conduit at exterior paved areas where minimum fill cover is less than 24" below finished elevation of paving, and less than 12" below finished elevations of interior floor slabs and at building footings where conduit is in the footing structural splay. Slurry per Section 32 13 13 Sitework concrete.
   3. Install two No. 4 bars in slurry concrete at top of bank under paved areas, minimum 3 inch concrete cover.
   4. Cover with stockpiled fill in 6-inch lifts to specified subgrade elevation, compact to 90 percent, or to 95 percent under traffic-supporting paved areas.
   5. Bury warning tape marked "Caution Buried High Voltage Line" 12 inches above all concrete-encased duct banks. Align tape parallel to and within 3 inches of the centerline of the duct bank.

C. Water Piping and Gas Piping:
   1. Bedding Fill: Sand, minimum thickness below piping 0.4 times outside diameter of pipe but not less than 4". Minimum thickness above top of piping, 6 inches, compacted to 90 percent.
   2. Fill: Slurry concrete, 6 inches cover at top, bottom and sides of pipes at exterior paved areas where minimum fill cover is less than 24" below finished elevation of paving, and less than 12" below finished elevations of interior floor slabs and at building footings where piping is in the footing structural splay. Slurry concrete per Section 32 13 13 Sitework concrete.
   3. Cover with stockpiled fill in 6-inch lifts to specified subgrade elevation, compact to 90 percent, or 95 percent under traffic-supporting paved areas.
   4. Observe joints at pressure tests.
   5. Bury warning tape marked "Caution Buried Gas (or "Pipeline") Line" 12 inches above all trenching. Align tape parallel to and within 3 inches of the centerline of trench.

D. Fire Lines:
   1. Bedding Fill: Manufactured Sand, minimum 6" thickness under piping, minimum thickness above top of piping and sides, 6", compact to 90 percent.
   2. Fill: Slurry concrete, 6" cover at top pipes at exterior paved areas where minimum fill cover is less than 24" below finished elevation of paving. Slurry concrete per Section 32 13 13 Sitework concrete.
   3. Cover with stockpiled fill in 6-inch lifts to specified subgrade elevation, compact to 90 percent, or 95 percent under traffic-supporting paved areas.
   4. Bury warning tape marked "Caution Buried Pipeline" 12 inches above all trenching. Align tape parallel to and within 3 inches of the centerline of trench.

E. Low Voltage Conduits and Communications: Direct Burial Minimum trench depth 36 inches.
   1. Bedding Fill: Sand, 6 inches at bottom, sides and 12 inches on top, compacted to 95 percent.
   2. Cover with stockpiled fill in 6-inch lifts to specified subgrade elevation, compact to 90 percent, or 95 percent under traffic-supporting paved areas.
   3. Bury warning tape marked "Caution Buried Communication Line Below" 12 inches above conduits. Align tape parallel to and within 3 inches of the centerline of conduits.

END OF SECTION

SECTION 31 23 19

DEWATERING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Section Includes design, acquisition, installation, testing, operation, monitoring and maintenance of open drainage or pre-drainage dewatering system to lower and control ground water levels and hydrostatic pressures, and removal of drainage flow, to permit excavation, backfill and construction to be performed in suitably dry conditions. Control of surface water shall be considered as part of the Work under this specification.

B. Related Sections
1. Section 01 20 00, Price and Payment Procedures
2. Section 01 50 00, Temporary Facilities and Controls
3. Section 01 57 23, Storm Water Pollution Control
4. Section 32 23 16, Excavation
5. Section 31 22 00, Earthwork
6. Section 33 46 13, Foundation Drainage Systems
7. Section 33 23 17, Water Wells

C. Allowances. Contract Amount paid for work this Section may be adjusted for actual cost of work in accordance with provisions of Division 01 requirements for price and payment procedures.

1.02 PERFORMANCE REQUIREMENTS

A. Dewatering Performance
1. Dewatering system shall be of sufficient size and capacity to lower and maintain ground water level at an elevation at least 60-inches below lowest foundation or pipe trench subgrade.
2. Dewatering system shall allow soils to be excavated and work conducted in reasonably dry conditions. Soils to be removed shall be sufficiently dry to permit excavation to grades shown and to remain stable without sheeting.
3. Maintain dewatering operations to ensure erosion control, stability of excavations and constructed slopes, and so that excavation does not flood and to prevent damage to subgrades and permanent structures.
4. Maintain stability of sides and bottom of excavations.
5. Accomplish dewatering without damage to existing buildings adjacent to excavation.
6. Prevent surface water from entering excavations by earth dikes, or other means.

1.03 SUBMITTALS

A. Action Submittals
1. Product Data for dewatering system components

2. Shop Drawings, signed and sealed by installer's engineer, of dewatering system showing arrangement, locations and details of system components including sedimentation containment and means of discharge and disposal of water.
   a. Include layouts of piezometers and flow-measuring devices for monitoring performance of dewatering system.
   b. Include a written report of control procedures for use when dewatering problems arise
3. Certified Copies of Field Test Reports and computations required for proper design of dewatering system

B. Record Submittals
1. Statement of Qualifications from Installer
2. Professional Certification of installer's engineer
3. Photo- or video-graphic record of existing conditions adjoining construction and site improvements prior to installation and operation of dewatering system

C. Closeout Submittals
1. Record Documents locating capped utilities and other subsurface structural, electrical, or mechanical conditions performed during dewatering.
   a. Note locations and capping depth of wells and well points

1.04 QUALITY ASSURANCE

A. Materials submitted shall be in a format acceptable for inclusion in required permit applications, if any, all regulatory agencies for which permits for discharge water from the dewatering system are required due to the discharge reaching city storm drain systems or regulated bodies of water.

B. Regulatory Requirements: Comply with water disposal requirements of authorities having jurisdiction.
1. Refer to Section 01 57 23, Storm Water Pollution Control.
2. Obtain discharge permits from authorities having jurisdiction.

C. Pre-Installation Conference: Conduct conference at Project site to comply with requirements in Section 01 30 00, Administration Requirements.

1.05 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated.

B. Project Site Information: A Geotechnical Report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of Geotechnical Engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by Geotechnical Engineer. Owner will not be responsible for interpretations or conclusions drawn from this data.
1. Make additional test borings and conduct other exploratory operations necessary for dewatering.
2. The Geotechnical Report is referenced elsewhere in the Project Manual.

C. Survey Work Design Engineer employing a qualified professional engineer or land surveyor, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

D. During dewatering, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations for comparison with original elevations. Promptly notify Architect if changes in elevations occur or if cracks, sags, or other damaged is evident in adjacent construction.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.
   1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site and surrounding area.
   2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

B. Install dewatering system 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 authorities having jurisdiction.

3.02 INSTALLATION

A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, discharge lines, sedimentation tanks, and standby power, filter material gradation, valves, appurtenances, water disposal and surface-water controls.

B. Before excavating below ground-water level, place system into operation to lower water to specified levels. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed, or until dewatering is not longer required.

C. Provide an adequate system to lower and control ground water to permit excavation, construction of structures and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.
   1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.

D. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.
   1. Maintain piezometric water level a minimum of 60 inches below surface of excavation.

E. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of Work under construction or completed. Dispose water in a manner that avoids inconvenience to others. Provide sumps, sedimentation tanks and other flow-control devices as required by authorities having jurisdiction.
   1. Refer to Section 01 57 23, Storm Water Pollution Control for additional requirements.

F. Provide standby equipment on-site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense to Owner.

G. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches below overlying construction.

H. Damages: promptly repair damages to adjacent facilities caused by dewatering operations.

3.03 OBSERVATION WELLS

A. Prior to any excavation below the ground water table, place system into operation to lower water table as required and then operate it continuously 24 hours a day, 7 days a week until all utilities and structures have been satisfactorily constructed including placement of backfill materials and dewatering is not longer required.

B. Place an adequate weight of backfill material to prevent buoyancy prior to discontinuing operation of the system.

C. Provide, take measurements, and maintain at least the minimum number of observation wells or piezometers indicated Observe and record daily elevation of ground water and piezometric water levels in observation wells.

D. Repair or replace, within 24 hours, observation wells that become inactive, damaged, or destroyed. Suspend construction activities in areas where observation wells are not functioning properly until reliable observations can be made. Add or remove water from observation-well risers to demonstrate that observation wells are functioning properly.
   1. Fill observation wells, remove piezometers, and fill holes when dewatering is completed.
   2. Insure compliance with all conditions of regulating permits and provide such information to the Owner.

3.04 CORRECTIVE ACTION

A. If dewatering requirements are not satisfied due to inadequacy or failure of the dewatering system (loosening of the foundation strata, or instability of slopes, or damage to foundation or structures), perform work necessary for reinstatement of foundation soil resulting from such inadequacy or failure by contractor, at no additional cost to Owner.

END OF SECTION

SECTION 31 23 23

BACKFILLING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Authorized types of fill.

B. Building area backfilling to subgrade elevations.

1.02 REFERENCE STANDARDS

A. Conform to reference standards by date of issue current on date of Contract Documents.

B. ASTM D1557 - Laboratory compaction characteristics of soil using modified effort.

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

D. Chapters 18A and 33, California Building Code, 2016.

E. CSS - Caltrans Standard Specifications, Latest Edition.

1.03 SUBMITTALS

A. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
   1. Classification according to ASTM D 2487 of each [on-site] [and] [borrow] soil material proposed for fill and backfill.
   2. Laboratory compaction curve according to ASTM D 1557 for each on-site [and] [borrow] soil material proposed for fill and backfill.

B.

1.04 QUALITY ASSURANCE

A. Borrow. Fill, backfill, aggregate base, and other soil materials obtained from off-site sources shall be sampled and tested in compliance with CA EPA Department of Toxic Substances Control recommendations to prevent the importation of contaminated materials to the Site.
   1. Testing Frequency
      a. For borrow up to 1,000-cu.yrd, conduct 1 test for each 250-cu.yrds.
      b. For borrow between 1,001- and 5,000-cu.yrd; conduct 4 tests for first 1,000- cu.yrd, if material tests acceptable, conduct 1 test for each additional 500-cu.yrds.
      c. For borrow over 5,000-cu.yrds, conduct 12 tests during import of first 5,000-cu.yrd, if material tests acceptable, conduct 1 test for each additional 1,000-cu.yrds.

2. Owner's Testing Laboratory shall take samples at source, conduct testing and evaluate test results prior to delivery.
3. Conduct tests for lead and other heavy metals, asbestos, PCB's, pesticides, herbicides, VOCs, and semi-VOCs.
4. When detectable quantities of hazardous materials are found, determine the risk to human health, the environment, or both using the DTSC Preliminary Endangerment Assessment Guidance Manual.
5. Do not import soils that exhibit a known risk to human health, the environment, or both.

PART 2 - PRODUCTS

2.01 FILL MATERIALS

A. This Section establishes standards of quality for backfill materials to be used as approved by Geotechnical Engineer in accordance with Chapter 18A CBC, Section 1803A.2 and Appendix J Section J107, California Building Code, and as scheduled in other Sections of this specification.

B. Crushed Rock and Rock Dust: Crushed rock and rock dust shall be product of crushing rock or gravel. Portion of material that is retained on a 3/8 inch sieve shall contain at least 50 percent of particles having three or more fractured faces. Not over 5 percent shall be pieces that show no such faces resulting from crushing. Of that portion which passes 3/8 inch sieve but is retained on No. 4 sieve, not more than 10 percent shall be gravel particles. Crushed rock shall conform to 3/4 inch sieve size in accordance with Subsection 200-1.2, SSPWC, Crushed Rock Gradation Table.

C. Pea Gravel: Natural stone; washed, free of clay, shale, organic matter; graded to the following:
   1. Minimum Size: 1/4 inch.
   2. Maximum Size: 5/8 inch.

D. Sand: Sand shall consist of manufactured granular material, or combination thereof, free of deleterious amounts of organic material, mica, loam, clay and other substances not suitable for purpose intended. Conform to Section 200-1.5.5, SSPWC, for gradation as required for Portland Cement Concrete, sand must achieve compaction of a minimum 90 percent.

E. Crushed Aggregate Base: Crushed rock and rock dust conforming to requirements of Section 200-1.2, SSPWC, or Class 2 aggregate base as defined in Section 26, CSS.]

F. Imported Fill: Clean granular, free of debris, no rock larger than 3 inches in any dimension, non-expansive, approved by Geotechnical Engineer prior to placement on site.

G. Structural Backfill: Shall conform to SSPWC section 217-3.

H. Concrete: Structural, as specified in Section 03 30 00.

I. Concrete Slurry: as specified in Section 31 23 17.

J. Stockpiled Fill: On-site soils, stored separately on site, approved for re-use by Geotechnical Engineer.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify fill materials to be reused or imported are acceptable to Architect.

B. Verify foundation perimeter drainage installation has been inspected and approved.

3.02 BACKFILLING

A. Backfill and compact areas to contours and elevations with unfrozen materials. Remove debris from areas to receive backfills.
   1. Compaction: ASTM D1557, Compact to 90 percent of maximum dry density.
   2. Floor slabs shall be in place a minimum of 7 days before backfill is placed against walls.

B. Fill areas and types of fill shall be inspected, tested and approved by Geotechnical Engineer.

C. Employ placement method that does not disturb or damage foundation perimeter drainage, foundation waterproofing and protective cover or utilities in trenches. Do not commence backfill until such work is in place, inspected and approved.

D. Maintain optimum moisture content of backfill materials to attain required compaction density. When operations are interrupted by rain, do not resume work until field tests indicate that moisture content and density of the fill are as previously specified.

E. Slope grade away from building minimum 2 inches in 10 ft, unless noted otherwise.

F. Make grade changes gradual. Blend slope into level areas.

G. Remove surplus backfill materials from site.

H. Leave fill material stockpile areas completely free of excess fill materials.

I. Compaction Equipment: Wherever feasible, perform compaction with approved power-driven equipment such as rollers and sheeps-foot compactors. Compact areas inaccessible to rollers with pneumatic tampers or other approved compactors.

J. Flooding and jetting is not permitted.

3.03 TOLERANCES

A. Top Surface of Backfilling Subgrade: Within 0.05 feet from required elevations.

3.04 FIELD QUALITY CONTROL

A. No fill shall be placed on any prepared surface until that surface has been inspected and approved by Geotechnical Engineer.

B. If tests indicate work does not meet specified requirements, remove work, replace and retest. Cost of retests shall be paid by Owner and deducted from contract sum by Change Order.

C. Frequency of Tests: Geotechnical Engineer may require as many tests as are necessary to ensure specified results.

3.05 PROTECTION OF FINISHED WORK

A. Protect finished Work.

B. Recompact fills subjected to and damaged by vehicular traffic.

END OF SECTION

SECTION 31 23 26

STABILIZED SUBSURFACE BASE

PART 1 - GENERAL

1.01 SCOPE:

A. This document defines requirements for the materials, installation, and operating performance of an athletic field subsurface base system needed for a professional grade synthetic turf field. Defined are the primary base system requirements for insuring vertical and dimensional stability of the playing surface. Unusual site conditions such as tidal flooding, seismic instability and native soil contamination are outside the scope of this document and require specific analysis and consideration.

B. All specifications listed are defined per applicable ASTM standard test methods, unless no ASTM standard exists. All other specifications and tolerances listed shall be defined under standard ANSI and/or ISO drawing and specification rules.
   1. Concrete curb around the entire perimeter of the athletic field. A composite header (2' x 4') is mounted to the inside face of the concrete curb for synthetic turf attachment.

1.02 REFERENCE STANDARDS

A. Conform to reference standards by date of issue current on date of Contract Documents.

B. American Society for Testing and Materials (ASTM):
   1. ASTM D-4829 Standard Test Method for Expansion Index of Soils

C. ASTM D-2487 Standard Practice for Classification of Soils

D. ASTM D-5080 Standard Test Method for Determination of (%) Compaction

E. ASTM D-75 Standard Practice for Sampling Aggregates

F. ASTM C-136 Standard Test Method for Sieve Analysis of Aggregates

1.03 UNDERLYING SOIL REQUIREMENTS

A. Prior to preparing the sub-base soil, a predetermined amount of material will be excavated from the field area and removed from the site. The amount of soil removal will vary from 3" - 6" depending on cross-sectional requirements for crown, slope, backfill, synthetic turf, field events, perimeter curb and drainage elevations.
   1. Removals shall conform to testing requirements of Division 01.

B. The native soil shall be sufficiently irrigated and strafed as required to meet
   1. the final conditions set forth below.

C. Field Contour - Overall surface contour after final grading and compaction shall be a lateral or center crown of 0.5% slope minimum. Additional longitudinal crowns at the field ends may be needed to properly dress the entire surface contour to meet minimum slope and nominal header height requirements.

D. Soils Compaction:
   1. For non-expansive soils (indices less than 30): After final contouring and rolling, soil compaction shall be greater than 92% on average with no measurement less than 86% based on 8 samples taken at reasonably spaced locations across the field surface. Provide certified test results for soils compaction (ASTM D5080) as required per owner-designated ruling.
   2. For expansive soils (indices greater than 30): Proper procedures must be followed as recommended per the specific site soils report to achieve a compaction greater than 86% on with no measurement less than 82% among 8 samples.

E. Finished Soil Contour and Flatness - Underlying soil conditions will dictate whether an optional structural base material will be imported and placed prior to installation of the synthetic underlayment material:
   1. For installations of base: Local soil contour after final compaction and grading shall not have deviations in surface shape greater than 3/16" over a 10' span. Final contour shall be plotted on a table of laser-sighted grade elevations using a rectangular grid size of 120 yards by 60 yards with measurements every 20 yards (28 total elevation points). Grade elevations to be reviewed and approved prior to installation of the soil isolation fabric.
      a. The finished compacted and laser-graded surface should be set 1.0" +/- .10" below the top surface of the header in preparation for synthetic underlayment material installation. A graded surface tolerance of +/-1/8" is required along the header with minimal contour deviations allowed.

1.04 For installations with (optional) Structural Base: Local soil contour after final compaction and grading shall not have deviations in surface shape greater than 1/2 over a 10 span. Final contour shall be verified using a Óstring line method: lengths of 50-100 pulled taught with high/low spots marked and hand-dressed prior to importation of the structural base material.

1.05 SOIL ISOLATION FABRIC

A. The soil isolation fabric is a nonwoven polypropylene-based material with a minimum gauge weight of four (4) Oz/yd^2, DuPont SF 65.

B. The prepared soil subsurface shall be isolated from the synthetic base and turf system above it with a water and air permeable fabric placed across the entire surface of the field. This insures no mixing of the soil subsurface, yet allows water and air passage between the soil and sub-base system. Flow rate of the selected permeable fabric shall be 130 gallons/minute/square foot minimum (ASTM D4491).

C. Fabric seams within the field of play shall be overlapped a minimum of 8-12" and intermittently bonded or staked into place.

D. The fabric is additionally draped and formed into the perimeter drainage

1. trenches to insure non-penetration of the surrounding soil. The trench fabric
2. should be placed in position first with the field fabric placed over it and
3. overlapped a minimum of 2 feet prior to pipe and gravel installation.

1.06 PERIMETER DRAIN SYSTEM

A. Surrounding the playing surface and inside the perimeter curbing is located a perimeter drainage system that is coupled to a main drain exit or other equivalent strom drainage overflow system, reference drawings.

B. The perimeter drainage trench is nominally placed 4–6 feet inboard of the perimeter curbing. The drainage trench should have a width of at least 18 inches to a maximum of 24 inches. Depth of the drainage trench shall be a minimum of 18 inches (at the highest elevation within the system) to 24" maximum depth.

C. The drainage trench is isolated from the surrounding soil and structural aggregate by use of a polymer fabric as described in Section 4.4 above.

D. The trench bottoms shall have a drainage slope of 0.5% minimum with a preferred slope of 1% throughout the entire system.

E. Drainage piping is a perforated 4" - 6" [12"] diameter HDPE, refer to drawings.

F. Drainage piping is encased within the trench in a volume of free-flowing 3/4" minus diameter coarse drain rock compacted to 90% minimum Proctor. Ensure the drain rock contains limited fines so flow of water is not restricted within the system after placement and compaction. A permeability test should be conducted at intervals throughout the trench system to verify performance.

G. Drainage trenches should be compacted using a localized method resulting in compaction of 90 % minimum with no individual measurement less than 86 %.

H. Surface contour between the drainage trench and perimeter concrete curb should be counter-sloped to the field at a minimum of 1% for surrounding infiltration (as needed).

I. Coarse Drainage Rock Gradation Criteria. Refer to Civil Drawings:

Mesh size	**% Passing**
3/4"	100
5/8	100
1/2"	90-100
3/8"	70-90
#4	25-40
#8	15-30
#30	5-15
#50	0-7
#200	0-3

Local aggregate contour after final compaction and laser grading shall not have deviations in

surface shape greater than 1/4 over a 10 span. Final contour shall be plotted on a table of laser-sighted grade elevations using a rectangular grid size of 120 yards by 60 yards with measurements every 20 yards (28 total elevation points). Grade elevations to be reviewed and approved prior to installation of the synthetic base material.

1.07 APPROVALS

A. Finished Subsurface base work must be approved in advance by the turf manufacturer prior to installation of the synthetic base material. Approvals to be based on documented laser-sighted grade elevations or a physical inspection prior to installation of the soil isolation fabric.

B. Any approvals sought upon completion without proper documentation or notification will become the responsibility of the General Contractor, as will any costs for repair or refinishing work.

END OF SECTION

SECTION 32 12 16

ASPHALTIC CONCRETE PAVING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes
1. Asphaltic concrete paving and surface sealer.
2. Sub-base preparation.
3. Aggregate base coarse.
4. Concrete parking bumpers.
5. Asphalt speed bumps.
6. Plastic parking bumpers and speed bumps.
7. Patching and repair of asphaltic concrete paving.

B. Related Sections
1. Section 01 35 43, Special Environmental Requirements.
2. Section 32 17 23, Pavement Marking.

1.02 REFERENCE STANDARDS

A. Conform to reference standards by date of issue current on date of Contract Documents.

B. ASTM - American Society for Testing and Materials
1. ASTM D977 - Standard Specification for Emulsified Asphalt
2. ASTM D1557 - Laboratory Compaction Characteristics of Soil Using Modified Effort.
3. ASTM D2026 - Standard Specification for Cutback Asphalt

C. AASHTO - American Association of State Highways and Transportation Officials
1. AASHTO MP 1 - Performance Graded Asphalt Binders

D. CSS - Caltrans Standard Specifications

E. SCAQMD - South Coast Air Quality Management District
1. SCAQMD-1108 - SCAQMD Rule 1108, Cutback Asphalt

F. SSPWC - Standard Specifications for Public Works Construction

1.03 QUALITY ASSURANCE

A. Perform Work in accordance with Sections 200, 203 and 302, SSPWC.

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

1.04 SUBMITTALS

A. Product data, mix design per Section 01 30 00, Administrative Requirements.

B. Special Environmental Requirements Form, found in Appendix A of Section 01 35 43 Special Environmental Requirements. Provide the following information for aggregate for base coarse.
   1. Recycled Content.
   2. Local/Regional Materials.

C. Special Environmental Requirements Product Form, found in Appendix A of Section 01 35 43 Special Environmental Requirements. Provide the following information for asphalt.
   1. Local/Regional Materials.

1.05 ENVIRONMENTAL REQUIREMENTS

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

B. Conformation to AQMD, Local Regulations.

1.06 SOILS INFORMATION

A. Geotechnical Investigation has been prepared under direction of Owner. Investigation is hereby referenced as information for Work of this Section. Architect assumes no responsibility for conclusions Contractor may draw from information provided. Contract Documents take precedence over recommendations that may be contained in investigation and Contractor must obtain approval for deviations from Contract Documents. Copy of investigation is available at Architect's office.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Acceptance at site.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Asphalt Binder: SSPWC 203-1 or AASHTO MP1, Performance Grade 64-10 South and Central Coast, Inland Valleys Regions, and shall conform to the testing requirements of Table 203-1.2 (A), Section 203 SSPWC.

B. Asphalt Aggregate: Uniformly graded in accordance with Section 203-6.2.2, SSPWC.

C. Crushed Aggregate Base (CAB): Crushed rock and rock dust conforming to requirements of Section 200-1.2, SSPWC, or Class 2 Aggregate Base as defined in Section 26, CSS.

2.02 ACCESSORIES

A. Primer: ASTM D2026, cutback type, slow curing, Grade SC-250.

B. Seal Coat: Conform to Section 203-9, SSPWC.
1. GUARDTOP by Industrial Asphalt/Vulcan Material Co., Inc., Irwindale, CA.
2. SATIN SEAL by Blue Diamond Co., Long Beach, CA.
3. Or equal, as approved in accordance with Division 01, General Requirements for Substitutions.

C. Parking Bumpers:
1. Precast concrete type, steel reinforced, air-entrained, 5000 psi, bars No. 3 minimum size. Bars shall extend to within 1-1/2 inches of ends of bumpers. Minimum bumper size: 6-inches high, 8-inches wide, 6-feet long unless otherwise indicated on Drawings. Provide chamfered corners, traverse drainage slots on underside, and a minimum of two factory-formed vertical holes through wheel stop for anchoring to substrate.
2. Recycled Plastic Parking Bumpers: 72-inches L x 6-inches W x 4-inches H, including attachment accessories, Model STWHLSTP, color: yellow. By Barco Products Company, Batavia, IL. Or equal.
3. Parking Bumpers: "Power-Stop", by Collins and Aikman (510-536-2600 or 800-444-2054), or approved equal meeting the following requirements:
   a. Material: 100% recycled composite parking stops manufactured from fibrous reinforcement and a blend of vinyl, nylon fibers, post-consumer plastics, and post-industrial plastics.
   b. Physical Properties:
      1) Density (ASTM D79): 60 lbs/cf.
      2) Leaching (EPA 1311): Pass.
      3) Water Absorption (ASTM D1027): 0.2%.
      4) Nail Pull-Out (ASTM 1761): 170 lbs.
      5) Compressive Stress (ASTM D198): 3104 psi.
      6) Modulus of Rupture (ASTM D198): 2307 psi.
      7) Modulus of Elasticity (ASMT D198): 120731.
   c. Size: 5-3/4 inches x 3-1/2 inches x length as indicated.
   d. Provision for Installation: Pre-drill parking stops for two 5/8" diameter rebar anchors.
4. Speed bumps: 96-100% post-consumer recycled plastic with countersunk holes for bolts. Provide lag bolts and required hardware. Exposed surfaces shall be dense, smooth, free of pits, honeycomb or other defects.
5. Installation adhesives: As recommended by parking stop and speed bump manufacturer for surface to which installed.

D. Speed Bumps: GNR Technologies, LaSalle, Quebec. Model: "Easy Rider", recycled rubber, 12 inches x 72 inches x 2-1/4 inches with end caps. 3 pieces each location per plans.

E. Soil Sterilizer: Spike 80DF. Non-selective weed and grass killer, by Dow-Agro Sciences, Indianapolis, IN, EPA Reg. No. 62719-107, or equal, as approved in accordance with Division 01, General Requirements for Substitutions.
   1. Active Ingredients:
      a. Tebuthiuron: 80%
      b. Inert Ingredients: 20%
      c. Total: 100%

F. Headers: Foundation grade redwood, minimum 2- x 4-inches. Stakes shall be minimum 2- x 3-inches in accordance with Section 302-5.5 SSPWC.

G. Raised Pavement Markers: Per Section 32 17 23.

2.03 ASPHALT PAVING MIX

A. Use dry material to avoid foaming. Mix Uniformly.

B. Mix: Surface Coarse; Section 203-6.4 SSPWC, 1/2-inch maximum aggregate size, medium gradation curve, as required by outside temperatures at time of laying.
   1. Single Coarse: C2 (Dense Medium) aggregate. Performance Grade 64-10 asphalt.
      a. Areas where hand spreading is required: Use 3/8-inch mix.

C. Mix: Section 203-6.4 SSPWC, 3/4-inch asphalt base coarse, 1/2-inch asphalt surface coarse aggregate size.
   1. Asphalt Base Coarse: B (Dense Medium Coarse), Performance Grade 64-10 asphalt. Thickness of 2-1/2 inches.
   2. Asphalt Surface Coarse: C2 (Dense Medium), Performance Grade 64-10 asphalt. Thickness of 1-1/2 inches.

D. Recycled Asphalt Concrete (RAC), C2-PG 64-10 RAC: Reclaimed Asphalt Pavement (RAP) maximum 15% unless noted otherwise on drawings, aggregate and asphalt per SSPWC Section 203-7.

PART 3 - EXECUTION

3.01 SUB-GRADE

A. Bring areas to be surfaced to required subgrades by cutting and filling with suitable equipment.

B. Scarify subgrade to minimum depth of 6-inches. Bring to optimum moisture content and compact to minimum 90 percent density in accordance with ASTM D1557 by rolling with power roller. Provide hard, even surface to receive subsequent base and paving.

C. Finish subgrade to required grades with allowance for compression and for thickness of base coarse and finish paving thickness.

3.02 SOIL STERILIZATION

A. After sub-grade has been compacted and approved by Geotechnical Engineer, treat areas to be paved with specified soil sterilizer. Conform to the following:
   1. Apply 7.5 lbs. of solution per acre for each 15 gallons of water, spray apply per manufacturer's instructions.

B. Exercise caution during storage of material and during application. Prevent injury to humans, animal life, adjacent plant life and property. Keep soil sterilization materials minimum three feet from tree wells or any plant life.

C. Legally dispose of containers.

3.03 BASE COARSE

A. Place and compact aggregate base upon finished subgrade in conformance with Section 301-2 SSPWC. Compaction: 95 percent.

B. Thickness of Base After Compaction: As indicated on Drawings but not less than 4-inches if indicated.

3.04 PREPARATION - PRIMER AND TACK COATS

A. Apply primer coat on base coarse surfaces in conformance with Section 302-5.3, SSPWC, at rate of 0.10 to 0.25 gallons per sq. yd. Allow to cure prior to application of Asphalt Coarse.

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

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

3.05 PLACING ASPHALT PAVEMENT – SINGLE/DOUBLECOARSE

A. Install redwood headers.

B. Place asphalt in conformance with Section 302-5 SSPWC. Conform to temperature maximums and minimums specified therein. Materials shall not be applied which have cooled below lower limit allowable.
   1. Install 1/2-inch mix for single coarse asphalt pavement.
   2. Install ¾" AC mix for double coarse indicated is section 2.03-C.1 above.

C. Place to thickness as indicated on drawings but not less than **2** inches if not indicated.

D. Install drainage grilles and frames in correct position and elevation.

E. Compact pavement by rolling with equipment specified in Section 302-5.6, SSPWC. Do not displace or extrude pavement from position.

F. Develop rolling with consecutive passes to achieve even and smooth finish, without roller marks, rock pockets, ridges or depressions.

G. If placing (2) coarses, base coarse may remain untreated until such time as the final coarse is desired near end of construction ctivities.

H. For second coarse follow steps A through F above using ½ inch AC mix indicated isn section 2.03-C.2 above.

3.06 SEAL COAT

A. Apply seal coat 30 days or more after surface coarse application, in accordance with manufacturer's recommendations.

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

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

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

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

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

3.07 PARKING BUMPERS

A. Securely attach precast concrete parking bumpers into pavement with two 5/8-inch diameter galvanized solid rod anchors. Extend anchors 24-inches into ground. Apply adhesive to underside of concrete bumpers, as recommended by the manufacturer.
   1. Low-VOC emission type, heavy duty adhesives as recommended by the manufacturer or expansion-type steel bolts set in holes drilled into concrete paving.

3.08 ASPHALT CONCRETE SPEED BUMPS

A. Construct hot-mix asphalt speed bumps over compacted pavement surfaces. Apply a tack coat unless pavement surface is still tacky and free from dust. Spread mix at a minimum temperature of 250 degrees F (121 degrees C).

B. Tack Coat Application: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq.yd. (0.2 to 0.7 L/sq.m.).

C. Asphalt Mix: Same as pavement surface-course mix.

D. Before installation, mill pavement that will be in contact with bottom of speed bump. Mill to a depth of 1-inch (25mm) from top of pavement to a clean, rough profile.

E. Place and compact hot-mix asphalt to cross section as indicated on Drawings or as specified below, by machine or by hand in wood or metal forms. Tamp hand-placed materials and screed to smooth finish. Remove forms after hot-mix asphalt has cooled.
1. Width: 1'-6", 3" high crown radius to 16".
2. Paint speed bump yellow per Section 32 17 23, Pavement Markings.

3.09 SPOT PATCHING AND REPAIRS

A. Patching: Saw cut perimeter patch and excavate existing pavement section to sound base. Scarify and recompact the upper 12-inches of subgrade to 95% of maximum density. Excavate rectangular or trapezoidal patches, extending 12-inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically.
1. Tack coat faces of excavation and allow to cure before paving.
2. Fill excavation with dense-graded, hot-mix asphalt base mix and, while still hot, compact flush with adjacent surface.
3. Partially fill excavation with dense-graded, hot-mix asphalt base mix and compact while still hot. Cover asphalt base course with compacted, hot-mix surface layer finished with adjacent surfaces.

3.10 PATCHING AND REPAIR OF ASPHALTIC CONCRETE PAVING

A. Tack Coat: Apply uniformly to existing surfaces of previously constructed asphalt or portland cement concrete paving to surfaces abutting or projecting into new, hot-mix asphalt pavement. Apply at a uniform rate of 0.05 to 0.15 gal.sq.yd. of surface.
1. Allow tack coat to cure undisturbed before paving.
2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

B. Preparation:
1. Subgrade Preparation: Scarify earth subgrade to a depth of not less than 6-inches, and compact to 95 percent of maximum density.
2. Moisten with water to approximate optimum moisture content, and while moist, roll until the surface is unyielding, with a power roller of such weight as to develop a pressure of not less than 200 pounds per linear inch of roller width.
3. Correct irregularities by dressing down or filling as may be required, to bring areas to true subgrade elevations.
4. Where filling is required, scarify the subgrade to bond the new material to the in-place material; use additional material as required, subject to the approval of the Architect, and provided by the Contractor.
5. Remove excess material from the site to a legal disposal area.

C. Compaction Repairs: Remove paved areas that are defective or contaminated with foreign materials. Remove paving coarse over area affected and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

D. Surface Treatments - Slurry Seal: Apply slurry coat in a uniform thickness according to ASTM D3910 and allow to cure.
   1. Roll slurry seal to smooth ridges and provide a uniform, smooth surface.

E. Application General:
   1. Finish elevations, extent of asphalt paving and locations of type of asphalt and class of base shall be as indicated and specified. Bring subgrade elevations sufficiently below the finish elevations of the paving so as to accommodate the thickness of paving and base.
   2. Compaction expressed in percentages in this section refers to the maximum dry density determined by Test Method No. 2016-F as described in the Caltrans "Manual of Tests".

F. Application of Base Coarse
   1. Placing Aggregate Subbase Coarse: Place sub-base coarse on the compacted sub-grade and compact in accordance with CALTRANS "Standard Specifications," Article 25-1.04. Finished surface of the sub-base at any point shall not vary more than 0.08 foot above or below the grade indicated.
   2. Placing Aggregate Base Coarse: Place base coarse on the compacted aggregate sub-base coarse and compact in accordance with applicable provisions of CALTRANS "Standard Specifications," Sections 25 and 26. Use compacting equipment adequate for the size of the installation and capable of achieving the compaction specified.
   3. Compact each layer to a relative compaction not less than 95% of that determined by Test Method No. Calif. 216.
   4. Apply finished base coarse to a thickness which does not vary more than 0.05 foot from the planned thickness at any point. Reshape or rework, water, and thoroughly re-compact base that does not conform to the specified requirements.

G. Sterilant Application: Place herbicide below asphalt paving. Meet the applicable environmental control requirements. Apply as directed by the manufacturer's printed instructions just before application of the paving. Take special care to insure that herbicide is not applied to any areas which are to be planted.

H. Placing Asphalt Concrete Surface:
   1. Prime Coat: Before the surface coarse is laid, apply liquid asphalt primer to the base coarse surface at rate of 0.20 to 0.50 gallons per square yard. Apply material to penetrate and seal, but not flood, the surface.
   2. Paint Binder: Before the surface coarse is laid, paint all vertical surfaces of curbs, gutters, and drainage structures and all cold or existing pavement joints with a paint binder at an approximate rate of 0.05 to 0.10 gallon per square yard.
   3. Placing Asphaltic Concrete Surface Coarse: Place and compact asphaltic concrete in accordance with Standard Specifications, CALTRANS Section 39-5, 39-6, and 39-7.
   4. Placing Asphaltic Concrete Surface Coarse: Spread asphaltic concrete mixture at a temperature of not less than 250 degrees F. Place by use of a self-propelled asphalt paving machine, except on small areas where inaccessibility precludes their use. On these small areas spread by means of a spreader box, or by hand methods.

a. Spread mixture in a single layer (two layers at Contractor's option) to such a thickness that, after receiving the final compaction, the finish paving shall have a minimum thickness as indicated.

5. Berms, curbs, and slow down strips shall be placed with an extrusion machine or other equipment capable of shaping and compacting the material to the required cross section.

I. Seal Coat:

1. Apply to all new asphaltic concrete paving, in accordance with SSPWC Standard Specifications, Section 302-8. Apply to all existing asphaltic concrete paving where indicated, in accordance with SSPWC Standard Specifications, Section 302-8. Dilute emulsion as directed with water not to exceed 20% of the total volume.
2. Thoroughly clean foreign matter off pavement before application. No emulsion shall be spread when the atmospheric temperature is less than 60 degrees F., or when weather conditions are unsuitable for drying.
3. Apply, just prior to "line" work, at rate of 0.10 gallon per square yard, at temperature between 100 and 140 degrees. If tackiness prevails, lightly dust affected areas with rock dust or fine sand.

J. Header Board Installation: Install header boards at perimeter of pavement with stakes spaced not over 24 inches on center unless otherwise indicated. Do not install header boards where asphaltic concrete paving abuts buildings, concrete walks or curbs, or other pavements.

K. Pavement Painting:

1. Allow seal coats to cure for ten days before applying paint.
2. Cleaning: Sweep and clean surface to eliminate loose material and dust.
3. Apply paint with mechanical equipment to produce uniform straight edges. Using painting equipment and templates specifically designed for this purpose. Protect adjoining work from damage.
4. Make lines 4" wide unless otherwise indicated.
5. Layout markings to exact requirements of Owner. Verify layout line widths, and colors prior to painting.

L. Field Quality Control:

1. Before seal coating, flood the paved areas with water to check drainage and surface irregularities. Replace, or overlay high and low spots in an acceptable manner and water test the paving again after corrections have been made.
2. Replace or repair deficient and damaged asphalt paving.
3. All paving shall drain properly before being accepted. There shall be no variation greater than 1/4-inch plus or minus from a 10-foot straight edge, except at grade changes.

3.11 TOLERANCES

A. Thickness: Compact each coarse to produce the thickness indicated within the following tolerances:

1. Base Coarse: Plus or minus 1/2-inch.
2. Surface Coarse: Plus 1/4-inch, no minus.

B. Surface Smoothness: Compact each coarse to produce a surface smoothness within the following tolerances as determined by using a 10-foot straight edge applied transversely or longitudinally to paved areas:
   1. Base Coarse: 1/4-inch.
   2. Surface Coarse: 1/8-inch.

C. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4-inch.

3.12 PROTECTION

A. Protect asphalt paving against vehicular traffic before and for 48 hours following seal coating.

END OF SECTION

SECTION 32 12 17

ASPHALTIC CONCRETE RAMPS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Asphaltic concrete pedestrian and vehicle ramps.

B. Sub-base preparation.

1.02 REFERENCE STANDARDS

A. Conform to reference standards by date of issue current on date of Contract Documents.

B. ASTM D946 - Penetration-Graded Asphalt Cement for Use in Pavement Construction.

C. ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb. rammer and 18 inch drop.

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

E. AQMD - Air Quality Management District, Local Regulations, Cutback Asphalt.

1.03 QUALITY ASSURANCE

A. Perform work in accordance with Section 203, SSPWC.

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

1.04 ENVIRONMENTAL REQUIREMENTS

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

B. Conform to AQMD, Local Regulations.

1.05 SUBMITTALS

A. Product data.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Asphalt Cement: ASTM D946.

B. Aggregate: Crushed rock, uniformly graded in accordance with Section 200, SSPWC.

C. Mix: AR4000, Type 1, medium (C) or medium course (B) in accordance with Section 203, SSPWC.

2.02 ACCESSORIES

A. Tack Coat: Homogeneous, slow setting emulsified asphalt SS1H.

B. Seal Coat: Asphalt based, plant blended, composed of mineral aggregates uniformly distributed in petroleum - based asphalt emulsion. Material shall comply with requirements of Section 203 SSPWC, GUARD TOP by Industrial Asphalt, Inc., Irwindale, CA, or equal, as approved in accordance with Division 01, General Requirements for Substitutions.

C. Soil Sterilizer: Spike 80DF. Non-selective weed and grass killer, by Dow-AgroSciences, Indianapolis, IN, EPA Reg. No. 62719-107, or equal, as approved in accordance with Division 01, General Requirements for Substitutions.

1. Active Ingredients:

a.	Tebuthiuron	80 percent
b.	Inert Ingredients	20 percent
	Total	100 Percent

PART 3 - EXECUTION

3.01 SUB-BASE

A. Bring areas to be surfaced to required subgrades by cutting and filling with suitable equipment.

B. Scarify subgrade to a minimum depth of 6 inches. Bring to optimum moisture content and compact to minimum 90 percent density in accordance with ASTM D1557 by rolling with a power roller. Provide a hard, even surface to receive paving.

C. Finish subgrade to required grades with allowance for compression and for thickness of finish paving thickness.

3.02 SOIL STERILIZATION

A. After sub-base has been compacted and approved by Geotechnical Engineer, treat areas to be paved with specified soil sterilizer. Conform to following:

1. Apply 7.5 lbs. of solution per acre for each 15 gallons of water, spray apply per manufacturer's instructions.

B. Exercise caution during storage of material and during application. Prevent injury to humans, animal life, adjacent plant life and property. Keep soil sterilization materials minimum three feet from tree wells or any plant life.

C. Legally dispose containers.

3.03 PREPARATION - TACK COAT

A. Apply soil sterilizer at ramps over grade, omit sterilizer at ramps over existing asphalt paving.

B. Apply tack coat over existing asphalt surfaces in conformance with Section 302, SSPWC.

3.04 PLACING ASPHALT

A. Provide wood headers in conformance with Section 302, SSPWC.

B. Place asphalt in conformance with Section 302, SSPWC.

C. Place to thickness of minimum 3 inches or to profile required for ramp configuration.

D. Compact pavement by rolling with equipment specified in Section 302, SSPWC. Do not displace or extrude pavement from position.

E. Develop rolling with consecutive passes to achieve even and smooth finish, without roller marks.

3.05 SEAL COAT

A. Apply seal coat 28 days or more after surface course application or as recommended by the seal coat manufacturer. Verify timing with construction schedule.

B. Add water to specified seal coat material in amounts approved by the manufacturer, to conform to the air temperatures encountered during application.

C. Apply seal coat to surface course in accordance with Section 302, SSPWC.

D. A second application shall be made after first coat has dried to the touch.

E. Allow seal coat to dry before permitting traffic, striping or installation of railings.

3.06 TOLERANCES

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

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

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

3.07 PROTECTION

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

END OF SECTION

SECTION 32 12 43

STABILIZED DECOMPOSED GRANITE PAVING

PART 1 - GENERAL

1.01 SCOPE

A. This Section includes material and labor requirements for construction with decomposed granite paving with Stabilizer binder additive for the following items:

1. Stabilized decomposed granite pathway

1.02 PERFORMANCE REQUIREMENTS

A. Perform gradation of decomposed granite material in accordance with ASTM C 136 – Method for Sieve Analysis for Fine and Course.

B. All D.G. surfaces shall comply with 11B-302.1 and 11B-303.

1.03 SUBMITTALS

A. Products Data: For each product specified. Submit a 5 lb. sample and sieve analysis for grading of decomposed granite to be sent to Stabilizer Solutions, Inc. prior to any construction – (allow 2 week turn around). Must be approved by Landscape Architect and owner.

1.04 PROJECT/SITE CONDITIONS

A. Field Measurements: Each bidder is required to visit the site of the Work to verify the existing conditions. No adjustments will be made to the Contract Sum for variations in the existing conditions.

1. Where surfacing is indicated to fit with other construction, verify dimensions of other construction by field measurements before proceeding with the work.

B. Environmental Limitations: Do not install decomposed granite paving during rainy conditions or below 40 degrees Fahrenheit and falling.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Installer to provide evidence to indicate successful experience in providing decomposed granite or crushed 3/8" or 1/4" minus aggregate paving containing Stabilizer binder additive.

1.06 WARRANTY

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

B. Special Warranty: Submit a written warranty executed by the installer agreeing to repair or replace components of stabilized surfacing that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, the following:

1. Premature wear and tear, provide the material is maintained in accordance with manufacturer's written maintenance instructions.
2. Failure of system to meet performance requirements.

C. Warranty Period: Contractor shall provide warranty for performance of product. Contractor shall warranty installation of product for the time of one year from completion.

D. Contractor shall provide, for a period of sixty days, unconditional maintenance and repairs as required.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Stabilizer for decomposed granite and crushed stone surfaces provided by the following manufacturer:

1. Stabilizer Solutions, Inc. 205 South 28th St., Phoenix, AZ 85034; phone (602) 225-5900, (800) 336-2468; fax (602) 225-5902; website stabilizersolutions.com; email lphubbs@stabilizersolutions.com

2.02 MATERIALS

A. Decomposed Granite screenings

1. Crushed Stone Sieve Analysis Percentage of Weight Passing a Square Mesh Sieve AASHTO T11-82 and T27-82

1/4" MINUS AGGREGATE GRADATION

U.S. Sieve No.	Percent Passing by Weight
# 3/8"	100
# 4	90 – 100
# 8	75 – 80
# 16	55 – 65
# 30	40 – 50
# 50	25 – 35
# 100	15 – 20
# 200 to	10 – 15

B. Stabilized Binder

1. Patented, non-toxic, organic binder that is a colorless and odorless concentrated powder that binds decomposed granite or crushed 3/8" or 1/4" minus aggregate

PART 3 - EXECUTION

3.01 BLENDING STABILIZER

A. Mechanically blend 12 to 16 lbs (call manufacturer for exact blend) of Stabilizer per 1-ton of decomposed granite. It is critical that Stabilizer be thoroughly and uniformly mixed throughout decomposed granite. Bucket blending is not acceptable. Blending with a rake and or shovel is not acceptable.

3.02 PLACEMENT

A. After pre-blending, place the Stabilized decomposed aggregate on prepared sub-grade. Level to desired grade and cross section.
1. All subgrade to be compacted to 90% or better.
2. All aluminum headerboard containing the D.G. are to be installed prior to placement of D.G. surface. Header and grade behind header, shall be firm and stable to comply with 11B-302.

B. Depth of pathways – 3" for heavy foot traffic and light vehicles.

3.03 WATERING

A. Water heavily to achieve full depth moisture penetration of the Stabilized pathway Profile. Water activates Stabilizer. To achieve saturation of Stabilized pathway Profile, 25 to 45 gallons of water per 1-ton must be applied. During water application randomly test for depth using a probing device to the final depth.

3.04 COMPACTION

A. Upon thorough moisture penetration, compact aggregate screenings to 85% relative compaction by compaction equipment such as; a 2 to 4-ton double drum roller or a 1,000 lb. Single drum roller with vibratory plate tamp. Do not begin compaction for 6 hours after placement and up to 48 hours.

B. Take care in compacting decomposed granite when adjacent to planting and irrigation systems. Hand tamping with 8" or 10" hand tamp recommended.

3.05 INSPECTION

A. Finished surface of pathway shall be smooth, uniform and solid. There shall be no evidence of chipping or cracking. Cured and compacted pathway shall be firm throughout profile with no spongy areas. Loose material shall not be present on the surface. Any significant irregularities in path surface shall be repaired to the uniformity of entire installation.

3.06 MAINTENANCE

A. Remove debris, such as paper, grass clippings, leaves or other organic material by mechanically blowing or hand raking the surface as needed.

B. During the first year, a minor amount of loose aggregate will appear on the paving surface (1/16" to 1/4"). If this material exceeds a 1/4", redistribute the material over the entire surface. Water thoroughly to the depth of 1". Compact with power roller of no less than 1000 lbs. This process should be repeated as needed.

C. If cracking occurs, simply sweep fines into the cracks, water thoroughly and hand tamp with an 8" – 10" hand tamp plate.

3.07 REPAIRS

A. Excavate damaged area to the depth of the Stabilized aggregate and square off sidewalls.

B. If area is dry, moisten damaged portion lightly.

C. Pre-bend the dry required amount of Stabilizer powder with the proper amount of aggregate in a concrete mixer.

D. Add water to the pre-blended aggregate and Stabilizer. Thoroughly moisten mix with 25 to 45 gallons per 1-ton of pre-blended material or to approximately 10% moisture content.

E. Apply moistened pre-blended aggregate to excavated area to finish grade.

F. Compact with an 8" to 10" hand tamp or 250 to 300 pound roller. Keep traffic off areas for 12 to 48 hours after repair has been completed.

END OF SECTION

SECTION 32 13 13

CONCRETE WALKS

PART I: GENERAL

1.01 SCOPE

A. This Section includes placing concrete for walks at locations shown on the Drawings.

1.02 QUALITY ASSURANCE

B. All construction shall be in conformance with Local and State codes. Contractor shall be responsible for obtaining all required permits.

C. Protect adjacent work and materials. Remove all rubbish and accumulated materials and leave work in clean, orderly and acceptable condition.

D. Obtain the pertinent engineering and or architectural plans before commencing work.

E. Contractor shall provide safety barricades and flashers and required by local codes.

1.03 MODIFICATIONS AND SAMPLES AND SUBMITTALS

A. Design modifications may be made only as necessary to meet field conditions and to insure the correct alignment and relationship of the work, and only as directed by the Landscape Architect.

PART 2: PRODUCTS

2.01 MATERIALS

A. Concrete and the equipment, workmanship, and materials, including all sampling and testing shall be in accordance with applicable requirements of Section 303-5. of the Standard Specifications for Public Works Construction. (2013 Edition).

B. All concrete for site flatwork shall be 2,500 PSI minimum strength at 30 days with 3" slump range.

C. The forms shall conform to the applicable requirements of Section 303-5.2 of the Standard Specifications for Public Works Construction. (2013 Edition)

D. Use coarse aggregate conforming to the requirements for coarse aggregate as specified in the Standard Specifications for Public Works Construction. (2013 Edition)

E. Reinforcing bars shall be deformed steel bars, conforming with ASTM A 615, grade 40.

PART 3: EXECUTION

3.01 PREPARATION

A. The subgrade shall be constructed true to grade and to the cross section shown on the Drawings. The subgrade shall be compacted to a density of 95 percent (minimum).

3.02 INSTALLATION

A. Deposit concrete in forms on compacted subgrade.

B. Provide and install 3/8" wide preformed expansion joint material in concrete walks and curbs at intervals as specified on the Plans, at intersections of concrete walks, and at intersections with other concrete surfaces, building foundations and other fixed surfaces. Expansion joints are to be recessed 1/2" below the top of the finished pavement surface and shall have tear-off plastic caps to allow for the installation of elastomeric sealant.

C. Provide and install 1/4" wide preformed expansion joint material around all appurtenances such as manholes, inlets, utility poles, etc. that fall within the limits of Portland cement concrete pavement, sidewalk.

D. Level concrete off and tamp sufficiently to bring mortar to the surface. Finish off with a wood float afterward.

E. After floating walks, round edges with an approved edger. Score concrete walks transverely at intervals not exceeding width of walk or as shown on the Drawings.

3.03 FINISHING

A. Finish the final finishes of concrete for walks, ramps, and steps after floating. Finishes are as noted on the plans.

B. Broom Finish: Pull broom across freshly floated concrete to produce fine texture in straight lines perpendicular to main line of traffic. Do not dampen brooms.

3.04 CURING

A. Protect and cure finished concrete paving, complying with applicable requirements of the Standard Specifications (Green Book). Use membrane forming curing compound or approved moist curing methods per manufacturer's requirements. Follow manufacturer's written instructions for colored concrete.

3.05 TOLERANCES

A. Minor variations in appearance of colored concrete, which are similar to natural variations in color and appearance of unpigmented concrete, are acceptable.

3.06 SEALANTS AND CLEAN-UP

A. Furnish and install elastomeric expansion joint sealant in all 3/8" wide expansion joints. Color of sealant is to match finished concrete color. Spread clean silica sand on freshly filled joint sealant.

B. Repair or replace broken or defective concrete as directed by the Landscape Architect.

C. Protect concrete surfaces from damage until acceptance of the work. Exclude traffic from pavements for at least 14 days after placement.

D. Sweep concrete pavement and wash free of stains, discolorations, dirt or other foreign material prior to acceptance.

END OF SECTION

SECTION 32 13 13.1

SITEWORK CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes
1. Cast-In-Place concrete pedestrian paving and sidewalks.
2. Curbs and gutters.
3. Concrete stairs, ramps and landings.
4. Light standard bases, fence post bases flagpole bases monument sign railing footings and similar site structures.
5. Utility concrete pads.
6. Perimeter concrete curbing, mow strips, concrete drainage structures, swales.

B. Related Sections:
1. Section 01 35 43, Special Environmental Requirements.
2. Section 31 23 16 Excavation.
3. Section 32 14 13, Unit Pavers, Detectable Warnings (Truncated Domes) texture.
4. Section 32 17 26 Tactile/Detectable Warning Surface Tile

1.02 REFERENCE STANDARDS

A. Conform to reference standards by date of issue current on date of Contract Documents.

B. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.

C. ACI 224.3R-95 - Joints in Concrete Construction

D. ACI 318-14 - Building Code Requirements for Structural Concrete and Commentary, 2008 Edition.

E. ACI 301 - Structural Concrete for Buildings.

F. ASTM - American Society for Testing and Materials
1. ASTM A185 - Steel Welded Wire Reinforcement, Plain, for Concrete
2. ASTM A615 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
3. ASTM C33 - Concrete Aggregates
4. ASTM C94 - Ready-Mixed Concrete
5. ASTM C150 - Portland Cement
6. ASTM C171 - Sheet Materials for Curing Concrete
7. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete
8. ASTM C618 - Coal Fly Ash and Raw or Calcinated Natural Pozzolan for use as a Mineral Admixture on Concrete
9. ASTM C920 - Elastomeric Joint Sealants
10. ASTM C979 - Pigments for Integrally Colored Concrete
11. ASTM C1107 - Packaged Dry, Hydraulic - Cement Grout (Non-Shrink)

12. ASTM D1751 - Preformed Expansion Joint Fillers for Concrete, Paving and Structural Construction
13. ASTM E1980-11 - Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.

G. CBC - 2016 California Building Code and Supplements
1. CBC-11 - CBC Chapter 11B, Accessibility to Public Buildings, Public Accommodations, Commercial Facilities and Publicly Funded Housing
2. CBC-17 - CBC Chapter 17A, Structural Tests and Special Inspections
3. CBC-19 - CBC Chapter 19A, Concrete DSA

H. LEED-NC Reference Guide.

1.03 SUBMITTALS

A. Placement Schedule for approval: Provide details or sketches showing location of each placement of concrete Work only if there is a deviation from the approved plan. Do not deviate from location of expansion joints or scorelines as indicated on the Architectural plans.

B. Design mix for each concrete mix if devieating from regional standards.

C. Steel reinforcement shop drawings, including materials, grade, bar schedules, spacing, bent bar diagrams, arrangement and supports if deveating from approved plans.

D. Submit contraction (crack control) joint, expansion, isolation and construction joint layout to Architect for approval if requested.

E. Product data on joint filler, sealants, curing compounds and reinforcing if requested.

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

G. Sustainable Design Submittals: Provide the following information by filling out the Special Environmental Requirements Product Submittal Form located in Appendix A of Section 01 35 43 Special Environmental Requirements, together with required supporting documentation.
1. Recycled Materials
2. Local/Regional Materials.

1.04 REGULATORY REQUIREMENTS

A. Pedestrian walks, plazas and paving shall comply with CBC Chapter 11B. Portland Cement concrete paving shall be stable, firm, and slip resistant and shall comply with CBC Sections 11B-302 and 11B-403.

B. Solar Reflectivity Index (SRI) of Concrete: minimum SRI of 35 target values per LEED-NC Reference Guide for LEED. LEED Sustainable Sites Credit 7.1.

1.05 QUALITY ASSURANCE

A. Maintain one copy of all records on site.

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

C. Conform to ACI 318-14 Chapter 5.13, California Building Code, when placing concrete during hot weather.

D. Conform to ACI 318-14 Chapter 5.12, California Building Code, when placing concrete during cold weather. No placement of concrete permitted below 50 degrees Fahrenheit.

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

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

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

B. Aggregates: ASTM C33, single source for all materials. Maximum size aggregate: 1 inch.

C. Non-Shrink Grout: ASTM C1107, premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 4,000 psi in 24 hours and 7,500 psi in 7 days unless otherwise indicated on Drawings; of consistency suitable for application and a 30 minute working time.

D. Threshold and landing mortar: Wheelchair lift ramp mortar: Ardex ERM Exterior Ramp Mortar, Mapei Quickcem Top 101 or equal. Finish with manufacturer's cement dressing products for smooth surface.

E. Crushed Aggregate Base: As specified in Section 32 12 16. Crushed rock and rock dust conforming to requirements of Section 200-1.2, SSPWC, , or Class 2 aggregate base as defined in Section 26, CSS.

2.02 ACCESSORIES

A. Expansion Joints:

1. Expansion Joint Filler - ASTM D1751: Closed cell, 1/2 inch thick; DECK-O-FOAM by W. R. Meadows, Dayton Superior or equal.
2. Joint Devices: Integral extruded polystyrene plastic; 1/2 inch max. thick, with removable top strip exposing sealant trough; Snap Cap Expansion Joint Cap by W. R. Meadows or equal.
3. Sealant: Polyurethane two-component type, self-leveling, for level surface application, UREXPAN NR-200 or DYNATRED for sloped surfaces, manufactured by Pecora Corp., Harleysville PA, or equal. Color shall be selected by Architect from manufacturer's standard list of colors.
4. Primer: As recommended by sealant manufacturer.
5. Joint Backing: ASTM C1330, Cylindrical, Type C, closed cell, polyethylene backer rod; oversized 30 to 50 percent larger than joint width. Green Rod by Nomaco Inc. or equal.

B. Highway Fiber Expansion Joint: 1/2 inch max. thick; FIBER EXPANSION JOINT by American Highway Technology, Kankakee, IL, or equal.

C. Slip Resistant Finish: Dry shake type White aluminum oxide abrasive grains, hardness No. 9 on Mohr's scale; Emery Non-slip, manufactured by Dayton Superior, Kansas City, KS, Emery Aggregate manufactured by Oregon Emery Co., Halsey OR, or equal as approved in accordance with Division 01, General Requirements for Substitutions.

D. Safety Stair Nosings: Style B-41A, 4 inches wide manufactured by Barrycraft Pattern and Foundry, Inc., Birmingham, AL, or equal as approved in accordance with Division 01, General Requirements for Substitutions. Provide nosings (strips) at all treads.
1. Install 2" wide nosings (Strips) (2" min. - 4" max.) in contrasting color (70% contrasting), 1" maximum from edge of nosing of each exterior stairs, CBC Section 11B-504.4.1. Colors to be selected by Architect.
2. Install in fresh concrete, cast in place.Renovation Treads: comply with CBC 11B-247.2 and 11B-705.2. Aluminum, anti-slip tread 9/32 inches thick, 11 inches wide, Model Type 511 SN two tone by Wooster Products Inc., Wooster, Ohio. comply with CBC 11B-504.2. Aluminum, anti-slip tread Model Type SG4702-5 inch tread SG500R-9 inch tread by American Safety Tread Co., Helena AL, or equal.
3. Install 2 inches contrasting color (70 percent recommended) warning stripe 1 inch maximum from edge of nosing of each exterior stair, and top and bottom nosing only at interior stairs.
4. Install at existing exterior concrete stairs with manufacturer's adhesive and countersunk screws.

2.03 CONCRETE MIX

A. Mix and deliver concrete in accordance with Section 1905A, California Building Code. Deliver concrete in transit mixers only. Mix concrete for 10 minutes minimum at a peripheral drum speed of approximately 200 feet per minute. Mix at jobsite minimum 3 minutes. Discharge loads in less than 1-1/2 hours or under 300 revolutions of the drum, whichever comes first, after water is first added.
1. Design Mix:
   a. Conform to ACI 318-14 Chapter 5.8 for Proportioning on the basis if field experience or trial mixtures method.

b. Conform to ACI 318-14 Chapter 5.8 for Selection of concrete proportions method. Selection of concrete proportions and ingredients for design mix by a DSA -approved Testing Laboratory and certified by a registered civil engineer licensed in California.

2. Do not exceed 0.50 water-cement ratio by weight for slabs and for other concrete.
3. Quantities of Materials: Weighmaster's records not required for sitework concrete.
4. Required Strength: Minimum 3,000 psi for sitework concrete.

B. Fly ash shall be used at 15% maximum replacement of the Portland cement at a 1:1 replacement ratio by weight. Fly Ash shall meet the requirements of ASTM C 618 with the exception that the Loss on Ignition shall not exceed 1.0 percent. Only Class F material is permitted.

C. Solar Reflectivity Index (SRI) of Concrete: provide concrete mix that yields a minimum SRI of 35 with Solar Reflectance value of 0.35 and emittance of 0.9.

D. Slurry Concrete:
1. Slump: Between 4 inches and 6 inches.
2. Aggregate: 40 percent sand by weight, 60 percent pea gravel, minimum 1/4 inch, maximum 5/8 inch.
3. Portland Cement: ASTM C150, 2-sack mix (2 sacks of cement per cubic yard).
4. Sufficient water shall be added to produce a fluid, workable mix that will flow and can be pumped without segregation of aggregate. Material shall be mechanically mixed until the cement and water are thoroughly dispersed.

2.04 REINFORCEMENT

A. Reinforcing Steel: ASTM A615; deformed billet steel bars, in grades as follows, and conforming to CBC-19, Section 1903A.
1. For No. 4 and larger bars, use 60 ksi yield grade.
2. For ties and stirrups, and No. 3 and smaller bars, use 40 ksi yield grade.
3. For welded bars, use ASTM A706 60 ksi yield grade.

B. Welded Wire Reinforcement: Plain type, ASTM A185; in flat sheets; uncoated finish, 6 x 6 - W4.0 x W4.0 unless otherwise note on drawings.

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

D. Dowels: ASTM A615; 60 ksi yield grade, plain steel, uncoated finish.

E. Secondary Reinforcement (plastic shrinkage control) Fibrous Reinforcement: Fibrillated, polypropylene fibers for concrete slabs with length of 3/4", Grace Fibers by W.R. Grace, or polypropylene monofilament fibers of 3/4" length Grace Mircofibers by the W.R. Grace, or equal. Meeting requirements of ASTM C1116, Type III.
1. Dosage: 1.0 lbs per cubic yard of concrete for 3/4" long fibers.

2.05 FORMS

A. Conform to ACI 318-14 Chapter 6.

B. Plywood Forms: APA - Medium density overlay, Group 1, Exterior, PS-1, for exposed surfaces. APA Plyform B-B, Class 1, Exterior, PS-1 for unexposed surfaces.
   1. Use flexible or curved forms for curves with a radius 100 feet or less.

C. Lumber: Douglas Fir species, construction grade, Surfaced Lumber, with grade stamp clearly visible for smooth and straight exposed surface.

D. Form Release Agent; commercially formulated form-release agent that will not bond with, stain or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.06 CURING MATERIALS

A. Polyethylene Film ASTM C171; 10 mil thick, clear, manufactured from virgin resin with no scrap or additives, manufactured by Burke-Edoco, Long Beach, CA, or equal as approved in accordance with Division 01, General Requirements for Substitutions.

B. Water: Potable and not detrimental to concrete.

C. Curing Compound for Non-Colored, Exposed Concrete or Concrete to be Covered: Water-based, non-staining compound that will not affect the appearance of the concrete, nor adversely affect the bond or effectiveness of subsequent treatments to be applied to the concrete surface. Curing compound to be applied to concrete surfaces that are to receive subsequent coatings or treatments, such as paint, waterproofing, flooring materials, sealers, etc. shall be specially formulated for such use and shall be certified by the manufacturer not to inhibit the bonding qualities of the treatments. When tested in accordance with ASTM C-156, compound shall restrict the loss of water to not more than 0.62 kg per square meter. Acceptable Product, Atlas Quantum-Cure, by Atlas Tech Products, or approved equal.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify site conditions.

B. Verify requirements for concrete cover over reinforcement.

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

3.02 PREPARATION

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

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

1. Remove existing natural soils to depth required for sitework concrete thickness and elevations.
2. Remove unsuitable soil, backfill with clean compactable soil or approve granular material to required elevations.
3. Scarify exposed natural sub-base to depth of 6 inches. Bring to optimum moisture content and re-compact to 90 percent in accordance with ASTM D 1557.
4. Add approved aggregated base to required elevation in 6 inch maximum lifts. Bring to optimum moisture content and compact to 90 percent in accordance with ASTM D1557.

3.03 PLACING CONCRETE (GENERAL)

A. Convey and deposit concrete in accordance with ACI 318-14 Chapter 5.9 and 5.10. Remove loose dirt from excavations.

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

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

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

E. Place concrete continuously between predetermined expansion joints.
1. Install expansion joints at vertical concrete walls at 24 feet on center unless noted otherwise on drawings.

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

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

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

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

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

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

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

C. Reinforcing Steel: #4 bars, place bars at 12 inches on center each way for sidewalks and paved areas and #4 bars for edges unless otherwise indicated on Drawings.

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

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

F. Isolation Joints: Locate at slabs abutting vertical concrete surfaces and as patterned on drawings. Install vertically, full depth of concrete with preformed joint filler recessed for plastic cap at 1/2 inch depth at top for sealant application.
   1. Doweled Isolation Joints at Heavy Vehicle Driveways and Parking: At abutting building foundations; provide 1/2-inch diameter smooth steel dowels 14 inches long, one end of dowel lubricated and set in capped sleeve to allow for longitudinal movement, spaced at 24 inches on center maximum, 6 inches from edges.
   2. Monolithic Curb and Gutter: No expansion joints required between gutter and curb face.

G. Expansion Joints: Locate maximum 24 feet centers and as patterned on drawings. Install vertically full depth of concrete, install preformed joint filler recessed for plastic cap at 1/2 inch depth at top for sealant application. ********dowels are not necessary unless heavy trucks will use surface. Aggregate interlock provide sufficient load transfer for normal sitework concrete.********
   1. Monolithic Curb and Gutter: No expansion joints required between gutter and curb face.

H. Contraction/Crack Control Joints: At 8 feet each way at concrete paved areas, and 5 feet at sidewalks, tool joint with 1/2 inch radius, depth 1/4 the thickness of slab but not less than 1 inch deep. Refer to drawings for required design patterns.

I. Curb Ramps: Form grooves, flush to finished surfaces, 12" wide border. Grooves at 1/4" deep, 1/4" wide and at 3/4" on centers at 3 sides on level surface of the sidewalk. Provide patterns as indicated in drawings. Detectable Warnings at Curb Ramps per IR 11B-2 and 11B-3, 11B-4 CBC 11B-705.1.1 and 11B-705.1.2.2
   ~~1. Detectable warning (Truncated Domes) required at curb ramps less than 1:15 (6.7% slope), DSA IR 11B-3~~
   2. Detectable Warnings (Truncated Domes) required at all Curb Ramps, American with Disabilities Act Standards for Accessibility Design Section 4.7.7.
      a. Set Paver Truncated Dome products in full mortar bed per Section 32 14 13 Unit Pavers and as indicated on drawings.
      b. Plastics/Composites: Cast in place plastic tiles per manufacturer's instructions and in accordance with CBC.
      c. Form bottom edge flush and free of abrupt changes .

J. Finish:
   1. Portland cement paving shall be stable, firm, and slip resistant and shall comply with CBC Sections 11B-302 and 11B-403.

2. Screed concrete to required grade, float to a smooth, flat, uniform surface. Edge all headers to 1/2 inch radius. Edge expansion joints to 1/4 inch radius. Steel trowel to hard surface.
3. Medium Broom Finish: After final troweling, apply a medium broom finish transverse to centerline or direction of traffic.

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

L. Remove expansion joint plastic caps. Prime both sides of joint and apply self-leveling sealant per Section 07 92 00. Provide smooth concave surface.

3.05 LIGHT STANDARD BASES, FENCE POST BASES, FLAGPOLE BASES, RAILING FOOTINGS, MISCELLANUOUS SURFACES, UTILITY PADS, AND SIMILAR SITE STRUCTURES

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

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

C. Coordinate installation of conduits, cast in place items and other inserts.

D. Finish: Grind or sack as required as determined by the Architect to produce a smooth, straight, plumb and acceptable finish without burrs or form marks. For horizontal surfaces: provide float finish.

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

F. Flagpole bases: refer to Section 10 75 00, Flagpoles for size of footings and cast in place items supplied by that section.

3.06 CONCRETE MONUMENT SIGNS

A. Verify concrete footings have been installed per details and shop drawings.

B. Prefabricated Monument Sign: Architect designed custom monument sign as indicated on drawings.

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

D. Forms: Plywood, APA medium density overlay, group I, exterior, PS-1 for sign surface. Ensure forms are set level and firm.

E. Letter Forms: Exterior grade polystyrene, minimum 1 inch deep, edges sloped at approximately 15 degrees, smooth flat face, firmly attached to plywood form, reverse image by VEFO Inc., Walnut, CA, or equal.

F. Coordinate with this Section to prevent formation of rock pockets or voids on surfaces.

G. Coordinate forms removal. Edges and corners of recessed surfaces shall be clean, sharp, and unbroken.

H. Finish:
1. Entire sign assembly shall be sandblasted lightly to remove laitance. Surfaces shall be uniformly textured.
2. Smooth-Rubbed Finish or Sack-rubbed finish as determined by the Architect to produce a straight, plumb and textured finish without burrs or form marks. For horizontal surfaces: provide float finish.

I. Curing: Cure surfaces utilizing one of the following methods:
1. Spread polyethylene film over areas, lapping edges and sides, minimum 6 inches and sealing with pressure sensitive tape; protect film from damage and dislodging, maintain in place for 7 days.
2. Apply liquid curing compound-clear at rate of 200 square feet per gallon, using power sprayer equipped with agitator. Do not apply liquid curing compound to surfaces scheduled to receive masonry units.

3.07 FORMED CONCRETE STAIRS AND LANDINGS

A. Subgrade Preparation: As approved by the Geotechnical Engineer.

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

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

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

E. Finish: Hard steel trowel at monolithic risers. Steel trowel surfaces treated with Slip Resistant Finish sufficiently to allow particles to extend slightly above finish surface.
1. Slip Resistant Finish: Apply in accordance with manufacturer's instructions on surfaces at a minimum rate of 50 lbs. per 100 square feet.
2. Owner's Option in lieu of Slip Resistant Finish:
   a. Apply Medium Broom Finish.

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

3.08 CURB AND GUTTER, MOW STRIPS CONCRETE DRAINAGE STRUCTURES SWALES

A. Subgrade Preparation: Subgrade material, base material and compaction requirements as approved by the Geotechnical Engineer.

B. Forms: Single face type required, cut to conform exactly with face batter and radius, sufficiently rigid to resist springing or deflection from concrete placement. Clean forms of all loose dirt, mortar or similar materials and apply a light coating of oil or other suitable material prior to concrete placement.
1. Slip Forms: Contractor's option upon approval of the Architect.

C. Reinforcement: Refer to drawings for size and spacing. Interrupt reinforcement at expansion joints.

D. Concrete Placement: Dampen subgrade to retain moisture in concrete mix. Tamp and spade to consolidate concrete to entire length of pour. Strike off upper surface to specified grades. Cut drain pipes to conform to curb batter.

E. Expansion Joints: Locate joint filler at maximum 20 foot centers. Trim off excess filler material flush to finish surface. No sealant application required.

F. Control Joints: at 8 feet on center, tooled joints, 1/2 inch radius.

G. Finish: Apply thin layer of mortar of 1 part portland cement to 1-1/2 parts sand to exposed faces. Trowel to a smooth and even finish with a fine hair broom applied parallel with the line of the work. Round all edges to 1/2 inch radius. No Contractor identification permitted.

H. Curing: Cure surfaces utilizing one of the following methods:
1. Spraying: Spray water over curb and gutter and maintain wet for 7 days.

2. Spread polyethylene film over areas, lapping edges and sides, minimum 6 inches and sealing with pressure sensitive tape; cover with plywood or otherwise protect film from damage; maintain in place for 7 days.
3. Apply liquid-curing compound at rate of 200 sf per gallon, using power sprayer equipped with agitator.

3.09 FINISH AT EXPOSED VERTICAL SURFACES

A. Rubbed Finish: Apply the following to smooth-formed finished concrete per ACI 301:
1. Grout-Cleaned Finish (Sack-rubbed finish): Remove fins, rough spots, stains, and hardened mortar by carefully rubbing with a fine abrasive stone to a smooth even surface. Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part Portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white Portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces.
2. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
3. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
4. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix one part Portland cement and one part fine sand with a 1:1 mixture of bonding agent and water. Add white Portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface with slow-speed grinder. In a swirling motion, finish surface with a cork float.

3.10 BUILD-UP CONCRETE AT DOOR TRESHOLDS FOR ACCESSIBLITY COMPLIANCE

A. Remove concrete areas as indicated on drawings.

B. Install Threshold and Landing Mortar at front of doors, 72 x 60 inches, level area, and edges to ramp to a maximum slope of 5%.

3.11 WHEELCHAIR-LIFT CONCRETE RAMP

A. Install wheelchair-lift concrete ramp and landing at location in front of wheelchair lift, 48 x 50 inches area flush to lift platform, ramp to landing shall have a slope of 8.3% and side flares at 12.5%. Outline pit area with contrasting paint color, 2" line, per Section 09 90 00 Painting.

3.12 FIELD QUALITY CONTROL

A. Provide free access to Work and cooperate with testing personnel

B. Measure Solar Reflectivity values of Site concrete and submit reports to Architect. ASTM E1980-11

3.13 TOLERANCES

A. Construction tolerances shall not violate dimensions, grades, slopes required by CBC for accessibility requirements. Adjust work accordingly to comply with requirements.

B. Comply with tolerances of ACI 117 and as follows (tolerances may not exceed CBC maximum or minimum):
1. Maximum deviation of 1/8 inch in 10 feet.
2. Elevation: 1/4 inch (6 mm).
3. Thickness: Plus 3/8 inch (10 mm), minus 1/4 inch (6 mm).
4. Surface: Gap below 10-foot- (3-m-) long, unleveled straightedge not to exceed 1/8 inch (3 mm).
5. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch (25 mm).
6. Vertical Alignment of Tie Bars and Dowels: 1/4 inch (6 mm).
7. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch (13 mm).
8. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches (6 mm per 300 mm).
9. Joint Spacing: 3 inches (75 mm).
10. Contraction Joint Depth: Plus 1/4 inch (6 mm), no minus.
11. Joint Width: Plus 1/8 inch (3 mm), no minus.

END OF SECTION

SECTION 32 13 14

PORTLAND CEMENT CONCRETE PAVING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Concrete paving for loading area and areas designated for heavy traffic, including fire lanes.

B. Related Sections:
1. Section 01 35 43, Special Environmental Requirements.

1.02 REFERENCE STANDARDS

A. Conform to reference standards by date of issue current on date of Contract Documents.

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

C. ASTM C33 - Concrete Aggregates.

D. ASTM C94 - Ready-Mixed Concrete.

E. ASTM C150 - Portland Cement.

F. ASTM C171 - Specification for Sheet Materials for Curing Concrete.

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

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

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

J. ASTM D1557- 02 - Laboratory compaction characteristics of soil using modified effort.

K. Chapter 19A, California Building Code, 2016.

L. ASTM C618 – Coal Fly Ash and Raw or Calcinated Natural Pozzolan for use as a Mineral Admixture on Concrete.

1.03 SUBMITTALS

A. Placement Schedule providing details or sketches showing location of each proposed placement. Do not deviate from location of expansion joints or scorelines as indicated on Architectural drawings.

B. Data on joint filler, sealants, curing compounds and reinforcing.

C. Special Environmental Requirements Submittal Product Form, found in Appendix A of Section 01 35 43 Special Environmental Requirements. Provide the following information for concrete materials and steel reinforcement:
   1. Recycled Content.
   2. Local/Regional Materials.

1.04 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of embedded sleeves, utilities and components which are concealed from view.

1.05 QUALITY ASSURANCE

A. Maintain one copy of all records on site.

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

C. Conform to Section 5.13 ACI 318-14, when concreting during hot weather.

D. Conform to Section 5.12 ACI 318-14, when concreting during cold weather. No pouring permitted below 40 degrees Fahrenheit.

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

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

B. Aggregates: ASTM C33, Single Source for all materials.

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

D. Fly ash shall be used at 15% maximum replacement of the Portland cement at a 1:1 replacement ratio by weight. Fly Ash shall meet the requirements of ASTM C 618 with the exception that the Loss on Ignition shall not exceed 1.0 percent. Only Class F material is permitted.

E. Crushed Aggregate Base: As specified in Section 32 12 16. Crushed rock and rock dust conforming to requirements of Section 200-1.2, SSPWC, with 3/8 inch sieve requirement waived, or Class 2 aggregate base as defined in Section 26, CSS.

2.02 ACCESSORIES

A. Expansion Joint Filler - ASTM D1751: Close cell bituminous saturated fiberboard, 1/2 inch thick; FIBER EXPANSION JOINT manufactured by American Highway Technology, Kankakee, IL, or approved equal.

B. Construction Joint Devices: Integral extruded polystyrene plastic; 1/2 inch thick, with removable top strip exposing sealant trough; JOINT CAPS.

C. Sealant: Polyurethane two-component type, self leveling, for level surface application, UREXPAN NE-200, manufactured by the Pecora Corp., Harleysville PA, or equal as approved in accordance with Division 01 for Substitutions.

D. Primer: As recommended by Sealant Manufacturer.

E. Slip Resistant Finish: Dry shake type aluminum oxide abrasive grains, hardness No. 9 on Mohr's scale; Emery Non-slip, manufactured by Dayton Superior, Kansas City, KS, Emery Aggregate manufactured by Oregon Emery Co., Halsey OR, or equal as approved in accordance with Division 01, General Requirements for Substitutions.

2.03 CONCRETE MIX

A. Mix and deliver concrete in accordance with Section 5.3 ACI 318-14. Deliver concrete in transit mixers only. Mix concrete for 10 minutes minimum at a peripheral drum speed of approximately 200 feet per minute. Mix at jobsite minimum 3 minutes. Discharge loads in less than 1-1/2 hours or under 300 revolutions of the drum, whichever comes first, after water is first added.
1. Design Mix: Conform to Method B or C, Section 5.3 ACI 318-14.
2. Quantities of Materials: Weighmaster's records not required for sitework concrete.
3. Required Strength: Minimum 4,000 psi, for paving concrete, minimum 7 inches thick.

2.04 REINFORCEMENT

A. Reinforcing Steel: ASTM A615; 60 ksi yield grade, deformed billet steel bars, uncoated finish.

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

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

2.05 CURING MATERIALS

A. Polyethylene Film ASTM C171; 10 mil thick, clear, manufactured from virgin resin with no scrap or additives, manufactured by Burke By Edoco, Long Beach, CA, or equal as approved in accordance with Division 01, General Requirements for Substitutions.

B. Water: Potable and not detrimental to concrete.

C. Curing Compound: ASTM C309; wax resin base, WHITE PIGMENTED CURING COMPOUND, by Burke By Edoco, Long Beach, CA, or equal as approved in accordance with Division 01, General Requirements for Substitutions. Curing materials and procedures for colored concrete in accordance with coloring material manufacturer's recommendations.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify site conditions.

B. Verify requirements for concrete cover over reinforcement.

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

3.02 PREPARATION

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

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

3.03 PLACING CONCRETE (GENERAL)

A. Place concrete in accordance with Section 3.7 ACI 318-14. Remove loose dirt from excavations.

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

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

D. Ensure sub-base or base materials have been compacted or otherwise treated as required by the Geotechnical Engineer, minimum 12 inches of compacted subgrade to 95 percent per ASTM D1557.

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

F. Place concrete continuously between predetermined expansion joints.

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

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

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

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

3.04 CONCRETE PAVING

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

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

C. Reinforcement: Unless indicated otherwise on the drawings, provide #4 rebar at 18 inches on center each way. Interrupt reinforcement at expansion joints.

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

E. Isolation Joints: Locate where slabs join vertical concrete surfaces. Install vertically, full depth of concrete leaving plastic cap at 1/2 inch depth at top for sealant application.
   1. Doweled Isolation Joints at Heavy Vehicle Driveways and Parking: At abutting building foundations; provide 1/2-inch diameter smooth steel dowels 14 inches long, one end of dowel lubricated and set in capped sleeve to allow for longitudinal movement, spaced at 24 inches on center maximum, 6 inches from edges.

F. Expansion Joint: Locate maximum 20 feet centers and as patterned on drawings. Install vertically, full depth of concrete, install preformed filler leaving plastic cap at 1/2 inch depth at top for sealant application.
   1. Doweled Expansion Joints at Heavy Vehicle, Fire Lanes, Driveways and Parking Lots: Provide 1/2 inch diameter smooth steel dowels, 14 inches long at expansion joints with one end of dowel lubricated and set in capped sleeve to allow for longitudinal movement. Spacing: 24 inches on center maximum, 6 inches from edges.

G. Contraction/Control Joints: Smooth trowel joints and edges at 8 feet each way at concrete paved areas, and 5 feet at sidewalks. Tool joint with 1/2 inch radius, depth, one fourth the thickness of slab but not less than 1 inch deep. Curved or non-aligned joints not acceptable. See drawings for design patterns.

H. Finish:
   1. Steel Trowel: Screed concrete to required grade, float to a smooth, flat, uniform surface. Edge all headers to 1/2 inch radius. Edge expansion joints to 1/8 inch radius. Steel trowel to hard, smooth surface.
      a. Grades less than 6 percent: After final troweling, apply a fine hard broom finish transverse to centerline.
      b. Grades exceeding 6 percent: Hand finish with wood float, and apply a dry shake type aluminum oxide non-slip surface treatment in accordance with manufacturer's recommendations. Remark as necessary after final finish to assure neat uniform edges, joints and score lines.

c. Score Lines: Minimum depth 1/4 inch and radius 1/8 inch, located at maximum 5 foot squares.

2. Broom Finish
   a. Medium: Surfaces less than 6 percent.
   b. Heavy: Surfaces greater than 6 percent.

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

3.05 PAVEMENT TOLERANCES

A. Comply with tolerances of ACI 117 and as follows:
   1. Maximum deviation of 1/8 inch in 10 feet.
   2. Elevation: 1/4 inch (6 mm).
   3. Thickness: Plus 3/8 inch (10 mm), minus 1/4 inch (6 mm).
   4. Surface: Gap below 10-foot- (3-m-) long, unleveled straightedge not to exceed 1/8 (3 mm).
   5. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch (25 mm).
   6. Vertical Alignment of Tie Bars and Dowels: 1/4 inch (6 mm).
   7. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch (13 mm).
   8. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches (6 mm per 300 mm).
   9. Joint Spacing: 3 inches (75 mm).
   10. Contraction Joint Depth: Plus 1/4 inch (6 mm), no minus.
   11. Joint Width: Plus 1/8 inch (3 mm), no minus.

END OF SECTION

SECTION 32 14 13

PRECAST UNIT PAVERS

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Concrete paver units.
B. Bedding and joint sand.
C. Clean gravel water storage base
D. Liner and geotextile underliners

1.2 REFERENCES

A. American Society of Testing and Materials (ASTM):
   1. C 33, Specification for Concrete Aggregates.
   2. C 136, Method for Sieve Analysis for Fine and Coarse Aggregate.
   3. C 140, Sampling and Testing Concrete Masonry Units.
   4. C 144, Standard Specification for Aggregate for Masonry Mortar.
   5. C 936, Specification for Solid Interlocking Concrete Paving Units.
   6. C 979, Specification for Pigments for Integrally Colored Concrete.
   7. D 698, Test Methods for Moisture Density Relations of Soil and Soil Aggregate mixtures using a 5.5-lb (2.49 kg) Rammer and 12 in. (305 mm) drop.
   8. D 1557, Test Methods for Moisture Density Relations of Soil and Soil Aggregate mixtures using a 10-lb (4.54 kg) Rammer and 18 in. (457 mm) drop.
   9. D 2940, Graded Aggregate Material for Bases or Subbases for Highways or Airports

1.3 QUALITY ASSURANCE

A. Installation shall be by a contractor and crew with at least two years of experience in placing interlocking concrete pavers on projects of similar nature or dollar cost within 100 miles of the project site.
B. Contractor shall conform to all local and state licensing and bonding requirements.

1.4 SUBMITTALS

A. Product data for paving products, liners or geotextiles other than those specifically specified on the drawings.
B. Full size samples of concrete paving units to indicate color and shape selections. Color will be selected by the Landscape Architect from manufacturer's standard available colors.
C. Sieve analysis for grading of bedding and joint stabilizer.
D. Sieve analysis for grading of gravel storage base.
E. Test results from an independent testing laboratory for compliance of paving unit requirements to ASTM C 936 or other applicable requirements.

1.5 MOCK-UPS

A. Install a 5 ft. x 5 ft. (minimum size) paver area as described in Article 3.2.
B. This area will be used to determine surcharge of the bedding layer, joint sizes, lines, laying pattern(s), color(s), and texture of the job.
C. This area shall be the standard from which the work will be judged and shall be incorporated into the work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver concrete pavers to the site in steel banded, plastic banded, or plastic wrapped cubes capable of transfer by fork lift or clamp lift. Unload pavers at job site in such a manner that no damage occurs to the product.
B. Cover sand with waterproof covering to prevent exposure to rainfall or removal by wind. Secure the covering in place.
C. Coordinate delivery and paving schedule to minimize interference with normal use of buildings adjacent to paving.

1.7 ENVIRONMENTAL CONDITIONS

A. Do not install bedding or pavers during heavy rain or snowfall.
B. Do not install pavers over muddy bedding.

PART 2 – PRODUCTS

2.1 CONCRETE PAVERS

A. Product manufacturer, name(s)/shape(s), color(s), overall dimensions, and thickness shall be as specified on the plans, or District approved equal.
B. Meet the following requirements set forth in ASTM C 936, Standard Specification for Interlocking Concrete Paving Units:
   1. Average compressive strength of 8,000 psi (55 MPa) with no individual unit under 7,200 psi (50 MPa).
   2. Average absorption of 5% with no unit greater than 7% when tested in accordance with ASTM C 140.
   3. Resistance to 50 freeze-thaw cycles when tested according to ASTM C 67.
   4. Dimensions: Dimensions of paving slabs, and concave or convex warping shall not differ from those agreed upon by the manufacturer by more than the following amounts:
      a. Length and width: - 1.0 mm to + 2.0 mm
      b. Height: $\pm$ 3.0 mm
C. Concave or convex warping in one dimension by the following amounts:
   1. Up to 450 mm, 2.0 mm; or, Over 450 mm, 3.0 mm

2.2 BEDDING AGGREGATE AND BEDDING SAND

A. Clean, non-plastic, free from deleterious or foreign matter; manufactured from natural or crushed rock. Do not use limestone or soft stone with a micro-devial degradation of over 8 percent. The percentage of angular and sub-angular particles shall be greater than 90%. Do not use rounded river gravel. When concrete pavers are subject to vehicular traffic, the bedding shall be as hard as practically available.

B. Bedding sand shall conform to the grading requirements of as shown in Table 1.

Table 1

Grading Requirements for Bedding Sand	
ASTM C 33	
Sieve Size	Percent Passing
3/8 in. (9.5 mm)	100
No. 4 (4.75 mm)	95 to 100
No. 8 (2.36 mm)	85 to 100
No. 16 (1.18 mm)	50 to 85
No. 30 (0.600 mm)	25 to 60
No. 50 (0.300 mm)	10 to 30
No. 100 (0.150 mm)	2 to 10

C. Bedding aggregate for use under pavers shall conform to the grading requirements of as shown in Table 1A.

Table 1A

Grading Requirements for Bedding Aggregate Course	
ASTM C 33	
Sieve Size	Percent Passing
3/8 in. (9.5 mm)	85-100
No. 4 (4.75 mm)	10 to 30
No. 8 (2.36 mm)	0 to 10
No. 16 (1.18 mm)	0 to 5

2.3 EDGE RESTRAINTS

A. Edge restraints shall be concrete as shown on the plans.

2.4 NON-WOVEN FILTER FABRIC

A. Non-woven filter fabric for use under the bedding course of vehicular pavements shall be DuPont Spunbond 5401WF (16.2 mil) non-woven, or equal.

2.5 JOINT STABILIZER COMPOUND

A. Joint stabilizer shall be 3 mm sieve size crushed granite sand.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that subgrade preparation, compacted density and elevations conform to the specifications. Soil subgrade shall be compacted to at least 95% Standard Proctor Density per ASTM D 698. Verify that base is dry, uniform, even, and ready to support sand, pavers, and imposed loads.

B. Verify location, type, installation and elevations of edge restraints around the perimeter area to be paved.

1. Beginning the work of gravel base, bedding sand and paver installation means acceptance of base and edge restraints.

3.2 BASE INSTALLATION

A. Place liners and/or geotextiles according to specifications and drawings.

B. Place and compact aggregate base materials to the thicknesses, compaction, surface tolerances, and elevations conforming to these specifications. Do not wrinkle or fold geotextile or liners.

1. Spread and compact aggregate base in uniform layers Base surface tolerance shall be plus or minus 3/8 in. (10 mm) over a 10 ft. (3 m) straight edge.
2. Compact base with 10 ton vibratory roller. Conduct 2 passes minimum in vibratory mode and 2 minimum in static mode until there is no visible movement of the base.
3. Compact bedding with vibratory plate until there is no visible movement of the bedding material.
4. Use mechanical tampers for compaction of soil subgrade and aggregate base around lamp standards, utility structures, building edges, curbs, tree wells and other protrusions.

3.3 PAVER INSTALLATION

A. Spread the bedding evenly over the base course and filter fabric. Screed bedding to required thicknesses and grades. The screeded bedding should not be disturbed. Place sufficient bedding to stay ahead of the laid pavers. Do not use the bedding to fill depressions in the base surface.

B. Ensure that pavers are free of foreign material before installation.

C. Lay the pavers in the pattern(s) as shown on the drawings. Maintain straight pattern lines.

D. Joints between the pavers on average shall be as recommended by the manufacturer for the specific paver type.

E. Fill gaps at the edges of the paved area with cut pavers or edge units. Units along edged subject to vehicular traffic shall be cut to no smaller than one-third of a whole paver.

F. Cut pavers to be placed along edges with a masonry saw.

G. Use a low amplitude, high frequency plate vibrator to vibrate the pavers into the bedding. Use 75-90 Hz compactor capable of a minimum of 5200 pounds of centrifugal compaction force.

H. Vibrate the pavers, sweeping dry joint compound into the joints and vibrating until they are full. This will require at least two or three passes with the vibrator. Do not vibrate within 3 ft. (1 m) of the unrestrained edges of the paving units.

I. All work to within 3 ft. (1 m) of the laying face must be left fully compacted with sand-filled joints at the end of each day.

J. Sweep off excess sand when the job is complete.

K. The final surface elevations shall not deviate more than 1/4 in. (10 mm) under a 10 ft. (3 m) long straightedge.

L. The surface elevation of pavers shall be 1/8" ± above adjacent drainage inlets, concrete collars or channels. For installation on a compacted aggregate base and soil subgrade, the top surface of the pavers may be 1/8"± above the final elevations after compaction. This difference in initial and final elevation is to compensate for possible minor settling

3.4 FIELD QUALITY CONTROL

A. After removal of excess sand, check final elevations for conformance to the drawings.

B. All paver installations are to be guaranteed against settling or heaving of more than ¼" over the first winter after the completion of installation. Areas that heave more than ¼", are damaged by snow plowing operations due to heaving or settling, or settle more than ¼" are to be replaced by the contractor, including any required reinstallation of base materials, recompaction and re-setting of pavers, at no additional cost to the District.

END OF SECTION

SECTION 32 17 23

PAVEMENT MARKINGS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes
1. Traffic markings including symbols, directional arrows, lettering and safety and loading zones
2. Parking-stall lines and related accessibility pavement markings
3. Pedestrian and related accessibility pavement markings
4. Fire lane markings
5. Raised pavement markers

B. Related Sections
1. Section 32 12 16, Asphaltic Concrete Paving
2. Section 32 13 13, Sitework Concrete

1.02 REFERENCE STANDARDS

A. Conform to reference standards by date of issue current on date of Contract Documents.

B. ADA Americans with Disabilities Act of 1990, as amended
1. ADA Standards ADA Title II Regulations and the 2010 ADA Standards for Accessible Design

C. APCD - Air Pollution Control District of San Diego County
1. APCD-67.0 - APCD Regulation IV, Rule 67.0, Architectural Coatings
2. APCD-67.21 - APCD Regulation IV, Rule 67.21, Adhesive Material Application Operations

D. ASTM - American Society for Testing and Materials
1. ASTM C 881 - Epoxy-Resin-Base Bonding Systems for Concrete
2. ASTM D 788 - Classification System for Poly(Methyl Methacrylate) (PMMA) Molding and Extrusion Compounds

E. CALTrans - California Department of Transportation
1. CALTrans Manual - CALTrans, Manual for Uniform Traffic Control Devices
2. CALTrans Specifications - CALTrans, Standard Specifications

F. CBC - 2016 California Building Code (CCR Title 24, Part 2)
1. CBC-11B - CBC Chapter 11B, Access to Public Buildings, Public Accommodations, Commercial Facilities and Publicly Funded Housing

G. Fed.Std / Fed.Spec - Federal Standard / Federal Specification
1. Fed.Std-595C - Colors Listed in Government Procurement
2. Fed.Spec TT-P-1952D - Paint, Traffic and Airfield Marking, Waterborne

H. SCAQMD - South Coast Air Qaulity Management District
   1. SCAQMD-1113 - SCAQMD Rule 1113, Architectural Coatings
   2. SCAQMD-1168 - SCAQMD Rule 1168, Adhesive and Sealant Applications

I. SSPWC - Standard Specifications for Public Works Construction (California)

1.03 SUBMITTALS

A. Action Submittal
   1. Product Data for each paint system product and accessory item
   2. Shop Drawings of traffic and parking markings

B. Record Submittals
   1. Manufacturer's Application Instructions

1.04 QUALITY ASSURANCE

A. Paints and Coatings: VOC content within limits set by SCAQMD-1113 .

B. Adhesives and Sealants shall have VOC content within limits required by SCAQMD-1168.

C. Regulatory Requirements
   1. Pavement markings for designated accessible parking spaces and related pedestrian stripping shall conform to ADA Standards or CBC-11B whichever provides persons with disabilities greater protection.
   2. Traffic control pavement and curb markings shall be in accordance with SSPWC, Sections 210-1.6 and 310-5.6.
   3. Paint products shall dry to a finish as slip resistant as surrounding pavement.
   4. Detectable warning textures shall be as specified in Section 32 13 13.

D. Manufacturer: company with minimum 10-years' experience manufacturing traffic line paint products for commercial projects similar in scale, complexity and quality to those required for this Project.

E. Installer: company with minimum 6-years' experience painting traffic and related pavement markings for commercial projects similar in scale, complexity and quality to those required for this Project.

F. Field Samples
   1. Provide field sample, illustrating coating color, width of stroke, thickness of application and dimensioning.
   2. Location: acceptable to Architect.
   3. Modify materials and methods of installation as required to obtain Architect's approval.
   4. Document materials and methods used to obtain Architect's approval. Maintain at least one copy of this documentation in a readily accessible location on Site while this work is in progress.
   5. Maintain access to and protect Field Sample from damage while this work is in progress.

6. Upon acceptance of related work, Field Sample in acceptable condition may remain as part of the work.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site in manufacturer's original, sealed containers with labels legible and intact.
   1. Labels shall include manufacturer's name, type of paint, brand name, brand code, coverage, surface preparation, drying time, cleanup, color designation and instructions for mixing and reducing.

B. Store paint materials at ambient temperatures between 45- and 90-degrees-F, unless expressly permitted otherwise in manufacturer's printed instructions.

1.06 MAINTENANCE

A. For each color of pavement marking paint furnish, as Extra Material, a quantity equal to approximately 3-percent of quantity required for its installation rounded up to next higher five-gallon container of the paint.
   1. Extra Materials shall be from same production run as installed materials.
   2. In addition to manufacturer's label, label each container for color, dates and locations of related installations and shelf life.
   3. Deliver Extra Materials to Owner as directed.

PART 2 - PRODUCTS

2.01 REGULATORY REQUIREMENTS

A. Accessible parking spaces shall be located as near as practical to a primary entrance and shall be marked according to CBC Section 11B-208.3.1

B. Surface slopes of accessible parking spaces and access aisles shall be the minimum possible and shall not exceed 2% slope in any direction. CBC Section 11B-502.4

C. Loading and unloading access aisle shall be marked by a border painted blue. Within the blue border, hatched lines a maximum of 36" on center shall be painted a color contrasting with the parking surface, preferable blue or white. CBC Figures 11B-502.3.3.
   1. The words "NO PARKING" shall be painted on the surface within each access aisle in white letters a minimum of 12" high and located to be visible from the adjacent vehicular way.

D. ISA Markings: Each accessible car and van space shall have surface identificaiton complying with 11B-502.6.4.

E. When blue color is used, it shall conform to Color No. 15090 per Federal Standard 595C.

F. Painted lines and markings on pavement are recommended to be 3" wide minimum.

2.02 PAVEMENT MARKING PAINTS

A. Acceptable Manufacturers. Products of following manufacturers form basis of design and quality intended for this Project.
   1. Dunn-Edwards Corporation, Los Angeles, CA
   2. PPG Paints, Los Angeles, CA
   3. Sherwin-Williams, Inc., Anaheim, CA
   4. Or equal, approved in accordance with Division 01 requirements for substitutions.

B. Traffic Line Paint: lead and chromate free, ready mixed, waterbourne emulsion type, complying with Fed.Spec TT-P-1952D with drying time of less than 45 minutes. Furnish paints in containers of at least 18 L (5 gallons).
   1. Colors
      a. Accessible Markings for Parking Stalls, Passenger Drop-Off Area and Related Markings: Fed.Std 595C, Color No. 15090, Blue, except that International Symbol of Access and NO PARKING notices marked on pavement shall be white.
      b. Other Parking Stall Lines and Traffic Control markings: white.
      c. Fire Lane markings: red with white lettering.
      d. Temporary Parking, markings: green with white lettering.
      e. Passenger / Postal Loading Zones, markings: white with black lettering.
      f. Commercial Loading Zone and Carpool Parking Space markings: yellow with black lettering.
   2. Acceptable Products
      a. Dunn-Edwards, Vin-L-Stripe Traffic Paint, Vinyl Epoxy Emulsion, W801
      b. PPG, Traffic & Zone Marking Paint, Latex.
      c. Sherwin -Williams, Pro-Park Waterbourne Traffic Marking Paint
      d. Or equal

C. Reflective Paint: SSPWC Table 210-1.6.1(A) and 210-1.6.5 rapid dry paint.
   1. Reflective material: glass beads added to surface of final coat of paint prior to setting. Glass beads shall conform to Calif. State Specification 8010-004(type II), applied mechanically at 8 lbs of beads per gallon of paint, dispensed by device developed for the purpose.
      a. For thermoplastic paint glass beads may be added to directly to the paint per 210-1.6.1 with additionally adding 1 pound of beads per gallon.
   2. Color: White, Yellow, or Black per Cal Trans Manual.
   3. Acceptable Products: by Emedco Buffalo, NY, or equal.

2.03 ACCESSORIES

A. Raised Pavement Markers: CALTrans Manual, Section 85, Type A-non-reflective white, ceramic disks (Bott's Dots).

B. Raised Pavement Markers: rectangular, raised, 4- by 4- by 3/4-inch, ASTM D 788, Grade 8 high-impact, plastic highway pavement markers with beveled edges and dual prismatic, reflective lenses.
   1. Reflector Color: white, except furnish blue for fire hydrant marker location.
   2. Acceptable Products: Hy-Viz, or equal.

C. K-Rail Lightweight Plastic Water-Filled traffic control barriers.
   1. Material: Recyclable polyethylene
   2. Width: 24"

3. Height: 46"
4. Length: 6'-1"
5. Weight: Empty: 130 lbs. Filled: 1500 lbs.

D. Adhesive: ASTM C 881, Type IV Grade, 3, Class B epoxy type, rapid set, CALTrans Manual, Sections 85-1.055 and 95-2.04.

PART 3 - EXECUTION

3.01 EXAMINATION

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

B. Do not begin installation until unsatisfactory conditions are corrected. Beginning installation means acceptance of existing conditions including the preparatory work of others, if any.

3.02 PREPARATION

A. Clean pavement in immediate vicinity of markings as directed by paint manufacturer.
1. Surfaces to be painted shall be clean and free of dust, dirt, grease, oil, water or other contaminates.
2. Existing lines to be removed shall be sandblasted clean.

B. Do not apply traffic paint to AC paving until seal coat has been in place minimum of 10 days.

3.03 APPLICATION

A. Apply paints by machine spray, airless sprayer, roller or brush to provide a minimum DFT of 15 mils. Precise edges are required; no overspray will be accepted.
1. Stripping: single, 4 inch wide lines, unless double lines are shown on drawings.

B. Perform Work in accordance with approved Shop Drawings and with SSPWC Section 310-5.6.8.
1. Striping, pavement markings, and curb markings shall be in accordance with SSPWC Sections 210-1.6 and 310-5.6 or accessibility requirements, as applicable.
2. Passenger Loading Zone. Paint accessible passenger transfer area as indicated.

C. At Fire Lanes paint curbs, or if there is no curb, paint 6 inch red stripe and let dry. Then stencil 4-inch high lettering reading NO PARKING – FIRE LANE at maximum 20 feet on center on painted curb or stripe, as applicable.

D. At Temporary Parking, paint curbs and let dry. Then, stencil 4-inch lettering that reads TEMPORARY PARKING 20 MINUTES centered in each parking space.

E. At Loading Zone, paint curbs and let dry. Then, stencil 4-inch high lettering that reads LOADING ZONE – NO PARKING at maximum 30 feet on center on painted curb.

F. At Carpool Parking, Spaces paint wheel-stops and let dry. Then, stencil 3-inch high lettering that reads CARPOOL PARKING ONLY.

G. Install Raised Pavement Markers in accordance with CALTrans Manual, Section 85-1.06 with adhesive.

3.04 DEFECTIVE WORK

A. Remove any paint that demonstrates evidence of checking, cracking, peeling, discoloration, lack of bonding or poor coverage. Misplaced lines shall be completely removed by paint remover or wet abrasive-blasting in accordance with SSPWC, Section 310.5.6.3. Painting over misplaced lines will not be permitted. Provide new complying work without claim for change in Contract Sum or Schedule.

END OF SECTION

SECTION 32 17 26

TACTILE/DETECTABLE WARNING SURFACE TILE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Surface Applied tactile tile modules where indicated.

1.02 SUBMITTALS

A. Product Data: Submit manufacturer's literature describing products, installation procedures and routine maintenance.

B. Samples for Verification Purposes: Submit two tile samples minimum 6" by 8" of kind proposed for use.

C. Shop drawings are required for products specified showing fabrication details; composite structural system; plans of tile placement including joints, and material to be used as well as outlining installation materials and procedure.

D. Material Test Reports: Submit test reports from qualified independent testing laboratory indicating that materials proposed for use are in compliance with requirements and meet the properties indicated. All test reports shall be conducted on Surface Applied tactile tile system as certified by a qualified independent testing laboratory.

E. Maintenance Instructions: Submit copies of manufacturer's specified maintenance practices for each type of tactile tile and accessory as required.

1.03 QUALITY ASSURANCE

A. Provide Surface Applied tactile tiles and accessories as produced by a single manufacturer.

B. Installer's Qualifications: Engage an experienced Installer certified in writing by tactile manufacturer as qualified for installation, who has successfully completed tile installations similar in material, design, and extent to that indicated for Project.

C. Americans with Disabilities Act (ADA): Provide tactile warning surfaces that comply with detectable warnings on walking surfaces section of Americans with Disabilities Act (Title 49 CFR TRANSPORTATION, Part 37.9 STANDARDS FOR ACCESSIBLE TRANSPORTATION FACILITIES, Appendix A, Section 4.29.2 DETECTABLE WARNINGS ON WALKING SURFACES.

D. California Code of Regulations (CCR): Provide only approved DSAAC detectable warning products as provided in the California Code of Regulations (CCR). Title 24, Part 1, Articles 2, 3 and 4 and Part 2, Section 205 definition of "Detectable Warning". Section 11B-705.1.2.2 for "Curb Ramps" and Section 11B-705.1.2.5 for Hazardous Vehicle Areas".

E. Detectable Warning Texture: Division of the State Architect (DSA/Access Compliance) approved products shall be used, compliance with CBC Section 11B-705.1.
   1. Truncated Domes: provide raised Detectable Warnings with diameter of 0.90" min. to 0.92" max. at base tapering to 0.45" min. to 0.47" max. at top, height of 0.18" - 0.22" and base-to-to base spacing of 0.65" min. measured between the most adjacent domes on a square grid (in-line pattern).
      a. Truncated Dome: shall contrast visually with adjoining surfaces, light-on-dark or dark-on-light. Material used to provide contrast shall be integral part of walking surface. Warning surface shall differ from adjoining surface in resiliency or sound to cane contact.

1.04 DELIVERY, STORAGE AND HANDLING

A. Tiles shall be suitably packaged or crated to prevent damage in shipment or handling. Finished surfaces shall be protected by sturdy wrappings and tile type shall be identified by part number.

B. Tiles shall be delivered to location at building site for storage prior to installation.

1.05 SITE CONDITIONS

A. Environmental Conditions and Protection: Maintain minimum temperature of 40°F in spaces to receive tactile tiles for at least 48 hours prior to installations, during installation, and for not less than 48 hours after installation. Store tactile tile material in spaces where they will be installed for at least 48 hours before beginning installation. Subsequently, maintain minimum temperature of 40°F in areas where work is completed.

B. The use of water for work, cleaning or dust control, etc. shall be contained and controlled and shall not be allowed to come into contact with the passengers or public. Provide barricades or screens to protect passengers or public.

C. Disposal of any liquids or other materials of possible contamination shall be made in accordance with federal state and local laws and ordinances.

D. Cleaning materials shall have code acceptable low VOC solvent content and low flammability if used on the site.

1.06 EXTRA STOCK

A. Deliver extra stock to storage area designated by engineer. Furnish new materials from same manufactured lot as materials installed and enclose in protective packaging with appropriate identification for Surface Applied tactile tiles. Furnish not less than two (2) percent of the supplied materials for each type, color and pattern installed.

1.07 WARRANTY (DETECTABLE WARNINGS AND DIRECTIONAL TEXTURE)

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

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
   1. Engineered Plastics Inc, Armor Tile.
   2. ADA Solutions, Inc., North Billerica, MA.
   3. Or equal.

B. Detectable Warning Texture: Division of the State Architect (DSA/Access Compliance) approved products shall be used, compliance with CBC Sections 11B-705.2 and 11B-705.3, IRs 11B-2, 11B-3 and 11B-4 and the California Accessibility Reference Manual.
   1. Truncated Domes: provide raised Detectable Warnings with diameter of 0.9 inch at base tapering to 0.45 inch at top, height of 0.2 inch, with center-to-center spacing of 2.3 to 2.4 inches and corner domes spaced at 0.896 inch from the corner edges of tile. Provide raised truncated domes in a square grid (in-line) pattern.
      a. Truncated Dome: shall contrast visually with adjoining surfaces, light-on-dark or dark-on-light. Material used to provide contrast shall be integral part of walking surface. Warning surface shall differ from adjoining surface in resiliency or sound to cane contact.
   2. Detectable Warning Texture (Truncated Domes): Plastics/Composites: Armor Tile, ADA Tactile Systems by Engineered Plastics Inc., North Billerica, or equal.

C. The Vitrified Polymer Composite (VPC) Surface Applied Tactile Tile specified is based on Armor-Tile manufactured by Engineered Plastics Inc. Existing engineered and field tested products which are subject to compliance with requirements, may be incorporated in the work and shall meet or exceed the specified test criteria and characteristics.

D. Homogenous glass and carbon reinforced composite that is colorfast and UV stable with the following characteristics:

Slip Resistance	C1028	0.98 dry, 0.94 wet
Accelerated Weathering	G26 (3,000 hours)	No Change
Wear Resistance	C501	564
Flame Resistance	E84	FSI=15
Water Absorption	D570	0.13%
Compressive Strength	D695	23,800 psi
Flexural Strength	D790	24,600 psi

E. Color: Yellow conforming to Federal Color No. 33538 of Federal Standard 595C. Color shall be homogeneous throughout the tile.

2.02 MATERIALS

A. Fasteners: Color matched, corrosion resistant, flat head drive anchor: 1/4" diameter x 1- 3/4" long, or manufacturer's recommended fasteners.

B. Adhesive and Sealant: Manufacturer's standard.

PART 3 - EXECUTION

3.01 INSTALLATION

A. During all surface preparation and tile installation procedures, ensure adequate safety guidelines are in place and that they are in accordance with the applicable industry and government standards.

B. The application of all tile, adhesives, mechanical fasteners, and caulking shall be in strict accordance with the guidelines set by their respective manufacturers.

C. Ensure that surfaces being prepared and fabricated to receive the tiles are constructed correctly and adequately for tile installation. Review design drawings with the Contractor prior to the construction and refer any and all discrepancies to Architect.

D. Set the tile true and square to the curb ramp area as detailed in the design drawings, so that its location can be marked on the concrete surface. Use thin permanent marker. Remove tile when done marking its location.

E. The surface to receive the detectable warning surface tile (not recommended for asphalt) is to be mechanically cleaned with diamond cup grinder or shot blaster to remove any dirt or foreign material. This cleaning and roughening of the concrete surface should include at least 4 inches around the perimeter of the area to receive the tile, and also along the cross pattern established by the corresponding areas on the backside of the tile. Those same areas should then be cleaned with a rag soaked in Acetone.

F. Immediately prior to installing the detectable warning surface tile, the concrete surfaces must be inspected to ensure that they are clean, dry, free of voids, curing compounds, projections, loose material, dust, oil, grease, sealers and determined to be structurally sound and cured for minimum of 30 days.

G. Using Acetone, wipe the backside of the tile around the perimeter and along the internal cross pattern, to remove any dirt or dust particles from the area to receive the adhesive.

H. Apply the adhesive on the backside of the tile, following the perimeter and internal cross pattern established by the tile manufacturer. Sufficient adhesive must be placed on the prescribed areas to have full coverage across the 2" width of the adhesive locator. A 3 x 4 foot tile will typically require an entire tube of adhesive.

I. Set the tile true and square to the curb ramp area as detailed in the design drawings.

J. Standing with both feet applying pressure around the molded recess provided in the tile, drill a hole true and straight to a depth of 3½" using the recommended diameter bit. Drill through the tile without hammer option until the tile has been successfully penetrated, and then with hammer option to drill into the concrete.

K. Immediately after drilling each hole, and while still applying foot pressure, vacuum, brush or blow away dust and set the mechanical fastener as described below, before moving on to the next hole.

L. Mechanically fasten tiles to the concrete substrate using a hammer to set the fasteners. Ensure the fastener has been placed to full depth in the dome, straight, and flush to the top of dome. Drive the pin of the fastener with the hammer, taking care to avoid any inadvertent blows to the truncated dome or tile surface. A plastic deadblow or leather hammer is recommended.

M. Working in a sequence that will prevent buckles in the tile, proceed to drill and install all fasteners in the tile's molded recesses.

N. Following the installation of the tiles, the perimeter caulking sealant should be applied. Follow the perimeter caulking sealant manufacturer's recommendations when applying. Tape all perimeter edges of the tile and also tape the adjacent concrete back 1/2" from the tile's perimeter edge. Tool the perimeter caulking with a plastic applicator or spatula to create a straight edge in a cove profile between the tile and adjacent concrete. Remove tape immediately after tooling perimeter caulking sealant.

O. Do not allow foot traffic on installed tiles until the perimeter caulking sealant has cured sufficiently to avoid tracking.

P. If installing adjacent tiles, note the orientation of each tile. Careful attention will reveal that one of the long edges of the tile is different than the other, in regard to the tiny dotted texture. You may also note a larger perimeter margin before the tiny dotted texture pattern begins. Consistent orientation of each Tile is required in order that the truncated domes on adjacent tiles line up with each other.

Q. In order to maintain proper spacing between truncated domes on adjacent tiles, the tapered edge should be trimmed off using a continuous rim diamond blade in a circular saw or mini-grinder. The use of a straightedge to guide the cut is advisable. All cuts should be made prior to installation of the tiles.

R. If installing adjacent tiles, care should be taken to leave a 1/8 inch gap between each. If tiles are custom cut to size, and if pre-molded recesses (to receive fasteners) are removed by the cut, then any truncated dome can be center-drilled with a ¼ inch through hole, and countersunk with a suitable bit, to receive mechanical fasteners. New holes should be created no closer to the edge of the tile than any of the other perimeter fastener pre-molded recesses. Care should be taken to not countersink too deeply. Fasteners should be flush with the top of the truncated dome when countersunk properly.

S. Adhesive or caulking on the surface of the Tile can be removed with Acetone.

3.02 CLEANING AND PROTECTING

A. Protect tiles against damage during construction period to comply with tactile tile manufacturer's specification.

B. Protect tiles against damage from rolling loads following installation by covering with plywood or hardwood.

C. Clean tactile tiles not more than four days prior to date scheduled for inspection intended to establish date of substantial completion in each area of project. Clean tactile tile by methods recommended by manufacturer.

END OF SECTION

SECTION 32 31 13

FENCES AND GATES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Fence framework, fabric, and accessories

B. Excavation for post bases.

C. Concrete anchorage for posts and center drop for gates.

D. Swing gates, signs and related hardware.
   1. Manual Operation

E. Related Section
   1. Section 32 13 13, Sitework Concrete.

F. Lock Box Fire-Department-Access padlock.

G. Tennis fabric.

1.02 REFERENCE STANDARDS

A. Conform to reference standards by date of issue current on date of Contract Documents.

B. ASTM International
   1. ASTM A 392 - Zinc-Coated Steel Chain-Link Fence Fabric
   2. ASTM A 824 - Metallic-Coated Steel Marcelled Tension Wire for Use With Chain Link Fence
   3. ASTM B221 Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
   4. ASTM F 552 - Terminology Relating to Chain Link Fencing
   5. ASTM F 567 - Installation of Chain-Link Fence
   6. ASTM F 626 - Fence Fittings
   7. ASTM F 900 - Industrial and Commercial Swing Gates
   8. ASTM F 969 - Construction of Chain-Link Tennis Court Fence
   9. ASTM F 1043 - Strength and Protective Coatings on Steel Industrial Chain Link Fence Framework
   10. ASTM F 1083 - Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures
   11. ASTM F 1184 - Industrial and Commercial Horizontal Slide Gates
   12. ASTM F 2049 - Fences/Barriers for Public, Commercial, and Multi-Family Residential Use Outdoor Play Areas.
   13. ASTM A653 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

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

D. CLFM - Chain Link Fence Manufacturer's Institute

E. CBC - 2016 California Building Code
   1. Chapter 10, Means of Egress
   2. Chapter 11B, Accessibility to Public Buildings, Public Accommodations, Commercial Buildings and Public Housing.
   3. Chapter 19A, Concrete

1.03 QUALITY ASSURANCE

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

1.04 SUBMITTALS

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

B. Product data.

C. Manufacturer's installation instructions.

D. Three samples illustrating each fence fabric finish.

1.05 WARRANTY

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

PART 2 - PRODUCTS

2.01 MATERIALS

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

B. Framework: ASTM F1043; Type I Group IA, Schedule 40, ASTM F1083 , 50,000 psi, hot-dipped galvanized steel pipe, minimum 1.8 oz/sq.ft., Sized in accordance with Table 206-6.2, Standard Specifications for Public Works Construction. One piece without joints in accordance with CLFM I.
   1. EXIT Gates: galvanized square tube, ASTM A500, Grade B, for square pipe at lintels and gate posts, minimum galvanizing coating of 1.8 ounces per sq. ft. 2-1/2 inches square.

C. Fabric: Type II ASTM A817, Class 2 ASTM A392, Class 2 (not less than 2 oz/ft sq.), galvanized before (G.B.W.) weaving, 2-inch mesh, 9 gauge, interwoven, top and bottom knuckled selvage. Single width fabric.
   1. Fabric at Enclosures: 1-3/4 inch mesh, 11 gage, single width fabric.

a. "Tennis" windscreen C-95 woven open mesh 100% polypropylene with 78 percent wind break, 6 x 12 inch cutouts at 10 feet o.c., reinforced tape at #2 brass grommets at 18 inches centers at perimeter, attach screen to chain link fence with 11 gauge brass hog rings. Color: Dark Gray. West Coast Netting, Kingman, AZ., Roxford Fordell, Los Angeles, CA, Shade Tree, Cornelia, Georgia or equal as approved in accordance with Division 01, General Requirements for substitutions.

b. Height: as indicated

2.02 CONCRETE MIX

A. Concrete: Normal Portland cement; 3,000 psi at 28 days; 4 inch slump, conforming to ACI 318-14 Section 5.2, CBC Section 1905A and Section 32 13 13 Sitework Concrete.
1. Design Mix: Conform to ACI 318-14 Section 5.2 along with CBC Amendments, Chapter 1905A.
2. Reinforcement: per Section 32 13 13 and as indicated on drawings.

2.03 COMPONENTS

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

	NPS	Pounds/LF
1.	1-1/4:	2.27
2.	1-1/2:	2.72
3.	2:	3.65 (3.87 for sq. pipe at exit gate frames)
4.	2-1/2:	5.79 (5.79 for sq. pipe at exit gate posts)
5.	3:	7.58
6.	3-1/2:	9.11
7.	6:	18.97
8.	8:	24.58

B. Line Posts for fencing

Fence height in feet	Outside diameter in inches
	5

C. Terminal Posts - end, corner and slope.

Fence height in feet	Outside diameter in inches
	5

D. Swing gate posts, single leaf; opening widths in feet:

1.	Up to 6 wide	2" diameter
2.	6-13 wide	3-1/2" diameter
3.	13-18 wide:	6" diameter
4.	18 or more wide:	8" diameter

E. Swing gate posts, double leaf, opening widths in feet:

1.	Up to 12 wide	2-1/2" diameter
2.	12-26 wide	3-1/2" diameter
3.	26-36 wide	6" diameter
4.	36 or more wide:	8" diameter

F. Top rail, mid rails, and braces: 1-5/8 inches diameter, plain end, sleeve coupled.

G. Top Rail Expansion Sleeve: 7 inches expansion sleeve with spring.

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

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

J. Caps: Domed cast steel or malleable iron, galvanized and coated; sized to post dimension, set screw retained.

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

L. Tension Wire: 7 gage thick coil spring steel, single strand, galvanized.

~~M. Lock Box: #1650 Medium Duty surface-mounted as manufactured by the Knox Company, Newport Beach, CA.~~

N. Truss Rod and Tightener: 3/8-inch diameter; furnish one at each end, pull, and gate post, and at both sides of corner posts.

O. Double Gates: Master-Halco Series 17200, latch assembly with drop rod (cane bolt).

P. Single Leaf Gate with panic hardware as indicated on plans:

HW SET: 915
DOOR NUMBER

G10					

EACH TO HAVE:

2	EA	EXIT DEVICE	CDSI-AX-98NL/OP	626	VON
3	EA	HINGE	3CB1 4.5 X 4.5	652	IVE
1	EA	CLOSER	4111 S-CUSH	689	LCN
2	EA	IC RIM CYLINDER	20-057-ICX	626	SCH
2	EA	MORTISE CYLINDER	30-001 FOR DOGGING	626	SCH
2	EA	PRIMUS CORE ONLY	20-740	626	SCH
2	EA	DOOR PULL	VR910NL	630	IVE
			BALANCE OF HARDWARE BY GATE MANUFACTURER		B/O

2.04 PADLOCK

A. Non Fire Access Padlock: 5 pin cylinder, corrosion resistant, hardened steel shackles, 5/16 inch shackle diameter, No. 1158A54 by McMaster-Carr, Los Angeles, CA, or equal as approved in accordance with Division 01, General Requirements for substitutions, master keyed to building standard one per gate.

B. Fire Department Access Padlock: heavy-duty brass body, 2-1/4 in. H x 2 in. W x 1-1/4 in. D. 3/8 in. diameter hardened steel shackle, 1-3/4 in. long shackle. Model No. PL-1W with EPDM elastomeric protection by Medeco Company, or equal as approved in accordance with Division 01, General Requirements for substitutions, one per fire-access gate.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install framework, fabric, accessories and gates in accordance with Section 304-3, SSPWC, ASTM F567 and manufacturer's instructions.
   1. Line post-footing diameter:18 inches min. Embed posts into footing 6 inches less than the depth of the footing. Slope at top to shed water, 1/4" per foot.
   2. Line post-footing minimum depth: 8 ft. minimum.
   3. Gate post-footing diameter: 18 inches.
   4. Gate post footing minimum depth: 8 ft.
   5. For fencing higher than 12 feet: footing depth of 60" minimum and diameter of 36" minimum unless noted otherwise on drawings.
   6. Reinforcing: per Section 32 13 13 and as indicated on drawings.
   7. Posts set in hard rock concrete: drill holes 1 inch larger than post and set in non-shrink grout.

B. Provide fence height as indicated on Drawings.

C. Space line posts at intervals not exceeding 10 feet.

D. Set terminal, gate and line posts plumb, in concrete footings with top of footing 2 inches above finish grade. Slope top of concrete for water runoff.

E. Provide top rail through line post tops and splice with 7 inch long rail sleeves, outside sleeve type.

F. Brace each gate, corner, and end posts to adjacent line posts with horizontal center brace rail and diagonal truss rods. Install brace rail, one bay from end and gate posts.

G. Center Rails: Install mid rails between posts with fittings and accessories for fabric height 12' and over, inclusive.

H. Install center and bottom brace rail on gate leaves, welded construction.

I. Stretch fabric between terminal posts or at intervals of 100 feet maximum, whichever is less.

J. Position bottom of fabric 2 inches above finished grade.

K. Fasten fabric to top rail, line posts, braces and bottom tension wire with tie wires maximum 16 inches on centers, one complete wrap.

L. Attach fabric to end, corner and gate posts with tension bars and tension bar clips.

M. Install bottom tension wire stretched taut between terminal posts, (corner posts shall have brace rail).

N. Double Gates: Provide drop rod to hold inactive leaf. Provide locking device and padlock eyes as an integral part of latch, requiring for locking both gate leaves.

O. Provide concrete center drop and drop rod retainers at center of double gate openings, except gates with panic hardware.

P. Weld mount galvanized steel plate to accept Lock Box nearest latch with access to door from outside of fence enclosure for Fire Department. Touch up all welding marks with Solder Zinc Alloy for Repair: Welco Gal-Viz self-fluxing solder alloy, Galvalloy, Galvabar or equal, ASTM A780, paragraph A1. Repair Using Zinc-Based Alloys.

3.02 SWING GATES

A. Gates that are part of the accessible route shall meet all the requirements of an accessible door in compliance with CBC 11B-404.

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

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

D. Hardware: Heavy-duty, galvanized ferrous metal industrial quality as manufactured by Master-Halco/Anchor Fence Inc., Baltimore, MD. Von Duprin, Adams Rite, Sargent, Trimco or equal as approved in accordance with Division 01, General Requirements for substitutions.

E. Hinges: Structurally capable of supporting gate leaf and allow opening and closing without binding. Non-lift-off type hinge design shall permit gate to swing 180 degrees inward as indicated on drawings .
   1. Latch: Fork type latch capable of retaining gate in closed position, except gates with exit devices (panic hardware); Master-Halco, Series 16000 or approved equal.
      a. At accessible gates, hardware shall not require pinching, grasping or twisting motion. Weld 1-1/2 inches by 2-1/2 inches by 1/4 inch diameter U-shaped galvanized rod to fork latch, both sides, for ADA accessibility as indicated on Drawings. Dress welded joints, leaving no burrs, or sharp abrasive corners, edges or surfaces, in accordance with NOMMA Guidelines for Finish 1. Touch up with Solder Zinc Alloy for Repair: Welco Gal-Viz self-fluxing solder alloy, Galvalloy, Galvabar or equal, ASTM A780, paragraph A1. Repair Using Zinc-Based Alloys.
   2. Locks: Self-latching bolt and deadbolt, 3/4 inch diameter, adjustable, lockable, with lever handle, by Ameristar Lock or equal, keyed lock. Hardware shall not require pinching, grasping or twisting motion. The lever of lever-activated latches or locks for an accessible gate shall be curved with a return to within ½" of the (face of) gate to prevent catching on the clothing or persons.
   3. Exit Device at Exit Gates only, outswing in accordance with 2016 CBC Sections 1008.1.9, 1008.1.10, and 1008.2, mounted 36" to 44" above finish floor. Exit Device (panic hardware) shall be mounted to provide 36" clear minimum below the device. Unlatching force not exceed 15# applied in direction of travel.

a. Panic Bar: Exit Device; Von Duprin Rim Device 99NL-OP (Night Latch, Cylinder Only) Series exit device, anodized aluminum finish, with 299 strike and VR914NL Vandal Resistant Trim, at single gates, devices in exit pathways where shown on drawings, include cylinders, attach to gate post. Grip trim on exterior of gate.
b. Accessories: 4" x 3" x ¼" x 8" high galv. steel angle welded to strike-side frame and 1" x 3" x ¼" thick latch bolt keeper.
c. Fabricate Steel Lock Box, galvanized, 16 ga x 3" high x 8" wide x 1-3/4" thick to encase lockset, weld all joints and grind smooth, touch up with galvanizing compound.

4. Locking: Provide padlock capability on non-pedestrian gates only. Do not install padlock capability on Exit Gates, gates on Path of Travel with Exit Devices and other pedestrian gates.
5. Gate Hardware Mounting: Mount at 34 to 40 inches above walking surface and according to 2016 CBC Sections 1008.1.9 and 1008.2 and 11B-404.2.7, 11B-404.2.9.
   a. Provide strike strap.
   b. Bolt keeper.
6. Install 0.125 inch thick aluminum protective plate 24 in. high by width of gate behind panic device centered at 40 in. above finish surface. Secure to gate frame with #8 stainless steel screws at 6 in on center.
7. Install 0.125 inch thick aluminum kickplate 10 inches high on push side (For larger gates install at both sides), CBC 11B-404.2.10, parts creating horizontal or vertical joints in these surfaces shall be within 1/16" of the same plane as the other and be free of sharp or abrasive edges. Cavities created by added kick plates shall be capped. Secure with #8 stainless steel screws 4 places each kickplate minimum. Clear space below gate shall be 3 inches maximum from walking surface on both sides of the gate.
8. Gate Closer for push out installation: ANSI A156.4, Grade 1. Install hydraulic gate closer, Model Dor-O-Matic SC71, Norton 7501, LCN 4041, or equal. Arm Rw/PA (regular arm with parallel arm bracket), adapter offset shoe, plate and spacer, TBSRT (thru bolt self-reaming and tapping) screws, plate. ADA compliant. With metal cover, aluminum finish. Attached to 2-1/2 inches square lintel. Opening force to be limited to 5 lbs maximum.

3.03 TESTING

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

END OF SECTION

SECTION 32 32 23

SEGMENTED BLOCK RETAINING WALL

SECTION 1
PART 1: GENERAL

1.1 Scope

Work includes furnishing and installing modular concrete block retaining wall units to the lines and grades designated on the construction drawings and as specified herein.

1.2 Reference Standards

A. ASTM C1372 Standard Specification for Segmental Retaining Wall Units.
B. ASTM C1262 Evaluating the Freeze thaw Durability of Manufactured CMU's and Related concrete Units
C. ASTM D698 Moisture Density Relationship for Soils, Standard Method
D. ASTM D422 Gradation of Soils
E. ASTM C140 Sample and Testing concrete Masonry Units

1.3 Delivery, Storage, and Handling

A. Contractor shall check the materials upon delivery to assure proper material has been received.
B. Contractor shall prevent excessive mud, cementitious material, and like construction debris from coming in contact with the materials.
C. Contractor shall protect the materials from damage. Damaged material shall not be incorporated in the project (ASTM C1372).

1.4 Contractor Requirements

Contractors shall be trained and certified by local manufacturer or equivalent accredited organization.

A. Contractors shall provide a list of projects they have completed.

PART 2: MATERIALS

2.1 Modular Wall Units

A. Wall units shall be Allan Block Retaining Wall units per plans or approved equal as produced by a licensed manufacturer.
B. Wall units shall have minimum 28 day compressive strength of 3000 psi (20.7 MPa) in accordance with ASTM C1372. The concrete units shall have adequate freeze-thaw protection with an average absorption rate in accordance with ASTM C1372 or an average absorption rate of 7.5 lb./ft³ (120 kg/m³) for northern climates and 10 lb./ft³ (160 kg/m³) for southern climates.
C. Exterior dimensions shall be uniform and consistent. Maximum dimensional deviations on the height of any two units shall be 0.125 in. (3 mm).
D. Wall units shall provide a minimum of 110 lbs total weight per square foot of wall face area (555 kg/m²). Hollow cores to be filled with wall rock and compacted by using plate compactor on top of wall units (see section 3.4). Unit weight of wall rock in cores may be less than 100% depending on compacted base.
E. Exterior face shall be textured. Color as specified in the plans.

2.2 Wall Rock
A. Material must be well-graded compactable aggregate, 0.25 in. to 1.5 in., (6 mm - 38 mm) with no more than 10% passing the #200 sieve. (ASTM D422)

2.3 Infill Soil
A. Infill material shall be as specified in Section 32 93 00. Unsuitable soils for backfill (heavy clays or organic soils) shall not be used in the soil mass

B. The contractor shall submit a fill soil sample and specifications to the Landscape Architect for approval.

2.4 Adhesive
A. Adhesive for securing cap blocks to wall and bottom course of wall to asphalt shall be SRW products retaining wall SP adhesive, solvent based meeting ASTM D3498 and C557requirements, or approved equal.

PART 3: WALL CONSTRUCTION

3.1 Excavation
A. Contractor shall excavate to the lines and grades shown on the construction drawings. Contractor shall use caution not to over-excavate beyond the lines shown, or to disturb the base elevations beyond those shown.
B. Contractor shall verify locations of existing structures and utilities prior to excavation. Contractor shall ensure all surrounding structures are protected from the effects of wall construction.

3.2 Foundation Preparation
A. All walls are to be set on an asphalt pavement foundation.
B. The contractor shall inspect the installed pavement and base to assure that the pavement will provide an adequate foundation for the segmented block planter walls.

3.3 Unit Installation
A. Install units in accordance with the manufacturer's instructions and recommendations for the specific concrete retaining wall unit, and as specified herein.
B. Ensure that units are in full contact with the asphalt base. Proper care shall be taken to develop straight lines on base pavement as per wall layout.
C. Glue base blocks to asphalt with adhesive per block manufacture's recommendations.
D. Fill all cores and with wall rock. Use planter fill soils behind the. Check again for level and alignment. Use a plate compactor to consolidate the area behind the base course. All excess material shall be swept from top of units.
E. Install next course of wall units on top of base course. Position blocks to be offset from seams of blocks below. Perfect "running bond" is not essential, but a 3 in. (75 mm) minimum offset is recommended. Check each block for proper alignment and level. Fill all cavities in wall units with wall rock. Place infill soil in uniform lifts not exceeding 8 in. (200 mm). Compaction requirements for all soils in areas in, around and behind the reinforced mass shall be compacted to 80% of maximum Standard Proctor dry density (ASTM D698) with a moisture content control of +1% to -3% of optimum.
F. Install each subsequent course in like manner. Repeat procedure to the extent of wall height.

G. As with any construction work, some deviation from construction drawing alignments will occur. Variability in construction of SRWs is approximately equal to that of cast-in-place concrete retaining walls. As opposed to cast-in-place concrete walls, alignment of SRWs can be simply corrected or modified during construction. Based upon examination of numerous completed SRWs, the following recommended minimum tolerances can be achieved with good construction techniques.

Vertical Control - ±1.25 in. (32 mm) max over 10 ft. (3 m) distance
Horizontal Location Control - straight lines ±1.25 in. (32 mm) over a 10 ft. (3 m) distance
Rotation - from established plan wall batter: ±2.0°

END OF SECTION

SECTION 32 80 00

IRRIGATION SYSTEM

PART I: GENERAL

1.01 QUALITY ASSURANCE

A. All local, municipal, county and state laws, safety orders, rules and regulations governing or relating to any portion of the work depicted on these plans are hereby incorporated into and made a part of these specifications, and their provisions shall be carried out by the contractor. Notify the Landscape Architect prior to installation in the event any equipment or methods indicated on the drawings or specifications conflict with local codes.

B. Verify the locations of all existing utilities, structures, and services before commencing work. The locations of utilities, structures, and services shown on these plans are approximate only. Any discrepancies between these plans and actual field conditions shall be reported to the Owner or Landscape Architect.

C. Obtain the pertinent Landscape Architectural and or architectural plans before commencing work.

D. Obtain and pay for all necessary permits and inspections required by authorities stated above to perform the work indicated herein before commencing work.

E. Notify the Landscape Architect prior to commencing work, and be responsible for coordinating work with the Owner, Landscape Architect, other construction trades, and governing agencies. Cause minimum interference with the work, materials, or equipment of other contractors.

F. Irrigation plan is diagrammatic only. Refer to the irrigation legend and details for equipment and installation.

G. Notify the Landscape Architect prior to commencing work in the event of conflicts between the drawings and specifications.

H. Prior to the submission of a bid, the contractor shall examine the site and the complete drawings and specifications for the project in addition to the sprinkler irrigation portion of the work.

1.02 SCOPE OF WORK

A. The work consists of furnishing all labor, materials, machinery, and processes required to complete the sprinkler irrigation system as shown on the drawings and described herein.

B. The intent of the drawings and specifications is to indicate and specify a complete sprinkler system, installed ready for use without further cost in labor or material to the Owner.

C. The contractor shall be responsible for all work to be performed under this contract. No subcontractor shall relieve the contractor of his liability to complete the work as shown on the drawings and specifications in a timely manner.

1.03 PROTECTION

A. Use all means necessary to protect all materials of this section before, during, and after installation and to protect all objects designated to remain.

B. In the event of damage, or theft immediately make all repairs and replacements necessary at no additional cost to the Owner.

C. The Contractor shall protect all existing utilities and features on and adjacent to the project site from damage as a result of construction or malfunction during construction. Contractor shall repair, at his own expense, all damage resulting from his operations or negligence.

D. The contractor shall carefully note all finished grades before commencing work. Any finished grade changed during the course of his work shall be restored to the original contours.

1.04 SUBMITTALS

A. The Contractor shall furnish the articles, equipment, materials or processes specified in name on the drawings. No substitutions will be allowed without prior written approval by the Landscape Architect. Equipment or materials furnished or installed without the prior approval of the Landscape Architect may be rejected and the contractor required to remove such materials from the site at his own expense.

B. Submit catalogue data and full descriptive literature for approval of items different than those specified.

C. Submit record drawings in accordance with Part 3.

1.05 EXTRA MATERIALS / MATERIALS TO BE FURNISHED

A. Deliver extra materials to Owner. Furnish extra materials matching products installed as described below. Package them with protective covering for storage and label clearly describing contents.
   1. Emitter tubing: (2) 50' rolls.
   2. The contractor shall provide two sets of sprinkler wrenches for adjusting, cleaning, or disassembling each type of sprinkler.
   3. Provide two keys for each automatic controller.
   4. Provide two quick coupler keys with hose swivels.
   5. Provide two each of any special tools required for other equipment.
   6. Two service manuals for all equipment shall be furnished to the Owner. Manuals may be loose leaf and should show drawings or exploded views of equipment and catalogue number.
   7. Operating instructions for all equipment shall be furnished.

PART 2: PRODUCTS

2.01 General

A. All equipment and materials shall be new and unused prior to installation.

2.02 Brass Pipe and Fittings

A. Brass pipe shall be heavy wall type, with threads complying to A.S.A. specifications.

B. Fittings to be used with brass pipe shall be case brass or case bronze threaded joint, and shall comply with A.S.A. specifications. Threads on pipe and fittings shall be taper type.

2.03 Plastic Pipe and Fittings

A. Plastic pipe shall be extruded from 100% virgin polyvinyl chloride (PVC) type 1, grade 11 (class 1220) as manufactured by Lasco, Johns-Manville, or equal.

B. All plastic pipe shall be continuously and permanently marked with the following information: manufacturer's name, nominal pipe size, PVC 1220, SDR (standard dimension ratio or pressure rating in psi).

C. Pipe shall be of the size and class or schedule as noted in the irrigation legend. Exposed pipe shall be "Brownline " UVR PVC or equal.

D. Plastic fittings shall be PVC 11, IPS, Schedule 40 NSF and Schedule 80 threaded and or slip fittings as shown in the details.

E. All threaded nipples shall be standard weight schedule 80 molded threads. Threaded nipples exposed above grade shall be gray in color.

F. Solvent to be used for joining plastic pipe and fittings shall be as per the pipe manufacturers recommendations.

2.04 SLEEVING

A. Sleeve all mainline and lateral lines with PVC. SCH. 40 pipe twice the diameter of the sleeved line where it passes under paved areas wider than four feet. Extend sleeve 12" beyond the edge of the pavement.

2.05 WIRING

A. Control Wire: Awg-uf, #14 min. direct-burial type. Common wire shall be black. Use alternate colors(s) for control wires.

B. Wire connections: Made with "Pen-tite" connectors (or equal). Locate mid wire splices in pull box (8" round plastic valve box).

C. Higher voltage connections or 110 v shall be made by clamp and shall be weather protected per local codes.

D. Other equipment shall be as specified in the irrigation legend on the drawings.

2.06 ASSEMBLIES

A. All threaded pipe and fittings shall be assembled using Teflon tape or equal, applied to the male threads only.

2.07 EQUIPMENT

A. Quick coupling valves, controllers, remote control (automatic) valves, ball valves, gate valves, sprinkler heads, backflow prevention units, and other equipment shall be as specified in the irrigation notes and legend on the drawings.

2.08 VALVE BOXES

A. All remote control, gate, ball, and isolation valves shall be housed in plastic valve boxes as detailed. Valve boxes shall be as manufactured by Brooks or equal.

B. Valve boxes shall be lock top or bolted. Provide two keys minimum for lockable boxes.

C. Valve box lids shall be marked as noted in the details.

2.09 CHECK VALVES

A. Anti-drain valves shall be of heavy duty virgin PVC construction with F.I.P. thread inlet and outlet. Internal parts shall be stainless steel and neoprene. Anti-drain valve shall be field adjustable against drawout from 5 to 40 feet of head. Anti-drain valve shall be Valcon ADV or approved equal.

PART 3: EXECUTION

3.01 SITE CONDITIONS

A. All scaled dimensions are approximate. The contractor shall check and verify all dimensions on the site prior to proceeding with the work of this contract.

B. The installation of all sprinkler materials, including pipe shall be coordinated with the planting plans to avoid interfering with tree, shrub, or other plant locations.

3.02 WATER SUPPLY

A. The contractor shall connect to the water source as indicated on the drawings. Verify static pressure as stated on the plans prior to beginning work. Notify the Landscape Architect promptly if static pressure or point of connection differ from that shown on plans.

3.03 SPRINKLER HEAD LOCATIONS

A. Layout sprinkler heads and make minor adjustments required due to differences between site and drawings. Any such deviations in layout shall be within the intent of the original drawings, and without additional costs to the Owner. When directed by the Landscape Architect the layout shall be approved prior to installation.

B. Do not willfully install the sprinkler system as indicated on the drawings when it is obvious in the field that unknown obstructions or grade differences exist that might not have been considered during Landscape Architecting. Such obstructions or differences shall be brought to the attention of the Landscape Architect.

3.04 VALVE LOCATIONS

A. Backflow prevention devices shall not be located in turf areas unless specifically indicated on drawings.

B. Automatic valves shall be grouped in manifolds, with valve boxes located approximately 12" from the edges of walks and paths. Do not locate manifolds in areas where they would result in gaps in hedge plantings or prevent trees from being located per plans.

C. Paint valve and controller number on top of automatic value box lids. Secure a plastic tag with the valve number embossed onto each automatic valve.

D. Check valves and anti-drain valves shall be installed where indicated, and where necessary to prevent water flow from lower elevation sprinkler heads when irrigation system is turned off.

3.05 PIPE AND PIPE DEPTH

A. All pressure mainlines shall be buried eighteen (18) inches deep, minimum.

B. All lateral piping shall be buried twelve (12) inches deep, unless otherwise indicated.

C. Pressure mains under paving shall be 30" deep minimum. Non-pressure laterals under paving shall be 24" deep minimum.

D. All PVC pipe 2" and smaller shall be cut with a pipe cutting tool. Saw cuts are not allowed.

E. Pipes placed in joint trenches shall be 18" apart minimum.

3.06 TRENCHING AND BACKFILLING

A. Make all excavations in open cut to width and depth necessary to construct the work in accordance with the Drawings and or as specified by the Landscape Architect. Exercise carefully to carry the excavation to the proper line and grade and to provide an even, uniform bearing surface for all piping.

B. The minimum allowable trench width is eight inches (8").

C. Hand trim excavations to required elevations. Do not over excavate. Remove large stones or other hard matter which could damage pipe.

E. Backfilling

1. Backfill for trenching shall be compacted to dry density equal to the adjacent undisturbed soil in planting areas, and to 90% under paved areas. Backfill shall conform to the adjacent grades without dips, sunken areas, humps, or other irregularities. Place excavated material in six inch (6") layers, loose measure, and thoroughly tamp under and around the pipe across the full width of the trench. Provide moist, not wet, backfill. Include no stones larger than two inches (2").

2. Allow for settlement. In the event of backfill settlement, the Irrigation Contractor shall perform required repairs at this own cost. Contractor shall be responsible for any settling of trenches from his work for a period of one year from acceptance by Owner.

3. Trenches shall be backfilled promptly after the open trench inspection.

3.07 ELECTRICAL

A. Verify power sources as shown on the drawings.

B. The contractor shall be responsible for making 110 volt electrical connections to the automatic controller, and for connecting remote control valves to the controller. All electrical work shall be in accordance with local codes and/or ordinances.

C. Control wires shall be installed with one foot of excess wire (coiled) at the end of each wire run, and at 100 foot intervals for runs over 100 feet. Coils shall be in 8" round valve boxes.

D. Run one extra hot wire and one common wire to the end of each circuit.

E. Control wires shall be installed in grey schedule 40 PVC conduit.

F. All control wiring shall be tested for continuity, open circuits and unintentional grounds prior to connecting equipment. The minimum insulation resistance to ground shall be fifty (50) megohms. Any wiring not meeting this requirement shall be replaced at the contractor's expense.

3.08 PRESSURE TESTING Prior to backfilling irrigation trenches:

A. All mainlines in the system shall be capped and hydrostatically pressure tested at 125 P.S.I. for a period of 24 hours with 0 P.S.I leak down. Any leaks found shall be corrected by removing and replacing the leaking pipe or fittings, and installing new material in its place.

B. All laterals shall be pressure tested at design pressure for four hours.

C. The contractor shall not allow or cause any of this work to be covered until it has been inspected, tested, and approved by the Landscape Architect.

D. Contact Landscape Architect a minimum of 48 hours prior to performing pressure tests. The Landscape Architect may elect to have the construction foreman observe the results of the test and document the results in the minutes of a regular construction progress meeting.

3.09 FLUSHING

A. After all new PVC pipe, lines, and risers are in place and connected, all necessary diversion work has been completed, and prior to the installation of heads, the control valves shall be opened and a full head of water used to flush out the system.

B. Cap off each head in sequence, from the control valve to the end of the line. Proceed to the next head only after the flow of water is clean and free of dirt, grit, and particulate matter.

3.10 SPRINKLER COVERAGE

A. Irrigation Contractor shall adjust all sprinkler heads to ensure an even coverage and to keep spray off of buildings, walls, walks, and drives.

B. Adjust sprinkler heads on a daily basis as the system is being balanced throughout the construction and maintenance periods. Overspray and overwatering are to be kept to an absolute minimum.

C. If it is determined that adjustments in the irrigation equipment or nozzle changes will provide proper and more adequate coverage, make necessary changes without additional cost to the Owner.

3.11 CLEAN-UP

A. Upon completion of the work, make the ground surface level, remove excess materials, rubbish, debris, etc. and remove construction and installation materials from the premises.

3.12 RECORD DRAWINGS

A. The contractor shall furnish to the Owner a complete set of "as-built" drawings on reproducible media showing exact locations of all items installed. Corrections and changes are to be drawn in red ink. Drawings are to be legible and accurate. Dimension locations of valves, mainlines, control wires, water sources, and other equipment from two visible stationary points. These are to be delivered on or before final inspection and approval.

B. A reduced irrigation plan indicating all irrigation systems and their appropriate sequenced control valve shall be laminated in clear plastic and mounted on the inside cover of each irrigation controller. The drawing shall clearly show locations of mainline, numbered control valves (and manifolds), shut off valves, and valve coverage areas.

3.13 INSPECTIONS

A. In no event shall the Contractor cover-up or otherwise remove from view any work under this contract without the prior approval of the Owner. Any work covered prior to inspection shall be uncovered by the Contractor at the Contractor's expense.

B. Mainline pressure test and trench depth inspections shall be made prior to backfilling of trenches.

C. When the irrigation system is completed and prior to planting, the Contractor shall in the presence of the Owner's authorized representative perform a coverage test on all planting areas to ensure it is complete and adequate. The Contractor shall furnish all materials and perform all work required to correct any inadequacies of coverage at his own cost.

D. Notify the Owner in writing seven days prior to final inspection at the end of the maintenance period. Final inspection will be to insure that the system is fully operational, and that all heads, valves, and watering sequences have been adjusted for the proper irrigation of the plantings.

E. Show evidence that the Owner has received all required accessories, charts, record drawings, etc. at the time of final inspection. The maintenance period may be extended if these materials have not been delivered.

3.14 MAINTENANCE AND GUARANTEE

A. Irrigation Contractor shall maintain the irrigation system for a period of ninety (90) days after pre-maintenance walk-thru, and shall water on a daily basis, or as required by plantings and weather conditions.

B. Irrigation Contractor shall guarantee the entire irrigation system as to materials and workmanship for a period of one (1) year from final acceptance by the Owner. Should any operational difficulties in connection with the irrigation system develop within the guarantee period, which in the opinion of the Owner may be due to workmanship or materials, said difficulties shall be immediately corrected by the Contractor at no additional cost to the Owner. Manufacturers warranties shall not relieve the Contractor of his liability under the guarantee.

END OF SECTION

SECTION 32 93 00

TREES, PLANTS AND GROUND COVERS

PART 1: GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, and equipment to provide, install, and maintain soil preparation, headers, finish grading, planting, and establishment period as described herein and on the plans.

B. The Contractor shall adequately protect the work, adjacent property, and the public, and shall be responsible for any damage, injury, and loss due to his acts or negligence.

C. Work not included: Rough grading.

1.02 QUALITY ASSURANCE

A. Verify the locations of all existing utilities, structures, and services before commencing work. The locations of utilities, structures, and services shown on these plans are approximate only. Any discrepancies between these Plans and actual field conditions shall be reported to the Landscape Architect.

B. Protect all existing utilities and features on and adjacent to the project site during construction. Contractor shall repair, at his own expense, all damage resulting from his operations or negligence.

C. The Contractor shall obtain the pertinent engineering and or architectural plans before commencing work.

D. Notify the Landscape Architect prior to commencing work, and be responsible for coordinating work with the Owner, Landscape Architect, other construction trades, and governing agencies.

E. The planting plan is diagrammatic, and all plant locations depicted thereon are approximate. Plant symbols take precedence over plant quantities specified, if any. Notify the Landscape Architect of discrepancies between quantities and symbols shown.

F. Prior to planting, the irrigation system shall be fully operational and all planting areas shall be thoroughly moistened to a depth of 24 inches.

G. The Contractor shall be responsible for and pay for all permits and Certificates of Inspection of plant materials that may be required by Federal, State, or other authorities. Copies of permits and inspection certificates shall be furnished to the owner without charge.

H. Protect bench marks, existing structures, fences, roads, sidewalks, lawns, and other finish surfaces against damage from equipment or other planting operations. Repair any damage at no cost to Owner.

1.03 SUBMITTALS

A. Obtain, pay for, and submit to the Landscape Architect a soil analysis report from an authorized soil testing agency to the Landscape Architect prior to commencement of work. Soil amendments listed below are subject to change per this soil analysis.

B. If a plant is found not to be suitable or available, the Contractor shall notify the Landscape Architect in writing prior to bidding. The Landscape Architect will select a suitable alternate and/or inform contractors of the availability of the plant.

C. Submit photographs from the nursery of one (1) typical tree of each species tagged for shipment and installation on this project. Photographs shall show trees of size and branching structure typical of those supplied for each species. Landscape Architect reserves the right to reject plant material on site that does not meet the standard established by the approved photographs. Replacement of rejected trees shall be at the contractor's expense.

1.04 MODIFICATIONS

A. Design modifications may be made only as necessary to meet field conditions. Planting shall be located where shown on the plans except where obstructions below ground or overhead are encountered, or as approved by the Landscape Architect.

B. Exact positioning of box trees will be determined in the field. Position materials as directed by the Landscape Architect.

PART 2: PRODUCTS

2.01 PLANTING MATERIALS

A. Plants shall have a habit of growth that is normal for the species and shall be symmetrical, sound, healthy, vigorous, and free of insect pests, plant disease, and injury. Trees shall not have crossing branches or weak branch structures atypical of their species.

B. Root bound plant material is not acceptable. Five gallon plants and larger shall be grown in their containers for a minimum of six months and a maximum of two years. All plant material shall be subject to inspection and possible rejection prior to installation.

C. All plants shall equal or exceed the measurements specified in the plant list, which are minimum acceptable sizes.

D. Substitutions for indicated plant materials will not be permitted without the prior written approval of the Landscape Architect. Substitutions are to be at no additional cost to the Owner. If accepted substitute materials are of less value that those

originally specified, the contract price will be adjusted in accordance with the provisions of the contract.

E. In all cases, quantities of plant materials shall be furnished as needed to complete the work and indicated on the drawings, including reseeding, redressing, and maintenance (replacements) during the contract period.

2.02 PLANTING MIXES, SOILS AND FERTILIZERS

A. The following soil amendments are to be used as the basis for bids. Once site improvements are in place and approximate finish grades established, the Contractor shall furnish to the Landscape Architect a soils test made from the surface and sub-surface (18" below grade) soil by an approved agricultural lab. The report shall include Ph, N / P / K, sar, ece, boron levels, and soil particle evaluation. Actual soil amendments to be installed may be adjusted by the Landscape Architect based on the findings of the report.

B. General soil preparation, amount per 1,000 square feet:

3 cubic yards nitrogen fortified redwood shavings
200 pounds agricultural gypsum
15 pounds soil sulfur
7 pounds 16-6-8 fertilizer

C. Soil: Plant backfill shall be native site soil, amended as noted on the plans and in accordance with soil test results.

D. Import soil or topsoil shall be natural, friable soil possessing the same characteristics of the existing site soil. Provide topsoil free from subsoil, brush, objectionable weeds, rocks, organic or inorganic debris, and clay. Soil shall be free of toxic substances, soil sterilants, and salts. Do not provide soil from roadbed excavations. Import soil shall be tested as noted for native soil.

E. Backfill soil for planters shall be of the following composition, premixed by machine blender prior to delivery to the site.

Six (6) parts well rotted sifted compost
Three (3) parts sandy loam soil
One (1) part by volume washed plaster sand
Two (2) lbs. per cu. Yd. Micro-Max Plus micronutrient Complex, or equal
Two (2) lbs. per cu. Yd. 16-6-8 fertilizer

2.03 TREE STAKES

A. Tree stakes shall be 2" diameter by 10' long new lodge pine poles treated with copper napthenate unless otherwise noted.

PART 3: EXECUTION

3.01 SCHEDULING

A. Planting shall not commence until completion of all construction work, grading, soil preparation, weed control and sprinkler installation.

3.02 PRE-PLANTING

A. Apply "Round-up" systemic herbicide (or approved equal) per manufacturer's specifications to existing undesired vegetation ten (10) days prior to commencement of any planting or irrigation work.

B. All areas to be planted, which have a slope of 2:1 or less shall be cross-ripped to a depth of six (6) inches and soil amendments spread evenly as specified and thoroughly blended-in per 1,000 square feet.

C. Maintain proof of delivery for all planting amendments on-site and available for inspection until acceptance of the entire installation.

3.03 FINISH GRADING

A. Finish grading after soil preparation shall establish final flow lines and gradients for uniform water drainage. Flow lines and gradients shall be established from the high point to the drainage outlet or an inlet structure.

B. Rake-out and remove all rocks 1/2 inch diameter and larger from the top two inches of finished grade.

C. Finished grades shall be 2" below the top of curbs, sills, and walkways in planting areas. At locations where drainage is to flow across hardscape, the grade shall be flush, or no more than 1/2" below hardscaping.

D. Maintain a minimum 2% surface drainage away from all buildings in planting areas. Finished grades shall be raked and smoothed to eliminate puddling or standing water and allow smooth, even flow.

3.04 LAYOUT AND SPACING

A. Stake locations of trees and outline planting areas as shown on plans. Obtain Landscape Architect's approval prior to excavation of plant pits. Landscape Architect reserves the right to interchange or shift plant locations prior to planting.

B. When plant material is spaced in rows, the total dimension shall be verified, and the plants equally spaced within the designated area. Plants are to be installed in evenly spaced straight lines as shown on the plans to form hedges and mass plantings. Irregular plant spacing will not be acceptable.

C. Ground cover material shall be triangularly spaced per dimension shown on the plans.

3.05 PLANT MATERIAL INSPECTION

A. Review by the Landscape Architect of the plants upon delivery shall be for quality, size, and variety only, and shall not in any way impair the right of rejection for failure to meet other requirements during progress of the work.

3.06 PLANTING

A. Plant pits shall be as shown in the planting details. Roughen smooth pit walls caused by augering holes. Slick pit walls caused by augering in too wet soil will not be accepted.

B. Plant material with root balls broken or cracked prior to or during planting operations shall not be planted.

C. Each plant shall receive "Agriform" (or approved equal) plant tablets as follows:

1 gallon container	1-21 gm
5 gallon container	2-21 gm
15 gallon container	3-21 gm
per 6 inch boxed tree size	1-21 gm

D. Backfill pit with planting mix half-way to finish grade and water thoroughly. Backfill to finish grade and tamp firm. Form a shallow basin around each plant pit as detailed.

E. Remove nursery stakes on all vines and attach to adjacent wall or fence with green plastic vine ties.

F. Remove nursery stakes from all container stock. Prune side growth on trees only as directed by Landscape Architect.

G. Container plants shall not be placed within 12 inches of sprinkler heads.

H. Shrubs and trees shown in planting areas shall be under-planted with groundcover shown by adjacent symbol, to within 12 inches of main plant stem.

I. Upon completion of the work, all trees and shrubs shall have had any broken branches removed and injuries repaired. Clean and re-cut wounds over 3/4" and coat with tree wound paint.

3.07 TREE STAKING

A. Stake all trees per details. Drive stake into firm soil next to root ball. Tree stakes shall be vertical in all cases. Nursery stakes are to removed except on shrub standards (Raphiolepis, Leptospermum, Photinia, etc.), where they are to remain until the end of the maintenance period.

3.08 FLATTED GROUND COVER

A. Rooted cuttings shall be planted sufficiently deep to cover all roots, and shall be spaced as noted on the drawings.

B. Rooted cuttings shall have been grown in flats and shall remain in those flats until time of transplanting. At time of transplanting the soil shall contain sufficient moisture so that the soil does not fall apart when lifting plants from the flat. Each plant shall be planted with its proportionate amount of soil in a manner that will ensure a minimum of disturbance to the root system.

C. Rooted cuttings shall not be allowed to dry out or wilt before or during planting. Wilted plants will not be accepted.

D. At the time of planting each ground cover plant, the earth shall be firmed sufficiently to force out air pockets. Water ground cover beds immediately after planting.

3.09 MULCHING

A. When planting operations are complete and shrub areas have been raked and dressed, mulch all shrub areas with a 3" layer of shredded fir bark (Walk-on Bark or approved equal). Mulch flatted ground cover beds prior to planting.

3.10 PROTECTION AND CLEAN-UP

A. The Contractor shall carefully and continuously protect all areas included in the contract, including lawn areas, plant material, supports, etc. until final acceptance by the Owner. Repair and/or replace any damaged areas at no additional cost to the Owner.

B. After planting operations are completed, the Contractor shall remove all trash, excess soil, empty plant containers, and other accumulated debris from the site. Leave the site in a clean, washed condition, removing all unused material, trash, and tools.

3.11 INSPECTIONS

A. The Contractor shall give 48 hours notice and set appointments for the review of the following operations by the Landscape Architect:

- Finish grading
- Review of plant material after delivery to the site
- Tree and shrub placement prior to digging holes
- Ground cover lines and headerboard placement
- Pre-maintenance period walk-thru
- Post maintenance / Final Acceptance walk-thru

B. In the event the Contractor requests inspection of the work, and said work is substantially incomplete, the Contractor shall be responsible for the Landscape Architect's hourly charges and per diem.

3.12 COMPLETION AND WALK-THRU

A. At the completion of all work as outlined on these plans, the Landscape Contractor shall contact the Landscape Architect and schedule a review of said work ("walk-thru") to determine that all aspects of work are complete. Work must be fully completed according to all drawings and specifications, and must be accepted by the Owner in writing prior to commencement of the maintenance period.

3.13 MAINTENANCE AND ACCEPTANCE

A. The Contractor shall continuously maintain all areas included in the contract during the progress of the work, through the establishment period, and until final acceptance of the work.

B. The Contractor shall maintain all plantings for a period of Ninety (90) calendar days after approval of completion and notification in writing of the start of the maintenance period. The maintenance period shall include the following scope of work:

1. Daily watering of all plant material.
2. Removal of all weeds from planting areas.
3. Replacement of any dead, dying, or damaged trees, shrubs, or ground covers.
4. Proper adjustment and maintenance of the irrigation system.
5. Filling, recompaction, and replanting of any eroded or settled areas.
6. Weekly removal of all trash, litter, clippings and foreign debris.
7. Disease, insect and rodent prevention and control measures.
8. At 30-days after completion of planting, apply ammonium phosphate at the rate of 5 lbs. per 1,000 square feet to all planting areas.
9. At 60-days after completion of planting, apply 16-6-8 fertilizer at the rate of 3 lbs. per 1,000 square feet to all planting areas.

C. Any day the Contractor fails to adequately water, replace unsuitable plants, weed, or other work of the maintenance period will not be credited towards the completion of the period. Plants and lawns which decline due to lack of Contractor maintenance shall be replaced by the Contractor at his expense.

D. Prior to the end of the maintenance period, again contact the Landscape Architect to schedule a final review ("walk-thru"). The Owner must accept all maintained areas in writing to ratify the end of the maintenance period.

E. If, during the maintenance period, on site observations by the Landscape Architect or Owner determine that proper maintenance procedures are not being followed, the Contractor will be notified in writing. Corrections shall be made within two working days of notification, or the Owner may elect to extend the maintenance period beyond 90 days, such extension being equal to the amount of time required to correct the maintenance practices.

3.14 PROTECTION

A. The Contractor is responsible for protecting the work covered by this section from vandalism and accidental damage. Any damage shall be promptly repaired by the Contractor at no additional cost to the owner.

B. The Contractor is responsible for protecting the work covered by this section from damage caused by frost or torrential rains. Any damage shall be promptly repaired by the Contractor at no additional cost to the owner.

3.15 GUARANTEE

A. All shrubs, ground covers and 5 gallon size trees or less shall be guaranteed as to growth and health for a period of ninety (90) days after final acceptance by the owner. 15 gallon and all box sized trees and larger shall be guaranteed for a period of one year after final acceptance by the owner.

B. Plants that die or loose more than thirty percent (30%) of their leaf or branching structure shall be replaced under this section.

C. The Contractor, within fourteen (14) days of written notification by the owner, shall remove and replace all guaranteed plants that for any reason fail to meet the requirements of the guarantee. All plant materials replaced shall be guaranteed for the original period, beginning with the date of replacement.

END OF SECTION

SECTION 33 05 16

UTILITY STRUCTURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Section includes the following:
   1. Handholes and boxes.
   2. Manholes.
   3. Utility Vaults
   4. Utility Structures
   5. Related Divisions 26 Electrical, 27 Communications, 33 Utilities.

1.2 SUBMITTALS

A. Product Data: For the following:
   1. Accessories for manholes, handholes, boxes, vaults, and utility structures.

B. Shop Drawings for Precast Underground Utility Structures: Include plans, elevations, sections, details, attachments to other work, and accessories, including the following:
   1. Reinforcement details.
   2. Frame and cover design and manhole frame support rings.
   3. Ladder details.
   4. Joint details.

C. Product Certificates: For concrete and steel used in precast concrete structures as required by ASTM C 858.

1.3 DESIGN LOADS

A. Design wheel loads: (16) kips. Reference document ASTM C857 - Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Structures.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store precast concrete underground utility structures at Project site as recommended by manufacturer to prevent physical damage. Arrange so identification markings are visible.

B. Lift and support precast concrete units only at designated lifting or supporting points.

1.5 COORDINATION

A. Coordinate layout and installation of utility structures with final arrangement of other utilities, site grading, and surface features as determined in the field.

B. Coordinate elevations of ducts and duct-bank entrances utility structures with final locations and profiles of ducts and duct banks as determined by coordination with other utilities, underground obstructions, and surface features.

PART 2 - PRODUCTS

2.1 PRECAST CONCRETE HANDHOLES AND BOXES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Carder Concrete Products.
2. Christy Concrete Products.
3. Elmhurst-Chicago Stone Co.
4. Oldcastle Precast Group.
5. Riverton Concrete Products; a division of Cretex Companies, Inc.
6. Utility Concrete Products, LLC.
7. Utility Vault Co.
8. Jansen Precast, Fontana CA.

B. Or equal in accordance with Division 01 for Substitutions.

C. Comply with ASTM C 858 for design and manufacturing processes.

D. Description: Factory-fabricated, reinforced-concrete, enclosures. Frame and cover shall form top of enclosure and shall have load rating consistent with that of handhole or box.
1. Frame and Cover: Weatherproof cast-iron frame, with cast-iron cover with recessed cover hook eyes and tamper-resistant, captive, cover-securing bolts.
2. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
3. Cover Legend: Molded lettering, "ELECTRIC", "TELEPHONE." And as indicated for each service.
4. Configuration: Units shall be designed for flush burial and have open, closed or integral closed bottom, as required for the application unless otherwise indicated.
5. Slabs: Designed to mate with bottom of enclosure. Same material as enclosure.
   a. Extension shall provide increased depth of 12 inches.
   b. Slab: Same dimensions as bottom of enclosure, and arranged to provide closure.
6. Duct Entrances in Handhole Walls: Cast end-bell or duct-terminating fitting in wall for each entering duct.
   a. Type and size shall match fittings to duct or conduit to be terminated.
   b. Fittings shall align with elevations of approaching ducts and be located near interior corners of handholes to facilitate racking of cable.
7. Handholes 12 inches wide by 24 inches long and larger shall have inserts for cable racks and pulling-in irons installed before concrete is poured.
8. Compressive Strengths: Minimum strength of 5500 PSI at 28 days.

2.2 PRECAST MANHOLES

A. Comply with ASTM C 858 and with interlocking mating sections, complete with accessories, hardware, and features.

1. Duct Entrances in Manhole Walls: Cast end-bell or duct-terminating fitting in wall for each entering duct.

B. Concrete Knockout Panels: 1-1/2 to 2 inches (38 to 50 mm) thick, for future conduit entrance and sleeve for ground rod.

C. Joint Sealant: Asphaltic-butyl material with adhesion, cohesion, flexibility, and durability properties necessary to withstand maximum hydrostatic pressures at the installation location with the ground-water level at grade.
1. Accessories: Joint Sealant for gasketing of concrete sections flexible butyl resin sealant, ASTM C990, Concrete Sealants CS-102 and CS-202 by ConSeal by Concrete Sealants Inc., New Carlisle, Ohio, or equal.

2.3 UTILITY STRUCTURE ACCESSORIES

A. Manhole Frames, Covers: Comply with structural design loading specified for manhole.
1. Frame and Cover: Weatherproof, gray cast iron complying with ASTM A 48/A 48M, Class 30B with milled cover-to-frame bearing surfaces; diameter, 29 inches.
a. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
b. Special Covers: Recess in face of cover designed to accept finish material in paved areas.
2. Cover Legend: Cast in.
a. Legend: "ELECTRIC-LV" for duct systems with power wires and cables for systems operating at 600 V and less.
b. Legend: "ELECTRIC-HV" for duct systems with medium-voltage cables.
c. Legend: "SIGNAL" for communications, data, and telephone duct systems.
d. Legend: “SEWER” for sanitary sewer manholes.
e. Legend: “WATER” for domestic water valve can covers.
f. Legend: “F-WATER” for Fire water valve can covers.
g. Legend: "STORM DRAIN” for private Storm Drain cleanout structures

B. Manhole Sump Frame and Grate: ASTM A 48/A 48M, Class 30B, gray cast iron.

C. Pulling Eyes in Concrete Walls: Eyebolt with reinforcing-bar fastening insert, 2-inch-(50-mm-) diameter eye, and 1-by-4-inch (25-by-100-mm) bolt.
1. Working Load Embedded in 6-Inch (150-mm), 4000-psi (27.6-MPa) Concrete: 13,000-lbf (58-kN) minimum tension.

D. Pulling-In and Lifting Irons in Concrete Floors: 7/8-inch- (22-mm-) diameter, hot-dip galvanized, bent steel rod; stress relieved after forming; and fastened to reinforcing rod. Exposed triangular opening.
1. Ultimate Yield Strength: 40,000-lbf (180-kN) shear and 60,000-lbf (270-kN) tension.

E. Bolting Inserts for Concrete Utility Structure Cable Racks and Other Attachments: Flared, threaded inserts of noncorrosive, chemical-resistant, nonconductive

thermoplastic material; 1/2-inch (13-mm) ID by 2-3/4 inches (69 mm) deep, flared to 1-1/4 inches (32 mm) minimum at base.
1. Tested Ultimate Pullout Strength: 12,000 lbf (53 kN) minimum.

F. Cable Rack Assembly: Steel, hot-rolled or hot-dip galvanized, except insulators.
1. Stanchions: T-section or channel; 2-1/4-inch (57-mm) nominal size; punched with 14 holes on 1-1/2-inch (38-mm) centers for cable-arm attachment.
2. Arms: 1-1/2 inches (38 mm) wide, lengths ranging from 3 inches (75 mm) with 450-lb (204-kg) minimum capacity to 18 inches (460 mm) with 250-lb (114-kg) minimum capacity. Arms shall have slots along full length for cable ties and be arranged for secure mounting in horizontal position at any vertical location on stanchions.
3. Insulators: High-glaze, wet-process porcelain arranged for mounting on cable arms.

G. Fixed Manhole Ladders: Arranged for attachment to roof and floor of manhole. Ladder and mounting brackets and braces shall be fabricated hot-dip galvanized steel.

H. Cover Hooks: Heavy duty, designed for lifts 60 lbf and greater, Two required.

I. Accessories: Joint Sealant for gasketing of concrete sections flexible butyl resin sealant, ASTM C990, Concrete Sealants CS-102 and CS-202 by ConSeal by Concrete Sealants Inc., New Carlisle, Ohio, or equal

2.4 SOURCE QUALITY CONTROL

A. Test and inspect precast concrete utility structures according to ASTM C 1037.

PART 3 - EXECUTION

3.1 UNDERGROUND ENCLOSURE

A. Handholes and Boxes for 600 V and Less
1. Refer to Division 26 and 27.
2. Units in Roadways and Other Deliberate Traffic Paths: Precast concrete. AASHTO HB 17, structural load rating.
3. Units in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Non-deliberate Loading by Heavy Vehicles: Precast concrete, AASHTO HB 17, H-20structural load rating.
4. Units in Sidewalk and Similar Applications with a Safety Factor for Non-deliberate Loading by Vehicles: Precast concrete, AASHTO HB 17, H-10structural load rating.
5. Units Subject to Light-Duty Pedestrian Traffic Only: Fiberglass-reinforced polyester resin structurally tested according to SCTE 77 with 3000-lbf vertical loading.

B. Manholes: Precast concrete.
1. Units Located in Roadways and Other Deliberate Traffic Paths by Heavy or Medium Vehicles: H-20 structural load rating according to AASHTO HB 17.

2. Units Not Located in Deliberate Traffic Paths by Heavy or Medium Vehicles: H-10 load rating according to AASHTO HB 17.

3.2 EARTHWORK

A. Excavation and Backfill: Comply with Division 31 Section "Earthwork," but do not use heavy-duty, hydraulic-operated, compaction equipment.
1. Shoring of the excavation shall be in accordance with all state and local regulations.

B. Restore surface features at areas disturbed by excavation and reestablish original grades, unless otherwise indicated. Replace removed sod immediately after backfilling is completed.
1. Remove shoring and complete the backfilling. Remove the shoring from the bottom up. Release the jacks or braces slowly. Use chains or wire ropes to pull out the jacks or braces from above.

C. Restore areas disturbed by trenching, storing of dirt, cable laying, and other work. Restore vegetation and include necessary topsoiling, fertilizing, liming, seeding, sodding, sprigging, and mulching. Comply with Division 2 Sections "Lawns and Grasses" and "Exterior Plants."

D. Cut and patch existing pavement in the path of underground ducts and utility structures according to Division 1 Section "Cutting and Patching."

E. Provide six (6) inches of base material at the bottom of the excavation, level and compacted to the proper elevation in conjunction with the conduit and the conduit entrance of vaults/manholes as designated on the utility plans.

3.3 INSTALLATION OF CONCRETE MANHOLES, HANDHOLES, AND BOXES

A. ASTM C-891 Standard Practice for the Installation of Underground Precast Concrete Utility Structures.

B. Precast concrete utility structure shall be lifted at the lifting points so designated by the manufacturer.

C. Precast Concrete Handhole and Manhole Installation:
1. Comply with ASTM C 891, unless otherwise indicated.
2. Install units level and plumb and with orientation and depth coordinated with connecting ducts to minimize bends and deflections required for proper entrances.
3. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1-inch (25-mm) sieve to No. 4 (4.75-mm) sieve and compacted to same density as adjacent undisturbed earth.
   a. Assemble the multi-section utility structures by lowering each section into the excavation. Lower, set level, and firmly position the base section before placing the additional sections.
   b. Seal material at joints between sections, or at the manufacturer's plant.

c. At mortar grout joints provide a minimum of 3/8 in. (10-mm) thickness of mortar on all joint surfaces. After assembly, dress the interior joint to remove excess mortar.

D. Elevations:
1. Manhole Roof: Install with rooftop at least 15 inches (380 mm) below finished grade.
2. Manhole Frame: In paved areas and trafficways, set frames flush with finished grade. Set other manhole frames 1 inch (25 mm) above finished grade.
3. Handhole Covers: In paved areas and trafficways, set surface flush with finished grade. Set covers of other handholes 1 inch (25 mm) above finished grade.
4. Where indicated, cast handhole cover frame integrally with handhole structure.
5. Unpaved area, slope the area around the entrance frame and cover to provide drainage away from the entrance cover. Slope the final grading upward to within 1 inch of the top surface of the frame and cover.

E. Drainage: Install drains in bottom of manholes where indicated. Coordinate with drainage provisions indicated.

F. Manhole Access: Circular opening in manhole roof; sized to match cover size.
1. Manholes with Fixed Ladders: Offset access opening from manhole centerlines to align with ladder.
2. Install collars, constructed of precast concrete collars and rings to support frame and cover and to connect cover with manhole roof opening. Provide moisture-tight masonry joints and waterproof grouting for cast-iron frame to chimney.

G. Waterproofing: Apply waterproofing to exterior surfaces of manholes after concrete has cured at least three days. Waterproofing materials and installation are specified in Division 07 Section Elastomeric Sheet Waterproofing. After ducts have been connected and grouted, and before backfilling, waterproof joints and connections and touch up abrasions and scars. Waterproof exterior of manhole collar after mortar has cured at least three days.

H. Hardware: Install removable hardware, including pulling eyes, cable stanchions, and cable arms, as required for installation and support of cables and conductors and as indicated.

I. Fixed Manhole Ladders: Arrange to provide for safe entry with maximum clearance from cables and other items in manholes.

J. Field-Installed Bolting Anchors in Manholes and Concrete Handholes: Do not drill deeper than 3-7/8 inches (98 mm) for manholes and 2 inches (50 mm) for handholes, for anchor bolts installed in the field. Use a minimum of two anchors for each cable stanchion.

K. Warning Sign: Install "Confined Space Hazard" warning sign on the inside surface of each manhole cover.

3.4 FIELD QUALITY CONTROL

A. Perform the following tests and inspections and prepare test reports:
   1. Demonstrate capability and compliance with requirements on completion of installation of utility structures.
   2. Test manhole grounding to ensure electrical continuity of grounding and bonding connections. Measure and report ground resistance as specified in Division 16 Section "Grounding and Bonding."

B. Correct deficiencies and retest as specified above to demonstrate compliance.

3.5 CLEANING

A. Clean internal surfaces of structures, remove foreign material.

END OF SECTION

SECTION 33 11 00

WATER SYSTEM

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Construction of on-site water service facilities and appurtenances, including the installation and testing of water system and services indicated for domestic water services, and private Fire service loop. The Contractor shall furnish and install pressure reducing valves, double check detectors, reduced pressure backflow preventers, blowoffs, air release valves, gate valves and appurtenances, in accordance with the Governing Water District.

1.02 REFERENCES

A. Geotechnical Report:

1. Geotechnical investigation as been prepared under the direction of the Owner. Investigation is hereby referenced as information for the work of this section. Architect / Engineer assume no responsibility for conclusions the Contractor may draw, from information provided. The Contract Documents take precedence over recommendations that may be contained in the investigation and the contractor must obtain approval for any and all deviations from the Contract Documents. Copy of investigation is available at Architect's office. Copy investigation is bound herein as a reference only.

B. Publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1. Standard Specifications:
   a. Standard Specifications for Public Works Construction (Latest Edition).
   b. CalTrans-Manual of Traffic Controls for Construction and Maintenance Work Zones, Latest Edition.
2. Standard Drawings:
   a. Standard Drawings, issued by Governing Water District, shall apply to the work to the extent referenced on plans. Rainbow Municipal Water District
   b. Equivalent Materials List, Governing Water District Standard Specifications.
   c. San Diego County Regional Standard Drawings, Latest Edition

C. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

1. ASTM D1785 1999 Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80 and 120
2. ASTM D2466 2001 (Vinyl Chloride) (PVC) Plastic Pipe Fitting, Schedule 40
3. ASTM D2564 1996 Solvent Cements for Polyvinyl Chloride (PVC) Plastic Pipe and Fittings
4. ASTM D2774 2001 Underground Installation of Thermoplastic

Pressure Piping

5. ASTM D2855 1996 Making Solvent-Cemented Joints with Polyvinyl Chloride (PVC) Pipe and Fittings
6. ASTM F402 1999 Safe Handling of Solvent Cements and Primers Used for Joining Thermoplastic Pipe and Fittings

D. AMERICAN WATER WORKS ASSOCIATION
1. AWWA C-900 1997 Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings 4 in. through 12 in., for Water District
2. AWWA C-509 2001 Resilient-Seated Gate Valves for Water Supply Service
3. AWWA C-800 2001 Underground Services Line Valves and Fittings
4. AWWA M-23 2002 PVC Pipe-Design and Installation
5. AWWA M9 1995 Concrete Pressure Pipe

E. UNDERWRITERS LABORATORIES, INC. (UL)
1. UL 262 1994 Gate Valves for Fire Protection Service, Seventh Edition
2. UL 312 1993 Check Valves for Fire Protection Service Eight Edition
3. UL 789 1993 Indicator Posts for Fire Protection Service, Ninth Edition

F. UNI-BELL PLASTIC PIPE ASSOCIATION (UBPPA)
1. UBPPA UNI-B-8 1986 Direct Tapping of Polyvinyl Chloride (PVC) Pressure Water Pipe

1.03 SUBMITTALS

A. Manufacturer's Catalog Data:
1. Pipe and Fittings
2. Joints and Couplings
3. Valves, including above-ground double check detector, post indicator valve and gate valves, reduced pressure Back Flow Preventer
4. Valve and Meter Boxes

B. Manufacturer's standard drawings or catalog cuts.

C. Certificates of Compliance:
1. Pipe and Fittings
2. Pipe Joint Materials
3. Valves

D. Certificates shall attest that products meet the requirements of the Governing Water District and that tests set forth in each applicable referenced publication have been

performed, whether specified in that publication to be mandatory or otherwise and that production control tests have been performed at the intervals or frequency specified in the publication. Other tests shall have been performed within 3 years of the date of submittal of certificates on the same type, class, grade, and size of material as is being provided for the project.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Storage. Inspect materials delivered to site for damage. Unload and store with minimum handling. Store materials on site in enclosures or under protective covering. Store plastic piping, jointing materials under cover out of direct sunlight. Do not store materials directly on the ground. Keep inside of pipes and fittings free of dirt and debris.

B. Handling. Handle pipe, fittings, valves, hydrants, and other accessories in a manner to ensure delivery to the trench in sound undamaged condition. Carry, do not drag pipe to the trench. Store plastic piping, jointing materials that are not to be installed immediately, under cover out of direct sunlight.

PART 2 - PRODUCTS

2.01 WATER SERVICE LINE MATERIALS

A. Piping Materials:

1. Plastic piping and fittings shall bear the seal of the National Sanitation Foundation for potable water service. Plastic pipe and fittings shall be supplied from the same manufacturer and shall be in accordance with the Governing Water District's, "Equivalent Material List" contained in their standard specifications.
   a. Polyvinyl Chloride (PVC) Plastic Piping: SDR 14 with Class 200 pressure rating manufactured in accordance with AWWA Standard C900, unless otherwise noted. Rubber water-lock rings shall be supplies by pipe supplier.
2. Ductile Iron Piping (DIP): Ductile iron pipe shall be pressure Class 350 with Tyton joints unless otherwise noted on plans and manufactured in accordance with AWWA standard C151. Ductile iron pipe and fitting shall be supplied by the same manufacturer and shall be in accordance with the governing District's approved materials list contained in their standard specifications.

B. Valves and Valve Covers:

1. Gate Valves and Butterfly Valves:
   a. Gate valves, including tapping valves, shall be resilient seat gate valves manufactured in accordance with AWWA standard C509.
   b. Butterfly valves shall be manufactured in accordance with AWWA Standard C504. Both gate valves and butterfly valves shall be listed on Governing Water District's approved materials list.
2. Gate Valve Covers and Gate Cans:

a. All gate valve covers shall be 8 inch diameter cast iron, have the word "Water" in raised letters on top. Gate material shall be 8 inch I.D. PVC pipe, schedule 40.

3. Post Indicator Valves, Double Detector Check Valves, and Check Valves . Comply with the Governing Water District's approved material list.

4. Reduced Pressure Detector Assemblies shall be Febco Master Series LF866 or equal.

C. Precast Meter Boxes and Vaults. Comply with the Governing Water District's approved material list and the standard drawings referenced on the plans.

D. Water Main Appurtenances. All water main appurtenances including, but not limited to fire hydrants, water meters, fire department connections, air and vacuum release valves, tapping sleeves, blow off assemblies, water services, brass fittings and iron fittings shall comply with the Governing Water District's approved materials list.

PART 3 - EXECUTION

3.01 INSTALLATION OF PIPELINES

A. Installation of all water mains, appurtenances and water service shall conform to the Governing Water District's standard specifications.

B. The Contractor shall notify Underground Service Alert at 1-800-422-4133 at least two (2) days prior to starting work and shall coordinate all work with utility company representatives. The existence and locations of existing underground facilities indicated on the plans were obtained from a search of available records. The Contractor shall take precautionary measures to protect any existing facility indicated on the plans, and any other which is not of record or indicated on the plans.

C. Prior to commencing the work, the Contractor shall <u>POTHOLE EXISTING UTILITIES</u> at points of connection.

D. Contractor shall coordinate locations of stub-outs from buildings with building plumbing Contractor.

E. Installation of Water Service Piping:

1. Location:

a. Connect water service piping to the building service where the building service has been installed. Where building service has not been installed, terminate water service lines approximately 5 feet from the building line at the points indicated; such water service lines shall be closed with plugs or caps.

2. Service Line Connections to Water Mains:

a. Domestic Service:

1. The Contractor shall be responsible to install the service lateral, 2" ball valve curb stop with PVC pack joint inlet and outlet per the Governing Water District's standard drawings set in a No. 3 Water meter box with extensions. The Contractor shall be responsible to continue water service piping from the 2" water stop to the building terminus as specified in Paragraph 3.01A. above.

b. Fire Sprinkler Service:

1. The Contractor shall be responsible to install fire service piping from the connection at main to the building terminus as specified in Paragraph 3.01A. above, including installation of above-ground double check detector assembly, reduced pressure backflow preventer, post indicator valve, thrust blocks, and calculations, and fire department connection as indicated.

F. Special Requirements for Installation of Water Service Piping:

1. Installation of Plastic Piping:

a. Install pipe and fittings in accordance with Section 306-1.2, 306-1.2.13 of the standard specifications and the applicable requirement of ASTM D2774 and ASTM D2855, unless otherwise specified. Handle solvent cements used to join plastic piping in accordance with ASTM F402.

1. Jointing: Make solvent-cemented joints for PVC plastic piping using the solvent cement previously specified for this material; assemble joints in accordance with ASTM D2855. Make plastic pipe joints to other pipe materials in accordance with the recommendations of the plastic pipe manufacturer. Make push-on joints in accordance with the recommendations of the manufacturer.

2. Plastic Pipe Connections to Appurtenances: Connect plastic pipe service lines to corporation stops and gate valves in accordance with the recommendations of the plastic pipe manufacturer.

G. Pipe Anchorage:

1. Provide concrete thrust blocks for water mains and fire service laterals in accordance with the Governing Water District's standards.

H. Trenching and Buried Warning Tape. Perform earthwork operations in accordance with Section 31 23 17, Trenching, including installation of buried warning tape.

I. Disinfection. Flush and disinfect all new water lines including reclaimed water lines and affected portions of existing potable water lines in accordance with AWWA C651. Apply chlorine by the continuous feed method.

3.02 FIELD QUALITY CONTROL

A. Field Tests and Inspections:

1. The Contractor shall perform pipeline testing in accordance with Section 306-1.4 of the standard specifications and the Governing Water District's standard specifications.

2. The Contractor shall produce evidence, when required, that any item of work has been constructed in accordance with the drawings and specifications.

B. Testing Procedure:

1. Test water mains and water service lines in accordance with the applicable specified standard. Test PVC plastic water service lines made with PVC plastic water main pipe in accordance with the requirements of UNI B3 for pressure and leakage tests. Test water service lines in accordance with

applicable requirements of AWWA C600 for hydrostatic testing. No leakage will be allowed at plastic pipe joints.

C. Special Testing Requirements:

1. For pressure test, use a hydrostatic pressure 50 psi greater than the maximum working pressure of the system, except that for those portions of the system having pipe size larger that 2 inches in diameter, hydrostatic test pressure shall be not less that 200 psi. Hold this pressure not less than 2 hours. Prior to the pressure test, fill that portion of the pipeline being tested with water for a soaking period of not less than 24 hours. For leakage test, use a hydrostatic pressure not less than the maximum pressure of the system. Leakage test may be performed at the same time and at the same test pressure as the pressure test.

END OF SECTION

SECTION 33 31 00

SANITARY SEWAGE SYSTEMS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Sanitary drainage piping, fittings and accessories.

B. Connection of building sanitary drainage system to site sewer systems.

C. Cleanout access.

D. Connection of site sewer system to [campus] [municipal] sewer system unless indicated otherwise on Drawings.

E. Grease Interceptor

1.02 REFERENCE STANDARDS

A. Conform to reference standards by date of issue current on date of Contract Documents. Drawings reference County of San Diego Regional Standard Drawings

B. ASTM D2751 - Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings.

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

D. APWA - American Public Works Association.

E. ANSI / ASTM D3034 – Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

1.03 REGULATORY REQUIREMENTS

A. Conform to Section 306, Standard Specifications for Public Works Construction, for materials and installation of Work of this Section.

1.04 SUBMITTALS

A. Product data for pipe and pipe accessories.

B. Project Record Documents
   1. Accurately record location of pipe runs, connections, manholes, cleanouts and invert elevations.
   2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

PART 2 - PRODUCTS

2.01 SEWER PIPE MATERIALS

A. Plastic Pipe: ASTM D2751, acrylonitrile-butadiene-styrene (ABS) material; sizes; bell and spigot style solvent sealed end joints.

B. VC gravity sewer pipe shall be made of PVC plastic having a cell classification of 12454-B, 13364-A, or 13364-B as defined in ASTM D1784. PVC gravity sewer pipe, fittings, coupling and joints, 4-inch through 15-inch, shall be manufactured in conformance with the requirements of ASTM D3034, SDR 35 and shall have gasketed joints. All pipe shall be of solid wall construction with smooth interior and exterior surfaces..

C. Hub and Spigot, Cast-Iron Soil Pipe and Fittings: ASTM A74, Service class, gray cast iron for gasketed joints. Include ASTM C564, rubber compression-type gaskets.

2.02 PIPE ACCESSORIES

A. Pipe Joints: Mechanical clamp ring type, stainless steel expanding and contracting sleeve, neoprene-ribbed gasket for positive seal.

B. Any fittings shall also be made of PVC plastic and have a cell classification of 12454-B, 12454-C, or 13343-C as defined in ASTM D1784. PVC gravity sewer pipe, fittings, coupling and joints, 18-inch through 21-inch, shall be manufactured in conformance with the requirements of ASTM F679 with T-1 wall thickness and shall have gasketed joints. All pipe shall be of solid wall construction with smooth interior and exterior surfaces.The minimum pipe stiffness for both small diameter and large diameter PVC gravity sewer pipe shall be 46 psi according to ASTM D2412.

C. PVC Sewer Pipe and Fittings, NPS 15 and Smaller: ASTM D3034, SDR 35, for solvent-cemented or gasketed joints.
   1. Gaskets: ASTM F477, Elastomeric seals.

2.03 CLEANOUTS

A. Lid and Frame: Cast iron construction, removable lid, closed checkerboard grill lid design; nominal lid and frame diameter as required for pipe sizes. (APWA 304-0) SDRSD SC-01

B. Manholes: Rainbow Municipal Water District standard drawing S-5

2.04 FILL MATERIAL

A. Bedding and Fill: As specified in Section 31 23 17.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that trench cut or excavation base is ready to receive work, excavations, dimensions and elevations are as indicated on Drawings.

B. Beginning of installation means acceptance of existing conditions.

C. Verify that existing invert elevations on site will allow proper tie in to new work with proper positive slope. Ascertain accuracy prior to trenching and installation of sanitary sewer system.

3.02 PREPARATION

A. Hand trim excavations to required elevations. Correct over excavation with approved fill material.

B. Remove large stones or other hard matter that could damage sewer pipe or impede consistent backfilling or compaction.

3.03 INSTALLATION - PIPE

A. Prior to commencing Work, Contractor shall pothole existing utilities at points of connection. Notify Architectin event of discrepancies.

B. Install pipe, fittings and accessories in accordance with Section 306, SSPWC and manufacturer's instructions. Seal joints watertight.

C. Place pipe on bedding as specified in Section 31 23 17.

D. Lay pipe to slope gradient noted on Drawings with maximum variation from true slope of 1/8 inch in 10 feet.

E. Do not displace or damage pipe when compacting.

F. Connect to site sewer outlet system through installed sleeves.

G. Do not cover joints until lines have been tested and approved.

3.04 INSTALLATION - CLEANOUTS

A. Form bottom of excavation clean and smooth to correct elevation.

B. Establish elevations and pipe inverts.

C. Mount lid and frame level in grout secured to top cone section to elevation indicated.

3.05 PROTECTION

A. Protect pipe cover from damage or displacement until backfilling operation is in progress.

END OF SECTION

SECTION 33 41 00

STORM DRAIN SYSTEMS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Storm drainage piping, fittings, and accessories.

B. Connection of building storm water drainage system to site storm drains.

C. Catch basins, paved area drainage, manhole access and site surface drainage.

1.02 REFERENCE STANDARDS

A. Conform to reference standards by date of issue current on date of Contract Documents.

B. San Diego County Regional Standard Drawings, Latest Edition.

C. CPC - California Plumbing Code, 2010, Chapter 11.

D. ASTM A74 - Cast Iron Soil Pipe and Fittings.

E. ASTM C76 - Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.

F. ANSI/ASTM C443 - Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.

G. ANSI/ASTM D2729 - Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

H. ANSI/ASTM D3034 - Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

I. ANSI A21.11 - Rubber Gasket Joints for Cast Iron and Ductile-Iron Pressure Pipe and Fittings.

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

K. APWA - American Public Works Association.

1.03 REGULATORY REQUIREMENTS

A. Conform to Section 306, SSPWC, code for materials and installation of the Work of this Section.

1.04 SUBMITTALS

A. Shop drawings indicating dimensions, locations and elevations of catch basins, manholes, cleanouts and subsurface structures.

B. Product data indicating pipe and pipe accessories.

C. Project Record Documents
1. Accurately record location of pipe runs, connections, catch basins, manholes, cleanouts and invert elevations.
2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

PART 2 - PRODUCTS

2.01 MANUFACTURERS - STORM DRAIN PIPE MATERIALS

A. Products of the following manufacturers form the basis for design and quality intended.
1. Cast Iron Pipes
   a. Precast Products, Garden Grove, CA.
2. Reinforced Concrete Pipes, Manholes, Utility Structures
   a. Johnson Bateman Co., Ontario, CA.
   b. Precast Products, Garden Grove, CA.
   c. Jensen Precast, Fontana, CA.
3. PVC Pipe
   a. Diamond Plastic Corp., Grand Island, NE.
   b. Advanced Drainage Systems, Inc., Hilliard, OH.
4. HDPE Pipe
   a. Advanced Drainage Systems (ADS), Inc. Hillard. OH

B. Or equal as approved in accordance with Division 01, General Requirements for substitutions.

2.02 STORM DRAIN PIPE MATERIALS

A. Cast Iron Pipe: ASTM A74; service type; plain end joints.

B. Cast Iron Pipe Joint Device: ANSI A21.11, rubber gasket joint device.

C. Reinforced Concrete Pipe: ASTM C76, with wall Type B; mesh or bar reinforcement; plain end joints.

D. Reinforced Concrete Pipe Joint Device: ASTM C443, rubber compression gasket joint.

E. Plastic Pipe: ASTM D2729, polyvinyl chloride (PVC) material; bell and spigot style solvent sealed end joints.

F. Plastic Pipe: ASTM D3034, Type PSM, polyvinyl chloride (PVC) material; bell and spigot style solvent sealed end joints.

G. HDPE Pipe: ASSHTO M294 Type "S" water tight joints tested in accordance with ASTM D 3212 for 5.0 psi (Low Head) (ADS N-12 WT).

2.03 PIPE ACCESSORIES

A. Pipe Joints: Mechanical clamp ring type, stainless steel expanding and contracting sleeve, neoprene ribbed gasket for positive seal.

B. Fittings: Same material as pipe, molded or formed to suit pipe size and end design, in required 'T', bends, elbows, cleanouts, reducers, traps, and other configurations required.

2.04 CATCH BASINS

A. Basin Lid and Frame: Welded steel grating construction conforming to ADA spacing requirements, hinged lid, linear grill lid design.
1. Grid/Openings limited to 1/2 – Inch maximum with direction of grate slots perpendicular to path of travel.

B. Shaft Construction and Cone Top Section: Reinforced precast concrete pipe sections, lipped male/female dry joints.

C. Base Pad: Cast-in-place concrete of type specified in Section 03 30 00; leveled top surface to receive concrete shaft sections, sleeved to receive pipe sections.

D. Accessories: Joint Sealant for gasketing of concrete sections flexible butyl resin sealant, ASTM C990, Concrete Sealants CS-102 and CS-202 by ConSeal by Concrete Sealants Inc., New Carlisle, Ohio. Or equal.

E. Approved drawings reference San Diego County Regional Standard Drawings, Latest Edition.

2.05 MANHOLES AND CLEANOUTS

A. Lid and Frame: Cast iron construction, removable lockable lid, closed lid design; nominal lid and frame diameter of 26 inches; manufactured by Brooks Products, or equal.

B. Shaft Construction and Cone Top Section: Reinforced precast concrete pipe sections, lipped male/female dry joints; cast steel ladder rungs into shaft sections at 12 inches; nominal shaft diameter of 48 inches; manufactured by Brooks Products, or equal.

C. Base Pad: Cast-in-place concrete of type specified in Section 32 13 13; leveled top surface to receive concrete shaft sections, sleeved to receive storm drain pipe sections.

D. Accessories: Joint Sealant for gasketing of concrete sections flexible butyl resin sealant, ASTM C990, Concrete Sealants CS-102 and CS-202 by ConSeal by Concrete Sealants Inc., New Carlisle, Ohio. Or equal.

E. Cleanouts: Iron body type; extra heavy bronze plugs; manufactured by Acorn Engineering Co., J.R. Smith Mfg. Co., or F.A. Zurn Mfg. as follows:
1. Concrete areas: non skid nickle bronze lid, set flush with surface; Acorn 120-11, Smith 4240, or Zurn Z-1326-10.

2. Non surface and asphalt surface areas: Non skid extra heavy cast iron cover; Acorn 120-10, Smith 4240, Zurn Z-1326-10.

F. Approved drawings reference County of San Diego County Regional Standard Drawings, Latest Edition

2.06 FILL MATERIAL

A. Bedding and Fill: Type specified in Section 31 23 17.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that trench cut or excavation base is ready to receive work.

B. Verify existing invert elevations for proper tie-in of new work prior to trenching and installation of storm drain system.

C. Beginning of installation means acceptance of existing conditions.

3.02 PREPARATION

A. Hand trim excavations to required elevations. Correct over excavation with approved fill material.

B. Remove large stones or other hard matter that could damage drainage pipe or impede consistent backfilling or compaction.

3.03 INSTALLATION - PIPE

A. Install pipe, fittings, and accessories in accordance with Section 306, SSPWC. Seal joints watertight.

B. Place pipe on bedding as specified in Section 31 23 17.

C. Lay pipe to slope gradients noted on drawings, with maximum variation for true slope of 1/8 inch in 10 feet.

D. Install bedding at sides and over top of pipe. Provide top cover to minimum compacted thickness of 12 inches.

E. Place bedding in maximum 8 inch lifts, consolidating each lift.

F. Do not displace or damage pipe when compacting.

G. Connect to storm drain municipal system through installed sleeves. Do not cover joints until lines have been tested and approved.

3.04 INSTALLATION - CATCH BASINS, MANHOLES AND CLEANOUTS

A. Install per Standard Specifications for Public Works Construction.

B. Form bottom of excavation clean and smooth to correct elevation.

C. Form and place cast-in-place concrete base pad, with provision for storm drain pipe end sections.

D. Establish elevations and pipe inverts for inlets and outlets.

E. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

3.05 FIELD QUALITY CONTROL

A. Request inspection by Geotechnical Engineer prior to placing cover over pipe.

3.06 PROTECTION

A. Protect pipe and filter aggregate cover from damage or displacement until backfilling operation is in progress.

END OF SECTION