

ENGINEER'S ESTIMATE-\$ 14,692,546

SPECIAL PROVISIONS

NOTICE TO BIDDERS BID FORM AND CONTRACT FOR CONSTRUCTION OF

BUILDING AND SITE IMPROVEMENTS AT 6741 DOWNING AVENUE,
BAKERSFIELD, CA

Contract No. 26016

PROJECT NO.
1789CC-C00027



BID OPENING DATE
July 08, 2026

PRE-BID MEETING
June 24, 2026

KERN COUNTY PUBLIC WORKS DEPARTMENT

Joshua R. Champlin, Director

FOR USE IN CONNECTION WITH THE STANDARD SPECIFICATIONS
OF THE STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION, DATED 2025

CONTRACTOR'S LICENSE CLASSIFICATION REQUIRED: B

**Public Works Department
County of Kern, State of California
CONTRACT NO. 26016**

Table of Contents

NOTICE TO BIDDERS	1
DIVISION I GENERAL PROVISIONS.....	6
1 GENERAL	6
2 BIDDING	9
3 CONTRACT AWARD AND EXECUTION.....	16
4 SCOPE OF WORK	19
5 CONTROL OF WORK.....	23
6 CONTROL OF MATERIALS.....	31
7 LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC	34
8 PROSECUTION AND PROGRESS	42
9 PAYMENT	46
DIVISION II GENERAL CONSTRUCTION.....	51
10 GENERAL	51
12 TEMPORARY TRAFFIC CONTROL.....	54
13 WATER POLLUTION CONTROL	59
14 ENVIRONMENTAL STEWARDSHIP	62
15 EXISTING FACILITIES.....	65
DIVISION III EARTHWORK AND LANDSCAPE	66
17 GENERAL	66
19 EARTHWORK	67
20 LANDSCAPE	68
22 FINISHING PROJECT	69
DIVISION IV SUBBASES AND BASES.....	70
26 AGGREGATE BASES	70
DIVISION V SURFACING AND PAVEMENTS	71
39 ASPHALT CONCRETE	71
DIVISION VIII MISCELLANEOUS CONSTRUCTION	90
80 FENCES.....	90
DIVISION XII BUILDING CONSTRUCTION.....	91
99 BUILDING CONSTRUCTION	91
BID DOCUMENTS	93
BID FORM	95
SUBCONTRACTOR'S LIST.....	101
BID BOND.....	103
NON-COLLUSION DECLARATION	105

BIDDER CERTIFICATIONS.....	107
BIDDERS LIST.....	109
AGREEMENT FOR CONSTRUCTION	111
CONSTRUCTION PERFORMANCE BOND.....	115
CONSTRUCTION LABOR AND MATERIAL PAYMENT BOND	117
IN-USE OFF-ROAD DIESEL-FUELED VEHICLE LIST	119
ADMINISTRATIVE BULLETIN NO. 19.....	121
APPENDIX A.....	125
PROJECT MANUAL	125

SUPPLEMENTAL PROJECT INFORMATION
PROJECT-SPECIFIC PLANS AND SPECIFICATIONS

ADDENDA

[To Be Inserted During Bid Period]

**Public Works Department
County of Kern, State of California**

**NOTICE TO BIDDERS
CONTRACT NO. 26016**

1. The County of Kern (**County**) will receive sealed Bids for construction on a highway in accordance with the plans and special provisions therefor to which special reference is made as follows: **FOR CONSTRUCTION OF BUILDING AND SITE IMPROVEMENTS AT 6741 DOWNING AVENUE, BAKERSFIELD, CA**, until 11:00 a.m. on **July 08, 2026**, at the following locations:
 - (a) Mailed via United States Postal Service to Kern County Public Works Department, 2700 "M" Street, Suite 400, Bakersfield, California, 93301;
 - (b) Delivered in person or by courier service to the Kern County Public Works Department, Suite 400, 4th Floor, Public Services Building, 2700 "M" Street, Bakersfield, California; or
 - (c) From 10:45 a.m. until 11:00 a.m. delivered in person to the first floor meeting room of said Public Services Building.
2. No bid will be considered unless it is made on a Bid form furnished by the County's Public Works Department (**Department**) and accompanied by bidder's security in an amount equal to 10% of the amount bid in accordance with the provisions set forth under Section 2, "Bidding," of the Standard Specifications of the State of California Department of Transportation, dated 2025, as modified by the special provisions. Plans, specifications, any addenda, and standard Bid form to be used for bidding on this project may be obtained at <https://pbsystem.planetbids.com/portal/59079/portal-home>.
3. The successful bidder must complete the work, including plant establishment work, within **360** working days.
4. The County reserves the right to reject any and all bids. If the contract is to be awarded, it will be awarded by the Board of Supervisors to the lowest responsible bidder whose bid complies with all prescribed requirements. The successful bidder must furnish a Performance Bond and a Payment Bond each in the amount of 100% of the contract price and on the County's form. Pursuant to Public Contract Code Section 22300, the substitution of securities for money withheld by Kern County to ensure performance of the contract will be permitted. All documents submitted in compliance with the requirements of this bid package and the contract must be scannable and photocopyable.
5. Each bidder must be licensed as required by law at the time the contract is awarded. Failure of the bidder to obtain proper and adequate licensing for an award of a contract shall constitute a failure to execute the contract and shall result in the forfeiture of the security of the bidder. The contractor license classification required for this project is: **B**.
6. This contract is subject to state contract nondiscrimination and compliance requirements pursuant to Government Code Section 12990.
7. No discrimination shall be made in the employment of persons for this project. Labor Code Section 1735 and all other applicable State and Federal requirements relating to employment discrimination shall be complied with.
8. Pursuant to the provisions of Labor Code Section 1771.1, a contractor or subcontractor shall not be qualified to bid on, be listed in a Bid, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, as defined in Chapter 1 of Part 7 of Division 2 of the California Labor Code, unless currently registered and qualified to perform public work pursuant to Civil Code Section 1725.5. ***Please note: It is not a violation of Section 1771.1 for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.*** Any bids submitted without proof that Bidder and any listed subcontractor(s) are currently registered and qualified to perform public work, pursuant to Labor Code Section 1725.5, shall not be accepted by the County.

9. In accordance with Labor Code Section 1771.4, the project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.
10. Interested subcontractors may obtain a list of plan-holding general contractors at <https://pbsystem.planetbids.com/portal/59079/portal-home>. Interested subcontractors should then contact general contractors for possible participation in their Bids on this project.
11. County shall not accept a Bid from a Bidder who is ineligible to bid or work on, or be awarded, a public works project pursuant to Labor Code Section 1777.1 or 1777.7. No bidder shall include in its Bid any subcontractor who is ineligible to bid or work on, or be awarded, a public works project pursuant to Labor Code Section 1777.1 or 1777.7.
12. Each bidder is hereby informed that, upon submittal of its Bid to the County, the Bid is the property of the County. The County shall consider each Bid subject to the public disclosure requirements of the Public Records Act (Government Code section 6250, et seq.) after Bid opening, unless there is a legal exception to public disclosure.
13. County specifically reserves the right, in its sole discretion, to reject any or all Bids, or re-bid, or to waive inconsequential deviations from Bid requirements not involving time, price, or quality of the work.
14. Pursuant to Part 7 of Division 2 of the California Labor Code (Section 1720 et seq.) the Contractor shall not pay less than the prevailing rate of wages to workers on this project as determined by the Director of California Department of Industrial Relations. The Director's schedule of prevailing rates is on file and open for inspection at the Kern County Public Works Department, may be obtained at <http://www.dir.ca.gov/oprl/DPreWageDetermination.htm>, and is incorporated herein by this reference.
15. All insurance (other than Workers Compensation/Employers' Liability) shall be issued by a company or companies admitted to do business in California and listed in the current "Best's Key Rating Guide" publication with a minimum of an A-, VII rating or in special circumstances, issuers pre-approved by both the Risk Management Division of the Office of County Counsel and the Public Works Department at least 5 business days prior to bid opening. Request for pre-approval to be submitted by RFI.
16. On March 4, 2022, Governor Gavin Newsom issued Executive Order N-6-22 (the EO) regarding Economic Sanctions against Russia and Russian entities and individuals. "Economic Sanctions" refers to sanctions imposed by the U.S. government in response to Russia's actions in Ukraine, as well as any sanctions imposed under state law. By submitting a bid or proposal, Contractor represents that it is not a target of Economic Sanctions. Should the State determine Contractor is a target of Economic Sanctions or is conducting prohibited transactions with sanctioned individuals or entities, that shall be grounds for rejection of the Contractor's bid/proposal any time prior to contract execution, or, if determined after contract execution, shall be grounds for termination by the State.
17. Subcontractors wishing information regarding bidding procedures, insurance or bonding requirements may contact the Public Works Contracts Group at PW-Contracts@kerncounty.com.
18. A pre-bid meeting and site walk will take place on **Wednesday, June 24, 2026**, at 10:00 a.m. at 6741 Downing Avenue, Bakersfield, CA 93308.

GENERAL DESCRIPTION OF WORK

The work to be performed consists, in general, of the construction of a new special waste facility, adjacent concrete parking garage, and associated site improvements at the southeast corner of Downing Avenue and Wear Street. The scope of work will include the new building structure, plumbing, electrical, HVAC, irrigation and landscaping, concrete pad and footings, sidewalks, curb and gutters, drive breaks, curb ramps, parking striping and bumpers, monument signs, gates and fences, traffic signage, asphalt and concrete paving, electric vehicle charging station infrastructure, truncated domes, septic system, and sump.

NOTICE: CONTRACTORS ARE REQUIRED BY LAW TO BE LICENSED, AND REGULATED BY CONTRACTOR'S STATE LICENSE BOARD. QUESTIONS CONCERNING A CONTRACTOR MAY BE REFERRED TO THE REGISTRAR OF THAT BOARD, WHOSE ADDRESS IS: CONTRACTORS' STATE LICENSE BOARD, 1020 "N" STREET, SACRAMENTO, CA 95814.

COUNTY OF KERN



Joshua R. Champlin
Director, Public Works Department

Date: June 09, 2026

THIS PAGE LEFT INTENTIONALLY BLANK

Public Works Department
County of Kern, State of California

SPECIAL PROVISIONS, BID FORM AND CONTRACT

FOR CONSTRUCTION OF
BUILDING AND SITE IMPROVEMENTS AT 6741
DOWNING AVENUE, BAKERSFIELD, CA

Annexed to Contract No. 26016

ORGANIZATION

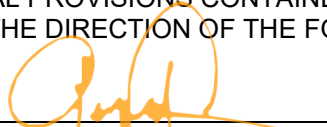
Special provisions are under headings that correspond with the main-section headings of the *Standard Specifications*. A main-section heading is a heading shown in the table of contents of the *Standard Specifications*.

Each special provision begins with a revision clause that describes or introduces a revision to the *Standard Specifications* as revised by any revised standard specification.

Any paragraph added or deleted by a revision clause does not change the paragraph numbering of the *Standard Specifications* for any other reference to a paragraph of the *Standard Specifications*.

THESE SPECIAL PROVISIONS CONTAINED HEREIN HAVE BEEN PREPARED BY OR UNDER
THE DIRECTION OF THE FOLLOWING REGISTERED ENGINEER:

SIGNED:




Gregory Frank, Architect
Skarphol / Frank Associates
CA License No. C-31980

DATE: June 09, 2026

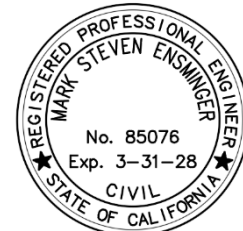


SIGNED:



Mark Ensminger, P.E.
Engineering Manager – Design
Engineering Division
Public Works Department, County of Kern

DATE: June 09, 2026



FOR USE IN CONNECTION WITH THE 2025 STANDARD SPECIFICATIONS OF THE
DEPARTMENT OF TRANSPORTATION OF THE STATE OF CALIFORNIA

DIVISION I GENERAL PROVISIONS

1 GENERAL

Replace the 12th paragraph of Section 1-1.01 with:

The following items from the Contractor must be in writing:

1. Assignments
2. Notifications
3. Proposals
4. Reports
5. Requests, including RFIs, sequentially numbered
6. Subcontracts
7. Test results

Replace "authorized laboratory" and its definition in Section 1-1.07B with:

Authorized laboratory: The laboratory of the Public Works Department of the County of Kern or other laboratories authorized by the Public Works.

Replace "contract" and its definition in Section 1-1.07B with:

Contract: When referencing a single document, the Agreement; otherwise, contract documents.

Replace item 2.2.5.5. in the definition of "day" in Section 1-1.07B with:

- 2.2.5.5. Workforce labor dispute of a utility or nonhighway facility owner (other than the County) resulting in a nonhighway facility rearrangement not described and not solely for the Contractor's convenience. Rearrangement of a nonhighway facility includes installation, relocation, alteration, or removal of the facility.

Replace "Department" and its definition in Section 1-1.07B with:

Department or Department of Transportation: The Public Works Department of the County of Kern, also referred to as the County (except where Department of Transportation forms or publications are cited, such cites are to remain as written, or where context clearly requires a reference to the State of California Department of Transportation (Caltrans)).

Replace "Director" and its definition in Section 1-1.07B with:

Director: The Director of the Public Works Department of the County of Kern.

Replace "Engineer" and its definition in Section 1-1.07B with:

Engineer: The Director of the Public Works Department of the County of Kern, acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties delegated to them.

Replace "plans" and its definition in Section 1-1.07B with:

Plans: Standard plans, revised standard plans (to the extent incorporated into the contract) and project plans.

1. **standard plans:** Standard Plans of the State of California Department of Transportation, dated 2025.
2. **revised standard plans:** Revisions to the standard plans issued by Caltrans
3. **project plans:** Drawings specific to the project, including authorized shop drawings

Replace "specifications" and its definition in Section 1-1.07B with:

Specifications: Standard specifications and special provisions.

1. **standard specifications:** The Standard Specifications of the State of California Department of Transportation, dated 2025.
2. **special provisions:** These Special Provisions.

Replace "State" and its definition in Section 1-1.07B with:

State: The County of Kern, State of California (except in connection with professional licensing and registration requirements, or other legal requirements where the context clearly does not refer to the County, in which cases it means the State of California).

Add to Section 1-1.07B:

Agency: The County (unless context clearly indicates other federal, state or local government agency).

Agreement: The executed Agreement for Construction Work or other written and executed agreement between the County and the Contractor.

Bidding Documents: Bid Form and all other items identified in Table of Contents as Bidding Forms.

Caltrans: Department of Transportation as defined in St & Hwy Code § 20 and authorized in St & Hwy Code § 90.

Contract documents: The Notice to Bidders, Agreement, specifications, plans, bonds, contract-specific plans and specifications, addenda and other items identified herein or therein as contract documents. Project supplemental information and information supplied for bidding purposes are not contract documents unless expressly otherwise provided in the contract or special provisions.

County: The County of Kern, State of California.

Department's Office: See special provision section 1-1.11.

Design Engineer: The licensed engineer who furnished the project-specific plans and specifications for the project.

Owner: The County.

State Contract Act: Chapter 1, Division 2 of the Public Contract Code. (See special provisions section 7-1.02J.)

Table of Contents: The table of contents which precedes these special provisions.

Underground Facilities: All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities that have been installed underground to furnish any of the following services or materials: electricity, gases, chemicals, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems, or water.

Replace Section 1-1.08 with:

1-1.08 RESERVED

Replace Section 1-1.10 with:

1-1.10 RESERVED

Replace the row for "Department" in the table in Section 1-1.11 with:

Department	https://kernpublicworks.com	Kern County Public Works Department Public Services Building 2700 "M" Street, Suite 400 Bakersfield, California, 93301	Tel: (661)862-5100 Fax: (661)862-8851
------------	---	---	--

Replace the 1st paragraph of Section 1-1.12 with:

Make check and bonds payable to the County of Kern.

Replace Section 1-1.13 with:

1-1.13 COMPLIANCE WITH LAWS

Nothing within this contract relieves you of your obligation to follow current law. Different laws apply to a state entity than the County. It is your responsibility to know which laws apply to the County of Kern.

2 BIDDING

Replace the headings and paragraphs in Section 2 with:

2-1.01 GENERAL

Section 2 includes specifications related to bid eligibility and the bidding process.

Your failure to provide submittals, required by these Special Provisions to be provided after bid opening, may be used in the determination of you as a non-responsible bidder on future Public Works contracts.

The bid form is bound in this book together with the *Notice to Bidders*, Special Provisions, and other forms. Wherever, in the specifications and other contract documents, reference is made to a book entitled "bid book," such reference shall be considered as a reference to this book.

The date and time for submission of bids shall be extended by no less than 72 hours in the event the County issues any material changes, additions or deletions to the plans and specifications later than 72 hours prior to scheduled bid closing. Revisions, if any, will be issued in the form of a written addendum and published at <https://pbsystem.planetbids.com/portal/59079/portal-home>. Bidders are solely responsible for ensuring the receipt of any and all addenda. All addenda issued by the Department shall be included in the bid proposal and made part of the contract documents. Failure to acknowledge receipt of all addenda may result in bid rejection.

To be considered responsive, the bid must take into account all issued addenda.

2-1.02 BID INELIGIBILITY

A firm that has provided architectural or engineering services to the Department for this contract before bid submittal for this contract is prohibited from any of the following:

1. Submitting a bid
2. Subcontracting for a part of the work
3. Supplying materials

2-1.03 RESERVED

2-1.04 CONTRACTOR REGISTRATION

No contractor or subcontractor may be listed on a bid form for a public works project 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)].

2-1.05 RESERVED

2-1.06 BID DOCUMENTS

2-1.06A General

Standard Specifications and *Standard Plans* are available at the Caltrans' Office of Construction Contract Awards website, <https://dot.ca.gov/programs/design>.

Special Provisions, Bid Form, Contract and project plans may be obtained as described in the Notice to Bidders.

2-1.06B Supplemental Project Information

Supplemental Project Information (if any) is available at Public Services Building, 2700 "M" Street, 4th Floor, Suite 400, Bakersfield, California.

2-1.06C Bidder Inquiries

Email requests for clarification or interpretation to the Public Works Contracts Group at PW-Contracts@kerncounty.com. Requests must be received at least 5 business days prior to bid opening. The Department will not respond to RFIs submitted after that time, unless the Department determines at its sole discretion that it is in the best interest of the public and the Department to do so.

Responses will be provided no later than 3 business days from when the RFI is received. If a question will affect all contractors who are bidding the contract, the Department will issue an addendum to the contract.

2-1.07 JOB SITE AND DOCUMENT EXAMINATION

2-1.07A General

Examine the job site and bid documents. Notify the Department of apparent errors and patent ambiguities in the plans, specifications, and Bid Item List. Failure to do so may result in rejection of a bid or rescission of an award.

Your investigation must include, without limitation, requesting and thoroughly examining all reports of exploration and tests of:

1. Subsurface conditions
2. As-built drawings
3. Drawings
4. Product specification(s) specifications or reports
5. All Existing Conditions Data (as defined below)

As part of your examination, contact the utility companies listed in Section 5-1.36D and ascertain to your satisfaction the extent and presence of facilities which may affect the contract operations. By submission of a bid, you warrant such contact has been made and that you are familiar with all utilities and non-highway facilities which may affect the work.

It is your responsibility to verify vertical clearances to low hanging overhead utilities, railroad cantilevers, and any other potential vertical obstructions that may affect your ability to complete the work.

You must request and thoroughly examine all Existing Conditions Data made available by the Department for bidding or contracting purposes or during your pre-bid examination. Existing Conditions Data is information regarding existing above ground and (to the extent applicable) below ground conditions, including information (as applicable) regarding:

1. Underground Facilities
2. Geotechnical data
3. As-built data
4. Utility surveys
5. Record documents
6. Hazardous materials surveys or similar materials which may appear or be referenced in the contract documents.
7. Local conditions

Your examinations must consider fully the fact that Existing Conditions Data is in many cases based on information furnished to the Department by others (e.g., the prior owner or builders), and that due to their age or their chain of custody since preparation, may not meet current industry standards for accuracy. You must:

1. provide the Department with prompt written notice of all conflicts, errors, ambiguities, or discrepancies of any type, that it discovered in or among the contract documents and the Existing Conditions Data, and
2. subject to the Department's approval, conduct any such additional or supplementary examinations, investigations, explorations, tests, studies and data compilations, concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site or otherwise, which Bidder may deem necessary in order to perform and furnish the work in accordance with the terms and conditions of contract documents.

You are responsible to determine any federal, state or local laws and regulations that may affect cost, progress, performance or furnishings of work or which relate to any aspect of the means, methods, techniques, sequences or procedures of construction to be employed by you and safety precautions and programs incident thereto.

During performance of the Contract, you will be charged with knowledge of all information that you should have learned in performing these examinations and other obligations, and shall not be entitled to Change Orders (time or compensation) due to any information, error, inconsistency, omission, or conditions that Bidder should have known as a part of this work. You shall be

responsible for the resultant losses, including, without limitation, the cost of correcting defective work.

Bid submission is your acknowledgment that you have examined the job site and bid documents and are satisfied with:

1. General and local conditions to be encountered
2. Character, quality, and scope of work to be performed
3. Quantities of materials to be furnished
4. Character, quality, and quantity of surface and subsurface materials or obstacles
5. Requirements of the contract

2-1.07B Limited Reliance Permitted on Owner's Existing Conditions Data

Regarding aboveground and as-built conditions shown on the contract documents or supplied by the Department, such information has been compiled in good faith, however, the Department does not expressly or impliedly warrant or represent that such information is correctly shown or indicated, or otherwise complete for construction purposes. You must independently verify such information as part of your pre-bid investigations, and where conditions are not reasonably verifiable or discrepancies are identified, bring such matters to the Department's attention through written question issued during the bid period. In executing contract, you must rely on the results of your own independent investigation and must not rely on Department-supplied information regarding aboveground conditions and as-built conditions, and you must accept full responsibility for your verification work sufficient to complete the work as intended.

Regarding subsurface conditions other than Underground Facilities shown on the contract documents or otherwise supplied by the Department, you may rely only upon the general accuracy of actual reported depths, actual reported character of materials, actual reported soil types, actual reported water conditions, or actual obstructions shown or indicated in the contract documents. The Department is not responsible for the completeness of any subsurface condition information, your conclusions or opinions drawn from any subsurface condition information, or subsurface conditions that are not specifically shown.

2-1.07C Additional Pre-Bid Investigation Requirements For Excavation And Utilities Relocation Projects

As part of your pre-bid investigations for projects involving excavation and/or relocation of existing utilities, you shall make reasonable efforts to verify information regarding underground facilities including, without limitation, requesting additional information or verification of information as necessary.

Because of the nature and location of County and the project, the existence of Underground Facilities is deemed inherent in the work of the contract, as is the fact that Underground Facilities are not always accurately shown or completely shown on as-built records, both as to their depth and location. You must, therefore, take care to note the existence and potential existence of Underground Facilities, in particular, above and below grade structures, drainage lines, storm drains, sewers, water, gas, electrical, chemical, hot water, and other similar items and utilities. You must carefully consider all supplied information, request additional information you may deem necessary, and visually inspect the site for above ground indications of Underground Facilities. You must also consider local underground conditions and typical practices for Underground Facilities, either through your own direct knowledge or through your subcontractors, and fully consider this knowledge in assessing the existing information and the reasonableness of its reliance.

2-1.08 RESERVED

2-1.09 BID ITEM LIST

Submit a bid based on the bid item quantities shown on the Bid Form.

2-1.10 SUBCONTRACTOR LIST

On the Subcontractor List form, list each subcontractor that will perform work in an amount in excess of 1/2 of 1 percent of the total bid or \$10,000, whichever is greater (Pub Cont Code § 4100 et seq.).

For each subcontractor listed, the Subcontractor List form must show:

1. Business name and the location of its place of business.
2. California contractor license number for a non-federal-aid contract.
3. Department of Industrial Relations registration number
4. Portion of work it will perform. Show the portion of the work by:
 - 4.1. Bid item numbers for the subcontracted work
 - 4.2. Percentage of the subcontracted work for each bid item listed
 - 4.3. Description of the subcontracted work if the percentage of the bid item listed is less than 100 percent

Bidder shall not use any subcontractor who is ineligible to perform work on this project pursuant to Sections 1777.1 or 1777.7 of the Labor Code, which pertain to the Labor Commissioner's debarring of certain contractors for noncompliance with the Labor Code.

Complete subcontractors list must be submitted with all other Bidding Documents, except as otherwise provided in Subcontractors List.

2-1.11 IN-USE OFF-ROAD DIESEL-FUELED VEHICLE LIST

Section 2-1.11 applies to non-informal-bid contracts.

Complete and submit the In-Use Off-Road Diesel-Fueled Vehicle List form under section 2-1.33.

On the In-Use Off-Road Diesel-Fueled Vehicle List form, list each fleet used by you or your subcontractor to perform work and is subject to 13 CCR § 2449 et seq. Submit a copy of a valid Certificate of Reported Compliance (13 CCR § 2449, subdivision (n)) for each fleet listed on the form within 10 days of bid opening. Failure to list a fleet used by you or your subcontractor to perform work on the In-Use Off-Road Diesel-Fueled Vehicle List form may result in a nonresponsive bid. Failure to submit the Certificate of Reported Compliance for a fleet listed on the In-Use Off-Road Diesel-Fueled Vehicle List form may result in a nonresponsive bid.

2-1.12 EXECUTIVE ORDER N-6-22 – RUSSIA SANCTIONS

On March 4, 2022, Governor Gavin Newsom issued Executive Order N-6-22 (the EO) regarding Economic Sanctions against Russia and Russian entities and individuals. "Economic Sanctions" refers to sanctions imposed by the U.S. government in response to Russia's actions in Ukraine, as well as any sanctions imposed under state law. The EO directs state agencies to terminate contracts with, and to refrain from entering any new contracts with, individuals or entities that are determined to be a target of Economic Sanctions. Accordingly, should the State determine Contractor is a target of Economic Sanctions or is conducting prohibited transactions with sanctioned individuals or entities, that shall be grounds for termination of this agreement. The State shall provide Contractor advance written notice of such termination, allowing Contractor at least 30 calendar days to provide a written response. Termination shall be at the sole discretion of the State.

2-1.13–2-1.32 RESERVED

2-1.33 BID DOCUMENT COMPLETION AND SUBMITTAL

2-1.33A General

Complete Bid Form and all other Bidding Documents identified in the Table of Contents. Submit all Bidding Documents to location, in the manner and at the time identified in Notice to Bidders and this special provision.

Submit your bid in a sealed envelope bearing the bidder's name, address, and name of the project for which the bid is submitted.

Submission of bids shall be within a sealed envelope labeled with the following information:

BID OF:	INSERT BIDDER'S NAME
CONTRACT NO.	26016
SEALED BID FOR:	BUILDING AND SITE IMPROVEMENTS AT 6741 DOWNING AVENUE, BAKERSFIELD, CA

Failure to submit the forms and information as specified results in a nonresponsive bid.

If an agent other than the authorized corporation officer or a partnership member signs the bid, file a Power of Attorney with the Department either before opening bids or with the bid. Otherwise, the bid will be considered nonresponsive.

2-1.33B Bid Form Submittal Schedules

The *Bid* book includes forms specific to the contract. The deadlines for the submittal of the forms vary depending on the requirements of each contract. Determine the requirements of the contract and submit the forms based on the applicable schedule specified in section 2-1.33B.

Bid forms and information on the form that are due after the time of bid may be submitted at the time of bid.

Submit the bid forms according to the schedule shown in the following table:

Bid Form Submittal Schedule

Form	Submittal deadline
Bid to the Board of Supervisors of Kern County	Time of bid
Bidder's Security	Time of bid
Subcontractor List	Time of bid
Non-Collusion Declaration	Time of bid
Bidder Certifications	Time of bid
County of Kern Bidders List	Time of bid
In-Use Off-Road Diesel-Fueled Vehicle List	No later than 4 p.m. 10 days after bid opening

2-1.33C Required Noncollusion Declaration

Pursuant to Section 7106 of the Public Contract Code, each bid shall be accompanied by a Noncollusion Declaration executed by the bidder. Form of declaration is contained in this book.

2-1.34 BIDDER'S SECURITY

Bids must include one of the following forms of bidder's security:

1. Cash
2. Cashier's check
3. Certified check, (certified without qualification and drawn on a solvent bank of the State of California or a national bank doing business in the State of California)
4. Bidder's bond in form contained in this book signed by a surety insurer who is admitted in California

The security shall be in an amount equal to at least 10 percent of the total amount bid. A bid will not be considered unless the required bidder's security is enclosed with it.

2-1.35–2-1.39 RESERVED

2-1.40 BID WITHDRAWAL

An authorized agent may withdraw a bid before the bid opening date and time by submitting a written bid withdrawal request at the location where the bid was submitted. Withdrawing a bid does not prevent you from submitting a new bid.

After the bid opening time, you cannot withdraw a bid.

2-1.41–2-1.42 RESERVED

2-1.43 BID OPENING

The Department publicly opens and reads bids at the time and place shown on the *Notice to Bidders*.

If apparent low bidder is determined to be non-responsive or non-responsible, then the County may proceed to the next apparent low bidder's Bid pursuant to any procedures determined in its reasonable discretion, and proceed for all purposes as if this apparent low bidder were the original apparent low bidder.

2-1.44 BID EVALUATION

For a lump sum based bid, the County compares bids based on the total price.

For a unit price based bid, the County compares bids based on the sum of the item totals (Extension Prices).

For a cost plus time based bid, the County compares bids based on the sum of the item totals and the total bid for time.

The County breaks a tied bid with a coin toss.

The County may conduct reasonable investigations and reference checks of Bidder and other persons and organizations as the County deems necessary to assist in the evaluation of any Bid and to establish Bidder's responsibility, qualifications, financial ability and ability to perform the work in accordance with the contract documents to County's satisfaction within the prescribed time. Submission of a Bid constitutes Bidder's consent to the foregoing.

The County shall have the right to consider information provided by sources other than Bidder. The County shall also have the right to communicate directly with Bidder's surety regarding Bidder's bonds.

Discrepancies between the multiplication of units of work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between written words and figures will be resolved in favor of the words. In the event the Bid Form itself specified rules which would cause a different result, the Bid Form rules shall control.

Bids shall be deemed to include the written responses of the Bidder to any questions or requests for information of the County made as part of Bid evaluation process after submission of Bid.

Consistent with Section 5-1.13A, except for a building-construction non-federal-aid contract, the Contractor must perform work equaling at least 30 percent of the value of the original total bid with its own employees and with equipment it owns or rents, with or without operators.

2-1.45 RESERVED

2-1.46 BID REJECTION

The County may reject:

1. All bids
2. A nonresponsive bid
3. A bid of a non-responsible bidder.
4. Any bid which includes any alteration of form, additions not called for, or irregularities of any kind. Accordingly, a bid may be rejected if it contains bid items with more than one unit price, more than one extension price, or additional bid items such as sales tax. The bidder's unit prices, extension prices, subtotals and totals should be inserted as indicated on the bid form.

In addition, the County may re-bid, or waive inconsequential deviations from bid requirements not involving time, price, or quality of the work.

2-1.47 BID RELIEF

The Department may grant bid relief under Pub Cont Code § 5100 et seq. Submit any request for bid relief to the Department at PW-Contracts@kerncounty.com.

2-1.48 RESERVED

2-1.49 SUBMITTAL FAILURE HISTORY

The Department considers a bidder's past failure to submit documents required after bid opening in determining a bidder's responsibility.

2-1.50 BID RIGGING

The US Department of Transportation (DOT) provides a toll-free hotline to report bid rigging activities. Use the hotline to report bid rigging, bidder collusion, and other fraudulent activities. The hotline number is (800) 424-9071. The service is available 24 hours 7 days a week and is confidential and anonymous. The hotline is part of the DOT's effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the DOT Inspector General.

2-1.51 PUBLIC RECORDS ACT REQUESTS

In accordance with the Public Records Act, County will make available to the public all correspondence and written questions submitted during the Bid period, all Bid submissions opened in accordance with the procedures set forth herein, and all subsequent Bid evaluation information. All submissions not opened will remain sealed and shall be returned to the submitter. Except as otherwise require by law, County will not disclose trade secrets or proprietary financial information submitted by Bidders that has been designated as confidential by Bidder. Any such trade secrets or proprietary financial information that Bidder believes should be exempted from disclosure shall be specifically identified and marked as such. Blanket-type identification by designating whole pages or sections shall not be permitted and shall be invalid. The specific confidential information must be clearly identified as such.

Upon a request for records regarding this Bid, County will notify the Bidder involved, within ten Days from receipt of the request, when the records will be made available for inspection. If the Bidder timely identifies any "proprietary, trade secret, or confidential commercial or financial" information that Bidder determines is not subject to public disclosure, and requests that County refuse to comply with the records request, Bidder shall take all appropriate legal action, indemnify and defend County's refusal to produce the information in all forums; otherwise County will make such information available to the extent required by applicable law, without restriction.

Information disclosed in the Bid and the attendant opened submissions are the property of County unless Bidder makes specific reference to data that is considered proprietary. Subject to the requirements in the Public Records Act, reasonable efforts will be made to prevent the disclosure of information except on a need-to-know basis during the evaluation process.

2-1.52 ACCESS TO RECORDS

The Grantee (County), the Controller General of the United States or any of their duly authorized representatives shall have access to any books, documents, papers, and records of the Contractor which are directly pertinent to a specific grant program for the purpose of making audit, examination, excerpts, and transcriptions for a period of three years after the project is completed or until all project audit findings have been resolved, whichever comes last.

3 CONTRACT AWARD AND EXECUTION

Replace the headings and paragraphs in Section 3 with:

3-1.01 GENERAL

Section 3 includes specifications related to contract award and execution.

3-1.02 CONSIDERATION OF BIDS

3-1.02A General

For a lump-sum-based bid, the Department compares bids based on the total price.

For a unit-price-based bid, the Department compares bids based on the sum of the item totals.

For a cost-plus-time-based bid, the Department compares bids based on the sum of the item totals and the total bid for time.

3-1.02B Tied Bids

The Department breaks a tied bid with a coin toss.

3-1.02C MANDATORY BID PROTEST PROCEDURES

Any Bid protest must be submitted in writing to pw-contracts@kerncounty.com before 2:00 p.m. of the fifth business day following bid results being posted to Planet Bids identifying the apparent low bidder.

3-1.02D Procedures for Submitting Bid Protests

The initial protest must contain a complete statement of the basis for the protest. The protest must refer to the specific portion of the document that forms the basis for the protest. The protest must include the name, address, and telephone number of the person representing the protesting party.

Only Bidders who County otherwise determines are responsive and responsible are eligible to protest a Bid; protests from any other party will not be considered.

The party filing the protest must concurrently transmit a copy of the initial protest document and any attached documentation to all other parties with a direct financial interest that may be adversely affected by the outcome of the protest. Such parties shall include all other Bidders who appear to have a reasonable prospect of receiving an award depending upon the outcome of the protest.

3-1.02E Exclusive Remedy

The procedure and time limits set forth in this section are mandatory and are Bidder's sole and exclusive remedy in the event of a Bid protest. Bidder's failure to comply with these procedures shall constitute a waiver of any right to further pursue the Bid protest, including filing a Government Code Claim or legal proceedings. A Bidder may not rely on a protest submitted by another Bidder, but must timely pursue its own protest.

3-1.03 CONTRACTOR REGISTRATION

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.

3-1.04 CONTRACT AWARD

If the County awards the contract, it will be to the lowest responsible bidder whose bid complies with all of the requirements prescribed and will be made within 60 days after the day of Bid opening, unless there is a bid protest, then 90 days after the day of bid opening.

3-1.05 CONTRACT BONDS (PUB CONT CODE § 20129, CIVIL CODE § 9550)

The successful bidder shall furnish a Construction Performance Bond and a Construction Labor and Material Payment Bond, each in a sum equal to 100% of the contract price. Said bonds must be on the forms included in this book, and shall be properly filled out and executed. Each bond shall be executed by an admitted surety insurer.

In conjunction with the submittal of bonds, the successful bidder shall furnish the following information: (a) the original, or a certified copy, of the unrevoked appointment, power of attorney, bylaws, or other instrument entitling or authorizing the person who executed the bonds to do so; (b) a certified copy of the certificate of authority of the insurer issued by the Insurance Commissioner of the State of California; and (c) a certificate pursuant to CCP 995.640(a) from the clerk of Kern County that the certificate of authority of the insurer has not been surrendered, revoked, canceled, annulled, or suspended, or, in the event that it has, that renewed authority has been granted. All alterations, extensions of time, extra and additional work, and other changes authorized by these specifications or any part of the contract may be made without securing the consent of the surety or sureties on the contract bonds.

3-1.06 CONTRACTOR LICENSE

1. Contractor must be properly licensed as a contractor from bid opening through Contract acceptance (Bus & Prof Code § 7028.15).
2. Joint venture bidders must obtain a joint venture license before contract award (Bus & Prof Code § 7029.1).

3-1.07 INSURANCE POLICIES

The successful bidder must submit:

1. Copy of its commercial general liability policy and its excess policy or binder until such time as a policy is available, including the declarations page, applicable endorsements, riders, and other modifications in effect at the time of contract execution. Standard ISO form no. CG 0001 or similar exclusions are allowed if not inconsistent with section 7-1.06. Allowance of additional exclusions is at the discretion of the Department.
2. Certificate of insurance showing all other required coverages. Certificates of insurance, as evidence of required insurance for the auto liability and any other required policy, shall set forth deductible amounts applicable to each policy and all exclusions that are added by endorsement to each policy. The evidence of insurance shall provide that no cancellation, lapse, or reduction of coverage will occur without 30 days prior written notice to the Department.

If the successful bidder uses any form of self-insurance for workers compensation in lieu of an insurance policy, it shall submit a certificate of consent to self-insure under Labor Code § 3700.

3-1.08–3-1.17 RESERVED

3-1.18 CONTRACT EXECUTION

The successful bidder must sign and deliver to County the following items, and any other items identified in the Notice of Intent to Award:

1. Contract bonds and other information identified in Section 3-1.05.
2. General liability insurance policy, certificate of insurance, and any other documents identified in Section 3-1.07.
3. Contractor's license number (if not already provided).
4. If the contract is awarded to a corporation, a corporate resolution which authorizes the person signing on behalf of the corporation to do so.

Unless otherwise provided for in the Notice of Intent to Award, all such documents must be received before the 10th business day after bidder receives the Notice of Intent to Award.

Upon confirmation of the award by the Board of Supervisors, County will deliver the Agreement to bidder.

Bidder's security may be forfeited for failure to execute the Agreement and comply with all contract execution requirements within the time specified.

3-1.19 BIDDERS' SECURITIES

The County reserves the right to retain all bidder securities until the later of (a) 60 days following award (Pub Cont Code Section 20129) or (b) execution of contract and compliance with all contract execution requirements within the time specified. In County's sole discretion, it may return all bidders' securities other than those from 1st, 2nd, and 3rd low bidders, upon the determination of the 1st, 2nd, and 3rd low bidders.

4 SCOPE OF WORK

Replace section 4-1.04 with the following:

4-1.04 USE OF MATERIALS FOUND ON THE JOB SITE

If the Engineer approves it, you may use aggregate or other materials found in excavation that comply with the specifications unless otherwise specified in Section 19-2.03D. The Department pays for the material excavated at the excavation item Contract price. Replace the quantity of material removed and used with an equal quantity of material at your own expense. The material must have been designated by the Engineer for use in the work. Do not excavate material from outside the excavation's slope and grade lines without written authorization from the Engineer.

Add the following to Section 4-1.05:

Significant Changes in the Character of Work

1. The engineer reserves the right to make, in writing, at any time during the work, such changes in quantities and such alterations in the work as are necessary to satisfactorily complete the project. Such changes in quantities and alterations shall not invalidate the contract nor release the surety, and the contractor agrees to perform the work as altered.
2. If the alterations or changes in quantities significantly change the character of the work under the contract, whether such alterations or changes are in themselves significant changes to the character of the work or by affecting other work cause such other work to become significantly different in character, an adjustment, excluding anticipated profit, will be made to the contract. The basis for the adjustment shall be agreed upon prior to the performance of the work. If a basis cannot be agreed upon, then an adjustment will be made either for or against the contractor in such amount as the engineer may determine to be fair and equitable.
3. If the alterations or changes in quantities do not significantly change the character of the work to be performed under the contract, the altered work will be paid for as provided elsewhere in the contract.
4. The term "significant change" shall be construed to apply only to the following circumstances:
 - When the character of the work as altered differs materially in kind or nature from that involved or included in the original proposed construction; or
 - When a major item of work, as defined elsewhere in the contract, is increased in excess of 125 percent or decreased below 75 percent of the original contract quantity. Any allowance for an increase in quantity shall apply only to that portion in excess of 125 percent of original contract item quantity, or in case of a decrease below 75 percent, to the actual amount of work performed.

Replace Section 4-1.06A with:

4-1.06A DIFFERING SITE CONDITIONS

1. During the progress of the work, if subsurface or latent physical conditions are encountered at the site differing materially from those indicated in the contract or if unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work provided for in the contract, are encountered at the site, the party discovering such conditions shall promptly notify the other party in writing of the specific differing conditions before the site is disturbed and before the affected work is performed.
2. Upon written notification, the engineer will investigate the conditions, and if it is determined that the conditions materially differ and cause an increase or decrease in the cost or time required for the performance of any work under the contract, an adjustment, excluding anticipated profits, will be made and the contract modified in writing accordingly. The engineer will notify the contractor of the determination whether or not an adjustment of the contract is warranted.

3. No contract adjustment which results in a benefit to the contractor will be allowed unless the contractor has provided the required written notice.
4. No contract adjustment will be allowed under this clause for any effects caused on unchanged work.

Replace the 5th and 6th paragraphs of Section 4-1.07B with:

Submit a VECP to the Engineer. The Engineer will acknowledge receipt of a VECP within 5 business days.

The Department is not required to consider a VECP. If a VECP is similar to a change in the plans or specifications being considered by the Department at the time the proposal is submitted or if the proposal is based on or similar to plans or specifications adopted by the Department before Contract award, the Department may make these changes without VECP payments. A VECP concept based on an alternative not chosen, but contemplated by the Department before bid, will be considered as a VECP.

Replace section 4-1.08 with:

4-1.08 CONTRACTOR'S OBLIGATIONS REGARDING UNDERGROUND FACILITIES AND SITE CONDITIONS

4-1.08A Contractor to Locate Underground Facilities

During construction, Contractor shall comply with Government Code Sections 4216 to 4216.9, and in particular Section 4216.2, which provides, in part: "Except in an emergency, every person planning to conduct any excavation shall contact the appropriate regional notification center at least two working days, but no more than 14 calendar days, prior to commencing that excavation, if the excavation will be conducted in an area which is known, or reasonably should be known, to contain subsurface installations other than the underground facilities owned or operated by the excavator, and, if practical, the excavator shall delineate with white paint or other suitable markings the area to be excavated. The regional notification center shall provide an inquiry identification number to the person who contacts the center and shall notify any member, if known, who has a subsurface installation in the area of the proposed excavation."

Contractor shall contact USA, and schedule the work to allow ample time for the center to notify its members and, if necessary, for any member to field locate and mark its facilities. Contractor is charged with knowledge of all subsurface conditions reflected in USA records. Prior to commencing excavation or trenching work, Contractor shall provide County with copies of all USA records secured by Contractor. Contractor shall advise County of any conflict between information provided for bidding purposes, the plans and that provided by USA records. Contractor's excavation shall be subject to and comply with the contract documents.

Contractor shall also investigate the existence of existing service laterals, appurtenances or other types of utilities, indicated by the presence of an underground transmission main or other visible facilities, such as buildings, manholes, new asphalt, meters and junction boxes, on or adjacent to the Site, even if not shown or indicated in Existing Conditions Data, contract documents, or USA records, or discovered during Contractor's pre-bid investigations. Contractor shall immediately secure all such available information and notify County and the utility owner, in writing, of its discovery.

4-1.08B Contractor to Protect Underground Facilities

At all times during construction, all operating Underground Facilities shall remain in operation, unless the contract documents expressly indicate otherwise. Contractor shall maintain such Underground Facilities in service where appropriate; shall repair any damage to them caused by the work upon written authorization by the owner; and shall incorporate them into the work, including reasonable adjustments to the design location (including minor relocations) of the existing or new installations. Contractor shall take immediate action to restore any in service installations damaged by Contractor's operations.

Prior to performing work at the Site, Contractor shall lay out the locations of Underground Facilities that are to remain in service and other significant known underground installations indicated by the Existing Conditions Data, contract documents, USA records, or any material otherwise reasonably available to Contractor, or discovered during Contractor's pre- or post-bid investigations. Contractor shall further locate, by carefully excavating with small equipment, potholing and principally by hand, all such utilities or installations that are to remain and that are subject to damage. If additional utilities whose locations are unknown are discovered, Contractor shall immediately report to County for disposition of the same. Additional compensation or extension of time on account of utilities not shown or otherwise brought to Contractor's attention, including reasonable action taken to protect or repair damage, shall be determined as provided in contract documents.

If during construction, an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown, indicated or discovered in the materials and investigations described in contract documents, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby (and in no event later than seven days), and prior to performing any work in connection therewith (except in an emergency), identify the owner of such Underground Facility and give written notice to that owner and to County. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

The cost of all of the following will be included in the original Contract price and Contractor shall have full responsibility for (a) reviewing and checking all available information and data including, without limitation, Existing Conditions Data, and information on file at USA; (b) locating all Underground Facilities shown or indicated in the contract documents or reasonably available information, or indicated by visual observation including, without limitation, and by way of example only, through performance of all pre-Bid investigations required by contract documents and Bidding Documents and post-Bid investigations required by this special provisions, and by engaging qualified locating services, and all necessary backhoeing and potholing; (c) coordination of the work with the owners of such Underground Facilities during construction; and (d) the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the work.

Consistent with Government Code Section 4215, as between County and Contractor, County will be responsible for the timely removal, relocation, or protection of existing main or trunk line utility facilities located on the Site only if such utilities are not identified in the contract documents or information made available for bidding. County will compensate for the cost of locating and repairing damage not due to Contractor's failure to exercise reasonable care, removing and relocating such main or trunk line utility facilities not indicated in the contract documents or information made available for bidding with reasonable accuracy, and equipment on the project necessarily idled during such work. Contractor shall not be assessed liquidated damages for delay in completion of the project, when such delay was caused by the failure of County or the utility to provide for removal or relocation of such utility facilities.

4-1.08C Concealed Or Unknown Conditions

If either of the following conditions is encountered at Site when digging trenches or other excavations that extend deeper than four feet below the surface, Contractor shall give a written Notice of Differing Site Conditions to County promptly before conditions are disturbed, except in an emergency as set forth in the Standard Specifications or special provisions, and in no event later than seven days after first observance of:

1. Subsurface or latent physical conditions which differ materially from those indicated in the contract documents; or
2. Unknown physical conditions of an unusual nature or which differ materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the contract documents.

In response to Contractor's Notice of Differing Site Conditions under this paragraph, County will investigate the identified conditions, and if they differ materially and cause increase or decrease in Contractor's cost of, or time required for, performance of any part of the work, County will negotiate the appropriate change order following the procedures set forth in the contract documents. If County determines that physical conditions at the Site are not latent or are not materially different from those indicated in contract documents or that no change in terms of the

contract documents is justified, County will so notify Contractor in writing, stating reasons (with Contractor retaining its rights to file a claim under Section 5-1.43.)

Contractor shall not be entitled to any adjustment in the contract price or contract time regarding claimed latent or materially different Site conditions (whether above or below grade) if Contractor knew or should have known of the existence of such conditions at the time Contractor submitted its Bid, failed to give proper notice, or relied upon information, conclusions, opinions or deductions of the kind that the contract documents preclude reliance upon.

Regarding Underground Facilities, Contractor shall be allowed an increase in the contract price, an extension of the contract time, or both, to the extent that they are attributable to the existence of any Underground Facility that is owned and was built by County only where the Underground Facility:

1. Was not shown or indicated in the contract documents or in the supplemental project Information, information supplied for bidding purposes or in information on file at USA.
2. Contractor did not know of it; and Contractor could not reasonably have been expected to be aware of it or to have anticipated it from the information available.

Contractor shall bear the risk that Underground Facilities not owned or built by County may differ in nature or locations shown in information made available by County for bidding purposes, in information on file at USA, or otherwise reasonably available to Contractor. Underground Facilities are inherent in construction involving digging of trenches or other excavations on County's project, and Contractor is to apply its skill and industry to verify the information available.

Contractor's compensation for claimed latent or materially different Site conditions shall be limited to the actual, reasonable, incremental increase in cost of that portion of the work, resulting from the claimed latent or materially different Site conditions. Such calculation shall take into account the estimated value of that portion of the work and the actual value of that portion of the work, using for guidance Contractor's or its subcontractor's bid amount and actual amounts incurred for that portion of the work and the reasonable expectation (if any) of differing or difficult site conditions in the work area based on the available records and locale of the work.

5 CONTROL OF WORK

Replace the last paragraph in Section 5-1.01 with:

Use contract administration forms available at the Department of Transportation's website.

Add the following to Section 5-1.03:

Nothing in this section or any other contract documents provision is intended to authorize Engineer to make any decision or give any approval that any applicable law requires be made by the County Board of Supervisors or other governmental official.

Replace Section 5-1.09 with:

5-1.09 RESERVED

Replace Section 5-1.12 with:

5-1.12 ASSIGNMENT

The performance of the Contract or any Contract part may be assigned only with prior written consent from the Board of Supervisors. To request consent, submit a Contractor Action Request – Assignment of Contract Performance form. The Department does not consent to any requested assignment that would relieve you or your surety of the responsibility to complete the work or any part of the work.

In order to assign the right to receive Contract payments, you must submit to the Engineer a Contractor Action Request – Assignment of Contract Monies, Assignee Change of Name/Address form. Payments will only be assigned upon approval of the request by the Board of Supervisors. Assigned payments remain subject to deductions or withholds described in the Contract. The Department may use withheld payments for work completion whether payments are assigned or not.

Replace Section 5-1.13B with:

5-1.13B Reserved

Replace Sections 5-1.13C with:

5-1.13C Reserved

Replace Sections 5-1.13D with:

5-1.13D Reserved

Replace Section 5-1.20C with:

**5-1.20C Railroad Relations
Reserved**

Add the following to Section 5-1.23B(1):

Action submittals include:

1. Shop drawings
2. Product data
3. Samples
4. Test samples
5. Quality control plans
6. Work plans
7. Material sources
8. Test data, test results, and evaluation reports

Replace Section 5-1.24 with:

5-1.24 CONSTRUCTION SURVEYS

The Department places stakes and marks under "The Kern County Public Works Department Construction Staking Booklet."

Complete survey staking requests on the appropriate form and return the completed form to the Engineer. The Engineer will verify that the area is ready for staking and then submit the request to the County's Office Survey Coordinator.

After receiving the request from the Engineer, the Office Survey Coordinator will have a survey crew onsite to begin staking within a reasonable length of time. In no case will a notice of less than five working days be considered a reasonable length of time.

"The Kern County Public Works Department Construction Staking Booklet" and appropriate survey request form can be obtained from the Engineer.

Preserve stakes and marks placed by the survey crew. If the stakes or marks are destroyed, the Department replaces them at the Department's earliest convenience and deducts the cost.

Notify the Engineer immediately regarding any survey monuments, bench marks, control points, stakes or marks, etc., that are in jeopardy of being disturbed or destroyed by your construction, so that they may be relocated and perpetuated.

Replace Section 5-1.27E with:

5-1.27E Change Order Bills

Maintain separate records for change order work costs.

Submit change order bills to the Engineer.

Replace the 1st paragraph of Section 5-1.29 with:

Prepare a job hazard analysis for each work activity to be performed on the job site as required by 8 CA Code of Regs § 3203(a)(4) and 1511(b).

Add the following to Section 5-1.30:

The Department may reduce payment for noncompliant work left in place.

Replace Section 5-1.32 with:

5-1.32 AREAS FOR CONTRACTOR'S USE

No area is available within the contract limits for your exclusive use. However, temporary storage of equipment and materials on County property may be arranged with the Engineer. Use of work areas and other County-owned property shall be at your own risk. The County shall not be held liable for damage to or loss of materials or equipment located within these areas.

Remove all equipment, materials, and rubbish from the work areas and other County-owned property you occupy and leave the areas in a presentable condition. Comply with Section 4-1.13.

You must secure, at your own expense, areas required for storage of materials and equipment or for other purposes if sufficient area is not available within the contract limits.

The County does not allow temporary residences within the County right-of-way.

Replace 7th paragraph of Section 5-1.36A with:

Install sheet piling, cribbing, bulkheads, shores, or other supports necessary to support existing facilities or support material carrying the facilities.

Maintain temporary facilities until they are no longer needed.

Dispose of temporary facilities when they are no longer needed.

Excavate and backfill as necessary to remove temporary facilities. Backfill with materials of equal or better quality and to a comparable density of surrounding materials and grade surface to match the existing grade and cross slope.

Add the following to Section 5-1.36C(1):

The following companies are believed to have utility and other facilities present within the project area. As part of site investigation of the project, bidders shall contact the below listed companies and ascertain to the bidder's satisfaction the extent and presence of facilities which may affect the contract operations. By submission of a bid, the bidder warrants such contact has been made and the bidder is familiar with all utilities and non-highway facilities which may affect the work.

COMPANY/CONTACT	ADDRESS	PHONE
Pacific Bell (ATT) Brian Franz	5650 Aldrin Ct, Bakersfield, CA 93313	661-546-8249
MCI Worldcom Nick Ring	295 Parkshore Drive, Folsom, CA 95630	916-926-1375
Spectrum-Charter (Bright House Networks) Tony Lara	4450 California Ave, Suite A, Bakersfield, CA 93309	661-546-6515
PG&E Electric Natalie Fritze	4101 Wible Rd, Bakersfield, CA 93313	707-497-8176
PG&E Gas Jeremiah Camarena	3580 East California Ave, Fresno, CA 93725	916-760-5375
So Cal Gas Co Evan Fisher	35118 McMurtrey Ave, Bakersfield, CA 93308	805-415-4120
San Joaquin Facilities Management Nate Jones	4520 California Ave, Bakersfield, CA 93309	661-371-2684
Kinder Morgan Mario Perez	5401 Brundage Ln, Bakersfield, CA 93307	714-560-4610
KSA Sewer Kyle Perez	2700 M St, Bakersfield, CA 93301	661-862-8852

Kern County Storm Drain Jason Scheer	2700 M St, Bakersfield, CA 93301	661-862-5083
Calwater Robert Grado	3725 South H St, Bakersfield, CA 93304	661-201-5282

Certain underground facilities exist that may require special precautions to protect the health, safety and welfare of workmen and of the public. Facilities requiring special precautions include, but are not limited to: conductors of petroleum products, oxygen, chlorine, and toxic or flammable gases; natural gas in pipelines greater than 6 inches in diameter or pipelines operating at pressures greater than 60 psi (gage); underground electric supply system conductors or cables, with potential to ground of more than 300 volts, either directly buried or in duct or conduit which do not have concentric grounded conductors or other effectively grounded metal shields or sheaths. Additional special requirements may be required when working over/near gas or oil lines, you should at your own cost contact the utility owner and comply with their special requirements for working over/near their lines.

At least two working days prior to beginning excavation notify Underground Service Alert-North (USA) at 811 / 1-800-642-2444, pursuant to California Government Code 4216-4216.9,

You will be required to work around public utility facilities and other improvements that are to remain in place within the construction area, or that are to be relocated and relocation operations have not been completed. You will be liable to owners of such facilities and improvements for any damage or interference with services resulting from his operations.

You must determine the exact location of underground facilities and improvements within the construction area before using equipment that may damage such facilities or interfere with the services.

Other forces may be engaged in moving or removing utility facilities or other improvements or maintaining services of utilities and you shall cooperate with such forces and conduct operations in such a manner as to avoid any unnecessary delay or hindrance to the work being performed by such other forces.

Main or trunk line facilities for the purposes of Government Code 4215 shall mean only the primary or principal transmission facilities conveying energy, information, material or product through the construction project site to or from a substantial number of users on the far side of the project from the source of the utility. More than one main or trunk line facility of the same type may be present within the project area. Any other utility facilities or related appurtenances not a main or trunk line, are laterals, particularly where installed to distribute or supply utility services to property abutting the project site, whether such service line or lateral serves one or more abutting property owners, or other users.

You shall infer the presence of underground service laterals and appurtenances from the presence of any visible facilities, including but not necessarily limited to, buildings, meters, valve covers, manholes and junction boxes, whether or not main or trunk lines of the same type are shown on the plans.

You are advised that utility and non-highway facilities, including but not necessarily limited to main or trunk lines, which do not directly affect the immediate work (i.e.: excavation or trench areas) are not necessarily shown on the plans, whether or not such lines may be present within the road right-of-way. The absence or presence on the plans of such facilities that do not directly affect the immediate work shall not relieve you of your obligation for independent investigation to determine facilities which may affect the work.

For the purposes of Government Code 4215 and this contract, the "site of the construction project" with respect to main or trunk line facilities shall consist only of those areas actually trenched or cut where soil 30 inches below existing grade is disturbed. The phrase "identified...in the plans and specifications" shall mean "identified in the plans and specifications as they relate to areas to actually be trenched or cut, where soil 30 inches below the existing grade is disturbed."

Replace the list in the 1st paragraph of Section 5-1.38 with:

1. For highway related work, a unit shall be a road, divided highway, frontage road or a contiguous group of roads, divided highways or frontage roads which is clearly separated from all other roads, divided highways and frontage roads on the project.
2. For work not related to highways, a unit shall be an area of work which is clearly separated from all other areas of work on the project.

Replace Section 5-1.43A with:

Minimize and mitigate the impacts of work or events for which you will make a potential claim.

For each potential claim, assign an identification number determined by chronological sequencing and the 1st date of the potential claim.

Use the identification number for each potential claim on the:

1. Initial Potential Claim Record form
2. Supplemental Potential Claim Record form
3. Full and Final Potential Claim Record form

Failure to comply with this procedure is:

1. Waiver of the potential claim and a waiver of the right to a corresponding claim for the disputed work in the administrative claim procedure
2. Bar to arbitration (Pub Cont Code § 10240.2)

Replace Section 5-1.43E with:

5-1.43E Reserved

Replace Section 5-1.43F with:

5-1.43F Compliance

The provisions of this Section 5-1.43 constitute a non-judicial claim settlement procedure that, pursuant to Government Code Section 930.2, shall constitute a condition precedent to submission of a valid Government Code Claim under the Government Code.

Contractor shall bear all costs incurred in the preparation, submission and administration of a claim.

Any claims presented in accordance with the Government Code must affirmatively indicate Contractor's prior compliance with the claims procedure herein and the previous dispositions under specification subsections 5-1.43B, 5-1.43C and 5-1.43D above of the claims asserted.

No suit or (if otherwise permitted) arbitration may be brought against County arising out of or in connection with the project unless and until Contractor presents to County a statutory Government Code Claim, in accordance with Government Code Sections 910, et seq.

Pursuant to Government Code Section 930.2, the one-year period in Government Code section 911.2 shall be reduced to 150 days from either accrual of the cause of action, substantial completion or termination of the contract, whichever occurs first; in all other respects, the Government Code shall apply unchanged.

Without limiting any other provision of Section 5-1.43, failure to submit and administer claims as required in Section 5-1.43 shall waive Contractor's right to claim on any specific issues not included in a timely submitted claim. Claim(s) or issue(s) not raised in a timely claim submitted under this Section 5-1.43 may not be asserted in any subsequent litigation, Government Code Claim, arbitration or legal action.

County shall not be deemed to waive any provision under this Section 5-1.43, if at County's sole discretion, a claim is administered in a manner not in accord with this Section 5-1.43. Waivers or modifications of this Section 5-1.43 may only be made a signed change order approved as to form by legal counsel for both County and Contractor; oral or implied modifications shall be ineffective.

Add the following to Section 5-1.43:

5-1.43G Disputes

5-1.43G(1) General

Notwithstanding any other provision of Section 5-1.43, Public Contract Code Sections 9204 and 20104, et seq., specify required provisions on resolving certain contract claims, which are set forth below, and constitute a part of this Contract.

For the purposes of this section 5-1.43G, "**Claim**" means a separate demand by Contractor sent by registered mail or certified mail with return receipt requested for (1) a time extension, (2) payment or money or damages arising from work done by or on behalf of Contractor arising under the contract documents and payment of which is not otherwise expressly provided for or the Claimant is not otherwise entitled to, or (3) an amount the payment of which is disputed by County. In order to qualify as a Claim, the written demand must state that it is a Claim submitted under specification Section 5-1.43 and be submitted in compliance with all requirements of that Section.

A voucher, invoice, payment application, or other routine or authorized form of request for payment is not a Claim for purposes of this section. If such request is disputed as to liability or amount, then the disputed portion of the submission may be converted to a Claim under this section by submitting a separate claim in compliance with contract documents claim submission requirements.

Caution. This section does not apply to tort claims, and nothing in this section is intended nor shall be construed to change the time periods for filing tort claims or actions specified by Chapter 1 and Chapter 2 of Part 3 of Division 3.6 of Title 1 of the California Government Code.

5-1.43G(2) Claims Requirements

The Claim must be in writing, submitted in compliance with all requirements of specification Section 5-1.43, including, without limitation, the time prescribed by and including the documents necessary to substantiate the Claim, pursuant to specification sections 5-1.43B, 5-1.43C and 5-1.43D. Claims must be filed on or before the day of final payment. Nothing in this section is intended to extend the time limit or supersede notice requirements for the filing of claims as set forth in specification Section 5-1.43 or elsewhere in the contract documents.

Owner may render a final determination in writing based on the Claim or may in its discretion conduct an administrative hearing on Contractor's claim, in which case Contractor shall appear, participate, answer questions and inquiries, and present any further evidence or analysis requested by Owner prior to rendering a final determination in writing. Should Owner take no action on the Claim within 45 Calendar Days of submission, it shall be deemed denied. The parties may extend this 45 day period by mutual agreement upon submission of a claim.

Notwithstanding and pending the resolution of any claim or dispute, Contractor shall diligently prosecute the disputed work to final completion in accordance with Owner's determination.

After their submission, claims that total less than \$375,000 in the aggregate at Contract closeout shall also be subject to the Local Agency Disputes Act.

Owner shall issue payment on any undisputed portion of the Claim within 60 days of Owner's final determination in writing. Failure by County to issue a written statement shall result in the claim being rejected in its entirety. A Claim that is denied by reason of Owner's failure to respond shall not constitute an adverse finding with regard to the merits of the Claim.

5-1.43G(3) Meet and Confer

If Claimant disputes County's written response, or County fails to respond within the time prescribed above, Claimant shall notify County, in writing, either within 15 days of receipt of County's response or within 15 days of County's failure to timely respond, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon demand County will schedule a meet and confer conference within 30 days for settlement of the dispute.

Within ten (10) business days following the conclusion of the meet and confer conference, if the Claim or any portion of the Claim remains in dispute, the Owner shall provide the Contractor with a written statement identifying the portion of the Claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the Claim shall be made within sixty (60) days after the Owner issues this written statement.

5-1.43G(4) Subsequent Proceedings

Any remaining disputed portion of the Claim, as identified by the Contractor in writing, shall be submitted to nonbinding mediation, with the Owner and the Contractor sharing the associated costs equally. The Owner and Contractor shall mutually agree to a mediator within ten (10) business days after the disputed portion of the Claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator, and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the Claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of a neutral mediator.

Mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes herein.

If mediation is unsuccessful, the parts of the Claim remaining in dispute shall be subject to applicable procedures outside this section.

Unless otherwise agreed to by the Owner and the Contractor in writing, the mediation conducted pursuant to this Article shall excuse any further obligation under Section 20104.4 of the Public Contract Code to mediate after litigation has been commenced.

The Claim resolution procedures in this section do not preclude Owner from requiring arbitration of disputes under private arbitration if mediation under this section does not resolve the parties' dispute.

Amounts not paid in a timely manner as required by this section shall bear interest at 7 percent per annum.

Following this procedure, the Claim or any portion remains in dispute, Claimant may file a claim as provided in Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the California Government Code. For purposes of those provisions, the running of the period of time within which a claim must be filed shall be tolled from the time Claimant submits its written claim as set forth herein, until the time that the mediation process set forth herein is complete, including any period of time utilized by the mediation process.

If the Government Code claim is denied, Contractor may file an action in court. Such action shall be subject to Public Contract Code sections 9204 or 20104.4. This Section applies only to Claims subject to Public Contract Code Sections 9204 or 20104; if a Claim is not subject to those sections, the Contractor's rights to file a civil action shall be as otherwise provided by law.

5-1.43G(5) Claims by Subcontractors

If a Subcontractor or a lower tier Subcontractor lacks legal standing to assert a Claim against Owner because privity of contract does not exist, the Contractor may present to the Owner a Claim on behalf of a Subcontractor or lower tier Subcontractor. A Subcontractor may request in writing, either on his or her own behalf, or on behalf of a lower tier Subcontractor, that the Contractor present a Claim for work which was performed by the Subcontractor or by a lower tier Subcontractor on behalf of the Subcontractor. The Subcontractor requesting that the Claim be

presented to Owner shall furnish reasonable documentation to support the Claim. Within forty-five (45) days of receipt of this written request, the Contractor shall notify the Subcontractor in writing as to whether the Contractor presented the Claim to the Owner and, if the original Contractor did not present the Claim, provide the Subcontractor with a statement of the reasons for not having done so.

5-1.43G(6) Consistency with Public Contract Code 9204 and 20104 et seq.

If any Claim arising under this Contract is subject to the provisions of Public Contract Code sections 9204 or 20104 et seq., and if the provisions of that article require a procedure or procedural element different from that established herein, then the provisions of that article shall apply in place of the conflicting procedure or procedural element established herein.

6 CONTROL OF MATERIALS

Add the following to Section 6-1.01:

Do not use materials manufactured or produced by convict labor.

Replace section 6-1.04 with:

6-1.04 BUY AMERICA

6-1.04A General

Buy America Requirements apply to iron or steel, manufactured products, and construction materials permanently incorporated into the project.

Buy America requirements do not apply to the following:

1. Tools and construction equipment used in performing the work
2. Temporary work that is not incorporated into the finished project

An article, materials, or supply to be permanently incorporated in the project should only be classified into one of the following categories:

1. Iron or steel products
2. Manufactured products
3. Construction materials
4. Excluded materials

Excluded materials means cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives.

6-1.04B Crumb Rubber (Pub Res Code § 42703(d))

Furnish crumb rubber with a certificate of compliance. Crumb rubber must be:

1. Produced in the United States
2. Derived from waste tires taken from vehicles owned and operated in the United States

6-1.04C Iron or Steel Products

All iron or steel products permanently incorporated into the project must be melted and manufactured in the United States except:

1. Foreign pig iron and processed, pelletized, and reduced iron ore may be used in the domestic production of the steel and iron materials;
2. If the total combined cost of the materials produced outside the United States does not exceed the greater of 0.1 percent of the total contract amount or \$2,500, the material may be used if authorized.

Iron or steel products are defined as articles, materials, or supplies that consist wholly or predominantly of iron or steel or a combination of both.

For a product to be considered to consist predominantly of iron or steel, or a combination of both means the cost of the iron or steel content of the product exceeds 50 percent of the total cost of all its components. The cost of iron or steel is the cost of the iron or steel mill products (such as bar, billet, slab, wire, plate, or sheet), castings, or forgings utilized in the manufacture of the product and a good faith estimate of the cost of iron or steel components.

Furnish iron or steel products to be incorporated into the work with certificates of compliance and certified mill test reports. Mill test reports must indicate where the iron or steel were melted and manufactured. All melting and manufacturing processes for these materials, including an application of a coating, must occur in the United States. Coating includes all processes that protect or enhance the value of the material to which the coating is applied.

6-1.04D Manufactured Products

All manufactured products permanently incorporated into the project must be manufactured in the United States. Manufactured products are defined as articles, materials, or supplies that have been:

1. Processed into a specific form and shape; or
2. Combined with other articles, materials, or supplies to create a product with different properties than the individual articles, materials, or supplies.

Manufacturer, in the case of manufactured products, means the entity that performs the final manufacturing process by bringing individual elements together that produces a manufactured product.

If an item is classified as an iron or steel product, a construction material, or an excluded material, then it is not a manufactured product. However, an article, material, or supply classified as a manufactured product may include components that are iron or steel products, construction materials, or excluded materials.

Iron or steel used in precast concrete manufactured products or Intelligent Transportation Systems (ITS) must meet the requirements of section 6-1.04C regardless of the amount used.

Iron and steel used in other manufactured products must meet the requirements of section 6-1.04C if the cost of steel and iron components is 50 percent or more of the total cost of the manufactured product.

Furnish manufactured products to be permanently incorporated into the work with certificates of compliance with each project delivery. The manufacturer's certificate of compliance must identify where the manufacturing occurred and attest specifically to Buy America compliance.

6-1.04E Construction Materials

Construction materials permanently incorporated into the project must be manufactured as defined in 2 CFR 184.6 in the United States.

Buy America requirements apply to the following construction materials that are or consist primarily of:

1. Non-ferrous metals
2. Plastic and polymer-based products such as:
 - a. Polyvinylchloride
 - b. Composite Building Materials
3. Glass (including optic glass)
4. Fiber optic cable (including drop cable)
5. Optical fiber
6. Lumber
7. Engineered wood
8. Drywall

Minor additions of articles, materials, supplies, or binding agents to these construction materials do not change the categorization of the construction material.

Furnish construction materials to be incorporated into the work with certificates of compliance with each project delivery. Manufacturer's certificate of compliance must identify where the construction material was manufactured and attest specifically to Buy America compliance.

6-1.04F Buy America Waiver for De Minimis Cost for Manufactured Products and Construction Materials

A De Minimis Cost Waiver can waive the application of FHWA's Buy America requirements for manufactured products and construction materials under a single project when the total value of non-compliant manufactured products and construction materials is no more than the lesser of \$1,000,000 or 5 percent of the total applicable material costs for the project.

The percent threshold is calculated based on the following formula:

$$X = NC / TA$$

where:

X = percent threshold

NC = total value of non-compliant manufactured products and construction material

TA = total applicable project costs (iron or steel products, manufactured products, and construction materials; does not include excluded materials)

This threshold is based on the actual cost of the iron or steel products, manufactured products, and construction materials, not the anticipated cost of those materials. Compliant and non-compliant Agency Furnished Materials for the project must be accounted for in a De Minimis Cost Waiver Worksheet calculation, if provided by the Local Agency.

Provide copies of invoices for the actual costs of materials including transportation to the project site.

In applying a De Minimum Cost Waiver, total cost of non-compliant construction materials and manufactured products does not include the cost of any products subject to a separate Buy America waiver.

If De Minimis Cost Waiver Worksheet calculation for materials subject to Buy America is not submitted, the Local Agency may:

1. Withhold from the next progress payment
2. Reject your request for a De Minimis Costs waiver for non-compliant construction materials or manufactured products

Replace Section 6-1.06 with:

6-1.06 Reserved

Add the following to Section 6-2.01A:

The Local Agency uses a Quality Assurance Program (QAP) to ensure a material is produced to comply with the Contract. The Local Agency may examine the records and reports of tests the prime contractor performs if they are available at the job site. Schedule work to allow time for QAP. All testing requests shall be submitted in writing to the County's Engineer. All testing requests shall be submitted in writing to the County's Engineer. All testing requests shall be submitted in writing to the County's Engineer.

7 LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

Replace Section 7-1.02I(1) with:

7-1.02I(1) General

No discrimination shall be made in the employment of persons upon public works because of the race, religious creed, color, national origin, ancestry, physical handicap, medical condition, marital status, or sex of such persons, except as provided in Section 12940 of the Government Code, and every contractor for public works violating this section is subject to all the penalties imposed for a violation of this chapter.

County adopts for purposes of this contract the Standard California Nondiscrimination Construction Contract Specifications (Gov. Code, Section 12990) applicable to all state contractors and subcontractors having a construction contract or subcontract of \$5,000, or more. Such provisions are contained in Standard Specification section 7-1.02I(2), and your attention is drawn to such sections.

No person performing any service or providing any goods designated under this Contract shall participate in any political or religious activity on County time or in any manner involving the use of county property or expenditure of public funds nor conveying the implication of County endorsement or support for a candidate for local, state, or federal office. Notwithstanding the foregoing, nothing in this Contract shall be construed to unlawfully limit an individual's Constitutional rights. Accordingly, the limitations contained in this section are for the sole purpose of preventing proselytizing and politicking while engaged in the performance of services under this Contract.

The County's Free Speech Policy, Administrative Bulletin No. 19, is attached to this Contract.

Replace Section 7-1.02J with:

7-1.02J State Contract Act

The provisions of the State Contract Act do not apply to this contract except for specific language of that Act that is specifically incorporated into this contract by reference.

Replace sections 7-1.02K(1) through 7-1.02K(5) with:

7-1.02K(1) General

Contractor shall pay to persons performing labor in and about work provided for in the contract documents an amount equal to or more than the general prevailing rate of per diem wages for (i) work of a similar character in the locality in which the work is performed and (ii) legal holiday and overtime work in said locality. The per diem wages shall be an amount equal to or more than the stipulated rates contained in a schedule that has been ascertained and determined by the Director of the State Department of Industrial Relations and County to be the general prevailing rate of per diem wages for each craft or type of workman or mechanic needed to execute this Contract. Contractor shall also cause a copy of this determination of the prevailing rate of per diem wages to be posted at each Site.

Contractor shall insert in every subcontract or other arrangement which Contractor may make for performance of work or labor on work provided for in the Contract, provision that Subcontractor shall pay persons performing labor or rendering service under subcontract or other arrangement not less than the general prevailing rate of per diem wages for work of a similar character in the locality in which the work is performed, and not less than the general prevailing rate of per diem wages for holiday and overtime work fixed in the Labor Code.

Pursuant to Chapter 1 of Part 7 of Division 2 of the Labor Code (commencing with Section 1720), Contractor agrees that in performing said work, by himself or through any subcontractor, eight hours' labor shall be a day's work and forty hours' labor shall be a week's work, and that Contractor shall keep an accurate record showing the name and actual hours worked for all workers employed in said

work, and that said record shall be kept open at all reasonable hours for inspection pursuant to Section 1812 of the Labor Code.

The prevailing rate for each craft, classification or type of work is determined by the Director of the California Department of Industrial Relations, and his schedule of prevailing rates is on file and available for inspection at the Public Works Department, or may be obtained on the internet at <http://www.dir.ca.gov/oprl/DPreWageDetermination.htm>, and is incorporated herein by this reference..

7-1.02K(2) Penalties

Contractor shall forfeit, as a penalty to County, \$200.00 for each laborer, worker, or mechanic employed in performing labor in and about the work provided for in the contract documents for each Day, or portion thereof, that such laborer, worker or mechanic is paid less than the said stipulated rates for any work done under the contract documents by him or her or by any Subcontractor under him or her, in violation of Articles 1 and 2 of Chapter 1 of Part 7 of Division II of the Labor Code. The sums and amounts that are forfeited pursuant to this Paragraph and the terms of the Labor Code shall be withheld and retained from payments due to Contractor under the contract documents, pursuant to this Document 00 72 00 and the Labor Code, but no sum shall be so withheld, retained or forfeited except from the final payment without a full investigation by either the State Department of Industrial Relations or by County. The Labor Commissioner pursuant to Labor Code Section 1775 shall determine the final amount of forfeiture.

7-1.02K(3) Compliance With Wage and Hour Laws

Contractor stipulates that it shall comply with all applicable wage and hour laws, including without limitation, Labor Code Sections 1776 and 1810-1815. Failure to so comply shall constitute a default under this Contract.

Contractor and its Subcontractors shall be responsible for compliance with Labor Code Sections 1810-1815.

Eight hours of labor performed in execution of the Contract constitutes a legal day's work. The time of service of any worker employed on the project is limited and restricted to 8 hours during any one calendar day, and 40 hours during any one calendar week.

1. Contractor and its Subcontractors shall keep an accurate record showing the name of and actual hours worked each calendar day and each calendar week by each worker employed by him or her in connection with the project. The record shall be kept open at all reasonable hours to the inspection County and to the Division of Labor Standards Enforcement.
2. Contractor or its Subcontractors shall, as a penalty to County, forfeit twenty-five dollars (\$25) for each worker employed in the execution of the contract documents by the respective Contractor or Subcontractor for each calendar day during which the worker is required or permitted to work more than 8 hours in any one calendar day and 40 hours in any one calendar week in violation of the provisions of Labor Code Sections 1810-1815.
3. Work performed on the project by employees of Contractor or its Subcontractors in excess of 8 hours per day, and 40 hours during any one week, shall be permitted upon compensation for all hours worked in excess of 8 hours per day at not less than 1 1/2 times the basic rate of pay.

The Department withholds from progress payments for delinquent or inadequate records (Labor Code § 1771.5). If you have not submitted an adequate record by the month's 15th day for the period ending on or before the 1st of that month, the Department withholds up to 10 percent of the monthly progress estimate, exclusive of mobilization. The Department does not withhold more than \$10,000 or less than \$1,000.

7-1.02K(4) Payroll Records; Prevailing Wage Monitoring; Listing of Trades Working

Contractor and its Subcontractors shall be responsible for compliance with Labor Code Section 1776. Further, this project is subject to prevailing wage compliance monitoring and enforcement by the Department of Industrial Relations.

1. Contractor and Subcontractors must keep accurate payroll records, showing the name, address, last four digits of social security number pursuant to Labor Code § 226(a), work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the work of the contract documents. Each payroll record shall contain or be verified by a written declaration as required by Labor Code Section 1776.
2. The payroll records enumerated above must be certified and shall be available for inspection at all reasonable hours at the principal office of the Contractor as required by Labor Code Section 1776.
 - a. Contractor shall inform County of the location of records enumerated above, including the street address, city and county, and shall, within five working days, provide a notice of a change of location and address.
 - b. Contractor or Subcontractor has ten days in which to comply subsequent to receipt of a written notice requesting the records enumerated above. In the event that the Contractor or Subcontractor fails to comply with the ten-day period, he or she shall, as a penalty to County on whose behalf the contract is made or awarded, forfeit \$100.00 for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due. Contractor is not subject to a penalty assessment pursuant to this Paragraph due to the failure of a Subcontractor to comply with this Paragraph.
3. With each application for payment, Contractor shall also deliver certified payrolls to County, and concurrently therewith (but in no event less frequently than monthly) directly to the Labor Commissioner in the format prescribed by the Labor Commissioner.
4. Contractor shall post all jobsite notices if and when prescribed by regulation.

Contractor shall list the trades working on the Site and their scheduled activities on a daily basis, and provide a copy of that list to County.

7-1.02K(5) Apprentices

7-1.02K(5)(a) Compliance Required

Contractor and Subcontractors shall comply with the requirements of Labor Code Sections 1776, 1777.5, and 1777.6 concerning the employment of apprentices by Contractor or Subcontractors. Willful failure to comply may result in penalties, including loss of the right to Bid on or receive public works contracts.

7-1.02K(5)(b) Certification of Approval

Labor Code Section 1777.5, as amended, requires a Contractor or Subcontractor employing tradespersons in any apprenticeable occupation to apply to the joint apprenticeship committee nearest the site of a public works project and which administers the apprenticeship program in that trade for a certification of approval. The certificate shall also fix the ratio of apprentices to journeypersons that will be used in performance of the Contract. The ratio of work performed by apprentices to journeypersons in such cases shall not be less than one hour of apprentices work for every five hours of labor performed by journeypersons (the minimum ratio for the land surveyor classification shall not be less than one apprentice for each five journeypersons), except:

1. When unemployment for the previous three month period in the area exceeds an average of 15 percent;
2. When the number of apprentices in training in the area exceeds a ratio of one to five;
3. When a trade can show that it is replacing at least 1/30 of its membership through apprenticeship training on an annual basis state-wide or locally; or
4. Assignment of an apprentice to any work performed under a public works contract would create a condition which would jeopardize his or her life or the life, safety, or property of fellow employees or the public at large or if the specific task to which the apprentice is to be assigned is of such a nature that training cannot be provided by a journeyperson.

7-1.02K(5)(c) Fund Contributions

Contractor is required to make contributions to funds established for administration of apprenticeship programs if Contractor employs registered apprentices or journeypersons in any apprenticeable trade on such contracts and if other contractors on the public works site are making such contributions.

7-1.02K(5)(d) Apprenticeship Standards

Information relative to apprenticeship standards, wage schedules, and other requirements may be obtained from the Director of the California Department of Industrial Relations, or from the Division of Apprenticeship Standards and its branch offices.

Add the following to Section 7-1.02K(6)(a):

You have the responsibility to ensure safety at the project location specified on the contract documents. The Engineer or the Engineer's representative will monitor construction on behalf of the Department for general observation that key design elements will be faithfully executed.

Construction observation does not constitute superintendence of construction process, site conditions, operations, compliance with any law or regulation, equipment or personnel, or the maintenance of a safe place to work or any safety in, or about, the project location as specified in the contract documents.

Prepare a Safety and Health Plan for work at the project location in compliance with all applicable sections of the Code of Federal Regulations (CFR), Title 29 and California Code of Regulations Title 8 (Cal/OSHA), and submit the Plan to the Engineer for review. The Safety and Health Plan must be submitted and in place prior to work commencing at the site.

The Safety and Health Plan will describe the hazard assessment and project location control. The plan will describe all Health and Safety methods and procedures to be followed by the contractor. The plan will outline process and coordination with the Engineer, the Kern County Environmental Health Department's Local Enforcement Agency (LEA), and all appropriate regulatory agencies on methods to be exercised if contaminated materials are found in the field.

Report all job related accidents or health problems to the Owner.

Note in your Safety and Health Plan that valley fever (*coccidioides immitis* fungus) is endemic in this region and notify each employee who works on the project.

Note in your Safety and Health Plan that residual leads may be found in paint and in the soil, generated by work activities, and/or in a state of air and non-air borne particulate at the contract project location and notify each employee who works on the project.

Provide information on any chemical used at the project location. This information must include, but not be limited to, inventory, quantity, use, MSDS (Material Safety Data Sheet) and location. This information will be retained by the Engineer.

The Owner relies on the information contained in MSDS's as permitted by the Cal/OSHA Hazard Communication Standard and does not do an independent hazard determination.

Provide in your Safety and Health Plan a written methodology of dealing with fire hazards and/or explosions that may engulf the project location. Fire extinguishers with a rating of at least A, B, and C must be available at all times on the site.

Replace Section 7-1.02K(6)(j)(iii) with:

7-1.02K(6)(j)(iii) Unregulated Earth Material Containing Lead

RESERVED

Replace the 6th, 7th, 8th, 9th, and 16th paragraphs in Section 7-1.03 with:

Upon completion of rough grading at the grading plane, or placing any subsequent layer thereon, the surface of the roadbed shall be brought to and maintained at a smooth, even condition, free of humps and depressions, satisfactory for the use of public traffic.

After the surface of the roadbed has been brought to a smooth, even condition for the passage of public traffic as above provided, any work ordered by the Engineer (in addition to maintaining a smooth, even condition as above provided) for accommodation of public traffic prior to commencing subgrade operations will be paid for as extra work as provided in section 4-1.05A, "Changes and Extra Work: General" of the Standard Specifications. After subgrade preparation for a specified layer of material has been completed, the Contractor shall, at his own expense, repair any damage to the roadbed or completed subgrade, including damage caused by his operations or use by public traffic.

Except during periods of road closure, when allowed by the special provisions, a minimum of one traffic lane, not less than twelve feet in width, shall be open for use by public traffic where construction operations are actively in progress. Where construction operations are not actively in progress, not less than two such lanes shall be open for use by public traffic. Public traffic may be permitted to use the shoulders and, if half-width construction methods are used, may also be permitted to use the side of the roadbed opposite to the one under construction. No additional compensation will be allowed for any shaping of shoulders or reshaping of subgrade necessary for the accommodation of public traffic thereon during subgrade preparation and paving operations.

In order to expedite the passage of public traffic through or around the work and where ordered by the Engineer, the Contractor shall, at his own expense, furnish, install and maintain construction area signs, lights, flares, temporary barrier system, barricades, changeable message signs (CSM), and other facilities for the sole convenience and direction of public traffic. Also, where directed by the Engineer, the Contractor shall furnish competent flaggers whose sole duties shall consist of directing the movement of public traffic through or around the work. When deemed necessary by the County, ROAD WORK AHEAD (W20-1) and END ROAD WORK (G20-2) signs shall be furnished, installed and maintained by the Contractor at locations as directed by the Engineer at least 48 hours in advance of any construction.

Flagging must comply with section 12-1. This work is to be done at your own expense.

Apply water or dust palliative for the prevention or alleviation of dust nuisance.

Replace the last sentence of the 7th paragraph in Section 7-1.04 with:

This work is to be done at your own expense.

Replace the paragraphs in Section 7-1.05A with:

County and each of its officers, employees, consultants and agents including, without limitation, the Board, Project Manager and each County's representative, shall not be liable or accountable in any manner for loss or damage that may happen to any part of the work; loss or damage to materials or other things used or employed in performing the work; injury, sickness, disease, or death of any person; or damage to property resulting from any cause whatsoever except their sole negligence, willful misconduct, or active negligence, attributable to performance or character of the work, and Contractor releases all of the foregoing persons and entities from any and all such claims.

To the furthest extent permitted by law, (including without limitation, Civil Code Section 2782), the Contractor agrees to indemnify, defend, and hold harmless County and County's agents, board members, elected and appointed officials and officers, employees, volunteers and authorized representatives from any and all losses, liabilities, charges, damages, claims, liens, causes of action, awards, judgments, costs, and expenses (including, but not limited to, reasonable attorneys' fees of County Counsel and of counsel retained by County, expert fees, costs of staff time, and investigation costs) of whatever kind or nature, which arise out of or are in any way

connected with any act or omission of the Contractor or Contractor's officers, agents, employees, independent contractors, subcontractors of any tier, or authorized representatives. Without limiting the generality of the foregoing, the same shall include bodily and personal injury or death to any person or persons, damages to any property, regardless of where located, including the property of County; and any workers' compensation claim or suit arising from or connected with any services performed pursuant to this Agreement on behalf of the Contractor by any person or entity.

With respect to third party claims against the Contractor, Contractor waives any and all rights to any type of express or implied indemnity against County and County's agents, board members, elected and appointed officials and officers, employees, volunteers, and authorized representatives. It is the intent of the parties that the Contractor will defend, indemnify, and hold the County and County's agents, board members, elected and appointed officials and officers, employees, volunteers, and authorized representatives harmless as set forth above regardless of the existence or degree of fault or negligence on the part of the Contractor or the County and the agents, board members, elected or appointed officials and officers, employees, volunteers, and authorized representatives or any of these.

County shall provide timely notice to Contractor of any third-party claim relating to the contract documents, in accordance with Public Contract Code Section 9201.

Approval or purchase of any insurance contracts or policies shall in no way relieve from liability nor limit the liability of Contractor, its Subcontractors of any tier, or the officers or agents of any of them.

To the furthest extent permitted by law (including, without limitation, Civil Code Section 2782), the indemnities, releases of liability and limitations of liability, claims procedures, and limitations of remedy expressed throughout contract documents shall apply even in the event of breach of Contract, negligence (active or passive), fault or strict liability of the party(ies) indemnified, released, or limited in liability, and shall survive the termination, rescission, breach, abandonment, or completion of the work or the terms of the contract documents. If Contractor fails to perform any of these defense or indemnity obligations, County may in its discretion back charge Contractor for County's costs and damages resulting therefrom and withhold such sums from progress payments or other Contract moneys which may become due.

Replace Section 7-1.05B with:

7-1.05B Responsibility to Other Entities

You are responsible for any liability imposed by law and for injuries to or death of any person, including workers and the public, or damage to property. Indemnify and save harmless any county, city or district and its officers and employees connected with the work, within the limits of which county, city, or district the work is being performed, all in the same manner and to the same extent specified for the protection of the County.

Replace Section 7-1.05C with:

7-1.05C Other

You are responsible to the fullest extent allowed by law, to defend and indemnify the County for any and all injury, illness, disease, or death arising out of or caused by an organism, including but not limited to animals, microscopic bacteria, fungi, plants and the like, to which persons, including but not limited to the public, any employees or agents of yours, the County, or any other contractors that are exposed in connection with the work on the project.

Replace the headings and paragraphs in Section 7-1.06 with:

7-1.06 INSURANCE

7-1.06A General

Nothing in the contract is intended to establish a standard of care owed to any member of the public or to extend to the public the status of a third-party beneficiary for any of these insurance specifications. Contractor shall not commence work under this contract until it has obtained all insurance required under this section and all required certificates have been filed with and approved by County, nor shall Contractor allow any subcontractor to commence work on its subcontract until its certificates have been filed with and approved by the County. Contractor shall be responsible for any deductibles under all required insurance policies.

7-1.06B Insurance and Amounts

Contractor shall maintain in full force and effect at all times between the signing of the contract and final acceptance of the completed work by the County the following Liability Insurance:

1. General Liability Insurance covering claims for personal injury, bodily injury and property damage arising out of the work and in a form providing coverage not less than that of a Standard Commercial General Liability Insurance policy (**Occurrence Form**). Such insurance shall provide for all operations and include independent contractors, products liability, completed operations for one year after final completion and acceptance of the final payment for the work, contractual liability, and coverage for explosion, collapse, and underground hazards. The limits of such insurance shall not be coverage of less than \$2,000,000 each occurrence, \$4,000,000 aggregate for products and completed operations, and \$2,000,000 general aggregate limit which applies to this contract only. The policy shall be endorsed to provide Broad Form Property Damage Coverage.
2. Automobile Liability Insurance covering all owned, non-owned, and hired vehicles. Such insurance shall provide coverage not less than the standard Comprehensive Automobile Liability policy with limits not less than \$1,000,000 each person Bodily Injury, \$1,000,000 each occurrence Bodily Injury, and \$1,000,000 each occurrence Property Damage.
3. Workers' Compensation Insurance for all persons whom the Contractor may employ in carrying out work contemplated under contract documents, in accordance with the Act of Legislature of State of California, known as "Workers' Compensation Insurance and Safety Act," approved May 26, 1913, and all acts amendatory or supplemental thereto, in the statutory amount. Also, Employer's Liability insurance with limits of at least \$1,000,000 for bodily injury or disease.

All insurance (other than Workers Compensation/Employers' Liability) shall be issued by a company or companies admitted to do business in California and listed in the current "Best's Key Rating Guide" publication with a minimum of an A-, VII rating or in special circumstances, issuers pre-approved by both the Risk Management Division of the Office of County Counsel and the Public Works Department at least 5 business days prior to bid opening. Request for pre-approval to be submitted by RFI. Insurers on the California List of Approved Surplus Lines Insurers (LASLI) are to be considered pre-approved, and an RFI is not required.

All insurance shall be primary to County and no other insurance or self-insured retention carried or held by County shall be called upon to contribute to a loss covered by insurance for the named insured.

Required minimum amounts of insurance may be increased should conditions of work, in opinion of County, warrant such increase. Contractor shall increase required insurance amounts upon direction by County, at County's costs (if they exceed amounts which Contractor already maintains).

All self-insured retentions (**SIR**) must be disclosed to the County for approval and shall not reduce the coverage limits. Insurance policies containing an SIR provision shall provide or be endorsed to provide that the SIR may be satisfied by either the named Contractor/named insured or the County.

7-1.06C Additional Insurance Provisions

All required insurance herein (other than Workers' Compensation/Employers' Liability) shall include an endorsement naming the County and County's board members, officials, officers,

agents and employees as additional insureds for liability arising out of this contract and any operations related thereto, and provide "Cross Liability" coverage under ISO forms separation of insureds clause or commercial general liability ("severability of interest") coverage for all said additional insureds. Additional insured language must be at least as broad as the Insurance Services Office (ISO) forms GC 20 38 04 13 and GC 20 37 04 13. Any other insurance maintained by the County, its governing board, officers, employees, or agents is excess and not contributing insurance.

The insurance coverage shall contain provisions that the insurance may not be canceled or reduced during the period of the contract unless the County receives 30 days prior written notice of such cancellation or reduction. Also, phrases such as "endeavor to" and "but failure to mail such notice shall impose no obligation or liability of any kind upon the company" shall not be included in the cancellation wording of the Certificate of Insurance.

Nothing herein shall be construed as limiting in any way the extent to which Contractor or any Subcontractor may be held responsible for payment of damages resulting from their operations.

Failure to maintain all such insurance in effect at all times until final acceptance of the completed work (and, for completed operations coverages, through the expiration of the patent deficiency in construction statute of repose set forth in Civ Pro Code § 337.15k) shall be a material breach of the contract by the Contractor.

Replace Section 7-1.08 with:

7.1-08 PERSONAL LIABILITY; COUNTY NONLIABILITY FOR CONSEQUENTIAL, ETC. DAMAGES

Neither the Director, the Engineer nor any other officer or authorized employee of the County, nor any officer or employee of any city or district shall be personally responsible for any liability arising under or by virtue of the Contract.

County, and each of its officers, board members, employees, consultants and agents including, without limitation, engineer, project manager and each other county representative, shall have no liability to contractor for special, consequential, or incidental damages, except to the limited extent that these contract documents or applicable public contracting statutes may specify their recovery.

Replace Section 7-1.10 with:

7-1.10 NO INTEREST OF PUBLIC OFFICIALS

No representative, officer, or employee of County, no member of the governing body of the locality in which the project is situated, no member of the locality in which County was activated, and no other public official of such locality or localities who exercises any functions or responsibilities with respect to the project, during the tenure of the official or for one year thereafter, shall, as principal, agent, attorney or otherwise, be directly or indirectly interested, in the contract documents or the proceeds thereof.

Replace Section 7-1.11 with:

7-1.11 RESERVED

8 PROSECUTION AND PROGRESS

Replace the headings and paragraphs in Section 8-1.02 with:

8-1.02 SCHEDULE

8-1.02A General

Before or at the preconstruction conference, submit a CPM baseline schedule.

For each schedule, submit a plotted original and PDF version, time-scaled network diagram on a sheet at least 11 by 17 inches with a title block and timeline.

Your initial schedule must show completion of the contract within the allotted contract working days.

Correct rejected schedules and resubmit them within 7 days upon notification. Allow 7 days for the review of the resubmittal.

Ensure that all activity sequences are logical and that each schedule shows a coordinated plan for completion of the work. If the Contract includes construction staging and you propose changes to the described staging, do not perform work affected by the proposed changes until the Engineer accepts your schedule and the Department approves a Change Order.

Perform critical path work activities in the sequence indicated on the current accepted schedule.

Notify the Engineer in advance of performance of non-critical work activities that comply with Contract requirements but are out-of-sequence with the current accepted schedule. Performance of such work shall not impact the critical path work activities.

The Engineer's review and acceptance of schedules neither voids any Contract part nor your responsibility for submitting complete and accurate information. Errors or omissions on schedules do not void your responsibility for completing all work within the time specified for completion of the work. If any aspect of the schedule has an error or omission after a schedule has been accepted, correct it on the next update schedule.

8-1.02B Schedule Format

On each schedule, show:

1. Planned start and completion dates of each work activity, including applicable:
 - 1.1. Submittal development, review and anticipated acceptance
 - 1.2. Material procurement
 - 1.3. Contract milestones and constraints
 - 1.4. Test periods (All testing requests shall be submitted in writing to the County's Engineer)
 - 1.5. Final cleanup
2. Order that you propose to prosecute the work
3. All controlling activities
4. Legible description of each activity
5. At least 1 predecessor and 1 successor to each activity except for project start and project end milestones
6. Duration of at least 1 working day for each activity
7. Start milestone date as the Contract approval date

8-1.02C Updated Schedule

If any proposed change in planned work would alter the critical path or extend the scheduled completion date, submit a revised schedule within 15 days of the proposed change.

Replace the last sentence of the 1st paragraph of Section 8-1.03 with:

Do not start work before the preconstruction conference without written authorization. Authorization is at the discretion of the County and will not be granted until all bonds and applicable insurance are in place.

Add the following row to the table in the 2nd paragraph of Section 8-1.03:

Any other matter requested by the County	
--	--

Replace the paragraphs in Section 8-1.04B with:

As the execution of the Agreement by County is a matter of public record, Contractor will be considered to have received actual notice the date the Agreement was executed by County on the date the Agreement is so executed by County. County may, but is not required to, send written notice to Contractor.

Contractor shall submit a notice 72 hours before starting job site activities. If the project has more than one location of work, submit a separate notice for each location.

Contractor's working days shall begin 13 calendar days after the date the Contract has been executed by County. Except as may otherwise be provided in Contract, Contractor shall begin work within 15 calendar days after the date working days begin and shall diligently prosecute the same to completion by the time set forth in contract documents.

Add the following to Section 8-1.06:

Suspensions of Work Ordered by the Engineer

1. If the performance of all or any portion of the work is suspended or delayed by the engineer in writing for an unreasonable period of time (not originally anticipated, customary, or inherent to the construction industry) and the contractor believes that additional compensation and/or contract time is due as a result of such suspension or delay, the contractor shall submit to the engineer in writing a request for adjustment within 7 calendar days of receipt of the notice to resume work. The request shall set forth the reasons and support for such adjustment.
2. Upon receipt, the engineer will evaluate the contractor's request. If the engineer agrees that the cost and/or time required for the performance of the contract has increased as a result of such suspension and the suspension was caused by conditions beyond the control of and not the fault of the contractor, its suppliers, or subcontractors at any approved tier, and not caused by weather, the engineer will make an adjustment (excluding profit) and modify the contract in writing accordingly. The contractor will be notified of the engineer's determination whether or not an adjustment of the contract is warranted.
3. No contract adjustment will be allowed unless the contractor has submitted the request for adjustment within the time prescribed.
4. No contract adjustment will be allowed under this clause to the extent that performance would have been suspended or delayed by any other cause, or for which an adjustment is provided or excluded under any other term or condition of this contract.

Replace Section 8-1.07A with:

8-1.07A General

To request a delay-related time or payment adjustment, submit an RFI within 7 calendar days of receipt of the notice to resume work.

The Department will evaluate your request. If the Engineer agrees that the cost and/or time required for the performance of the contract has increased as a result of such suspension and the suspension was caused by conditions beyond the control of and not the fault of you, your suppliers, or subcontractors at any approved tier, and not caused by weather, the Engineer will make an adjustment (excluding profit) and modify the contract in writing accordingly. You will be notified of the Engineer's determination whether or not an adjustment of the contract is warranted.

No contract adjustment will be allowed unless you have submitted the request for adjustment within the time prescribed.

No contract adjustment will be allowed under this clause to the extent that performance would have been suspended or delayed by any other cause, or for which an adjustment is provided or excluded under any other term or condition of this contract.

Replace the 2nd, 3rd and 4th paragraphs in Section 8-1.10A with:

Liquidated damages amounts for this contract are **\$2,000.00** per day, as set forth in the Agreement.

Time is of the essence. Execution of the Agreement by Contractor shall constitute its acknowledgement that County will actually sustain damages in the form of contract administration expenses (such as project management and consultant expenses) in the amount fixed in the contract documents for each and every calendar day during which completion of work required is delayed beyond expiration of time fixed for completion plus extensions of time allowed pursuant to provisions hereof.

Contractor and County agree that because of the nature of the Project, it would be impractical or extremely difficult to fix the amount of such actual damages incurred by County because of a delay in completion of all or any part of the Work. Contractor and County agree that specified measures of liquidated damages shall be presumed to be the amount of such damages actually sustained by County, and that because of the nature of the project, it would be impracticable or extremely difficult to fix the actual damages.

Liquidated damages for delay shall cover administrative, overhead, interest on bonds, and general loss of public use damages suffered by County as a result of delay. Liquidated damages shall not cover the cost of completion of the Work, damages resulting from Defective Work, lost revenues or costs of substitute facilities, or damages suffered by others who then seek to recover their damages from County, and defense costs thereof. County may deduct from any money due or to become due to Contractor subsequent to time for completion of entire work and extensions of time allowed pursuant to provisions hereof, a sum representing then-accrued liquidated damages.

Once liquidated damages begin to accrue, additional contract time will not be granted for any reason other than delays which are solely caused by County. The Contractor shall schedule and conduct all work during the time frame as shown in Section 10-1.03 of these Special Provisions. The contractor may, upon written approval of the Engineer, perform work outside of the work hours stated provided that all mandated site safety and security requirements are met. The working hours for construction activities must be approved by the Engineer. The Contractor will be assessed liquidated damages at a rate of \$500.00 per 30 minute intervals for construction activities performed outside of the approved working hours. Any work within the interval will be assessed the full interval amount. The parties agree that the actual damages created by construction activities outside the approved hours are extremely difficult to ascertain, and that these damages set forth in this section, are agreed upon by the parties as liquidated damages for such activities. The parties expressly agree that Section 8-1.10 shall apply to these damages.

Replace Section 8-1.13 with:

8-1.13 TERMINATION OF CONTRACT FOR CAUSE

Contractor shall be in default of the contract and County may terminate the Contractor's right to proceed under the contract, for cause, in whole or in part, should the Contractor commit a material breach of the contract and not cure such breach within ten calendar days of the date of notice from County to the Contractor demanding such cure; or, if such breach is curable but not curable within such ten day period, within such period of time as is reasonably necessary to accomplish such cure. (In order for Contractor to avail itself of a time period in excess of ten calendar days, the Contractor must provide County within the ten day period with a written plan acceptable to County that demonstrates actual resources, personnel and a schedule to promptly

to cure said breach, and then diligently commence and continue such cure according to the written plan).

In the event of termination by County for cause as provided herein, Contractor shall deliver to County possession of the work in its then condition including, without limitation, all designs, engineering, project records, cost data of all types, plans and specifications and contracts with vendors and subcontractors, all other documentation associated with the project, and all construction supplies and aids dedicated solely to performing the work which, in the normal course of construction, would be consumed or only have salvage value at the end of the construction period. The Contractor shall remain fully liable for the failure of any work completed and materials and equipment provided through the date of such termination to comply with the provisions of the contract documents. The provisions of this Section shall not be interpreted to diminish any right which County may have to claim and recover damages for any breach of the contract documents or otherwise, but rather, the Contractor shall compensate County for all loss, cost, damage, expense, and/or liability suffered by County as a result of such termination and/or failure to comply with the contract documents.

In the event a termination for cause is later determined to have been made wrongfully or without cause, then the termination shall be treated as a termination for convenience under Section 8-1.14, and Contractor shall have no greater rights than it would have had following a termination under that Section. Any Contractor claim arising out of a termination for cause shall be made in accord with Section 5-1.43. No other loss, cost, damage, expense or liability may be claimed, requested or recovered by the Contractor.

Replace the heading of Section 8-1.14 with:

TERMINATION OF CONTRACT FOR CONVENIENCE

Add the following to Section 8-1.14D:

Under no circumstances may Contractor recover legal costs of any nature, nor may Contractor recover costs incurred after the date of the termination.

Replace Section 8-1.15 with:

8-1.15 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

Contractor hereby assigns to County each Subcontract for a portion of the work, provided that:

1. The assignment is effective only after County's termination of Contractor's right to proceed under the contract documents (or portion thereof relating to that Subcontract) as set forth in either Section 8-1.13 or 8-1.14.
2. The assignment is effective only for the Subcontracts which County expressly accepts by notifying the Subcontractor in writing;
3. The assignment is subject to the prior rights, if any, of the Surety, obligated by Construction Performance Bond provided under the contract documents, where the Surety exercises its rights to complete the Contract;
4. After the effectiveness of an assignment, Contractor shall, at its sole cost and expense (except as otherwise provided in contract documents), sign all instruments and take all actions reasonably requested by County to evidence and confirm the effectiveness of the assignment in County; and
5. Nothing in this Section shall modify or limit any of Contractor's obligations to County arising from acts or omissions occurring before the effectiveness of any Subcontract assignment including, without limitation, all defense, indemnity and hold-harmless obligations arising from or related to the assigned Subcontract.

9 PAYMENT

Replace the 10th through 14th paragraphs of Section 9-1.03 with:

County will be responsible for interest and penalties if and only to the extent required by law.

Replace the 1st paragraph of Section 9-1.07A with:

Section 9-1.07 applies to asphalt contained in materials for pavement structure and pavement surface treatments such as HMA, tack coat, asphaltic emulsions, bituminous seals, asphalt binders, and modified asphalt binders placed in the work.

Replace the 8th paragraph of Section 9-1.07A with:

The Department makes payment adjustments due to price index fluctuations for changed quantities under section 9-1.06. All bond cost markups shall be included in the payment adjustment for price index fluctuations and no separate payment will be made therefore.

Add to Section 9-1.07A:

The provisions of this section shall apply only to the following contract items:

ITEM NO.	ITEM
7	HOT MIX ASPHALT (TYPE A)

Replace Section 9-1.08 with:

9-1.08 PROMPT PAYMENT OF FUNDS WITHHELD TO SUBCONTRACTORS

The Agency shall hold retainage from the prime contractor and shall make prompt and regular incremental acceptances of portions, as determined by the Agency of the contract work and pay retainage to the prime contractor based on these acceptances. The prime contractor or subcontractor shall return all monies withheld in retention from all subcontractors within seven (7) days after receiving payment for work satisfactorily completed and accepted including incremental acceptances of portions of the contract work by the Agency. Any delay or postponement of payment may take place only for good cause and with the Agency's prior written approval. Any violation of these provisions shall subject the violating prime contractor or subcontractor to the penalties, sanctions, and other remedies specified in Section 7108.5 of the California Business and Professions Code and Section 10262 of the California Public Contract Code. This requirement shall not be construed to limit or impair any contractual, administrative or judicial remedies otherwise available to the contractor or subcontractor in the event of a dispute involving late payment or nonpayment by the contractor; deficient subcontractor performance and/or noncompliance by a subcontractor. This clause applies to both DBE and non-DBE subcontractors.

Any violation of these provisions of Prompt Progress Payment and Prompt Payment of Withheld Funds to Subcontractors shall subject the violating prime contractor or subcontractor to the penalties, sanctions and other remedies specified therein. These requirements shall not be construed to limit or impair any contractual, administrative, or judicial remedies otherwise available to the prime contractor or subcontractor in the event of a dispute involving late payment or nonpayment by the prime contractor, deficient subcontract performance, or noncompliance by a subcontractor.

Replace Section 9-1.11 with:

9-1.11 RESERVED

Delete item 3 in the first paragraph of Section 9-1.16A

Replace item 5 in the first paragraph of Section 9-1.16A with:

5. Deductions and retentions

Replace the paragraph in Section 9-1.16C with:

No partial payment will be made for any materials on hand which are furnished but not incorporated in the work.

Replace the headings and paragraphs of Section 9-1.16D with:

9-1.16D Mobilization

Section 9-1.16D applies if a bid item for mobilization is shown on the Bid Item List. Unless otherwise specified, County will make partial payments for mobilization as provided in Pub Cont Code § 10264(a).

Payments for mobilization made under section 9-1.16D are in addition to amounts payable for other bid items under the Contract.

The Department pays the item total for mobilization in excess of the maximum allowed under Pub Cont Code § 10264(a)(5) in the 1st payment after Contract acceptance.

Replace the headings and paragraphs in Section 9-1.16E with:

9-1.16E Withholds

County may withhold from any payment (progress or final) for noncompliance, as provided in contract documents and applicable law. Noncompliance includes, without limitation, if in County's judgment work is not proceeding in accordance with Contract, or Contractor is not complying with requirements of Contract. County may withhold to comply with stop notices or to offset liquidated damages accruing or expected. County reserves the right to withhold up to 5% from any progress payment if Contractor has failed to comply with either its schedule update or informational submittal requirements

County returns the noncompliance withhold in the progress payment following complete correction of noncompliance.

Withholds are not retentions under Pub Cont Code § 7107, do not accrue interest under Pub Cont Code § 20104.50, and are independent of deductions.

Replace the paragraph in Section 9-1.16F with:

The County will retain five percent of the amounts otherwise due from each progress payment, or a lesser amount if so provided in contract documents and by law.

Replace Section 9-1.16G with:

9-1.16G Payment Procedures

Satisfactory progress will be determined from State of California Form CEM-2601, "Construction Progress Chart".

The progress estimate prepared by the Engineer, pursuant to Section 9-1.16A, "Progress Payments: General," of the Standard Specifications, shall be submitted to the Contractor for review. Once the Contractor signs estimate, it shall be considered an application for payment for the purposes of this section of these special provisions.

Upon receipt of each application for payment, the County shall act in accordance with both of the following:

1. Each application for payment shall be reviewed by the County as soon as practicable after receipt for the purpose of determining that the application for payment is a proper payment request; and
2. Any application for payment determined not to be a proper payment request suitable for payment shall be returned to the Contractor as soon as practicable, but not later than seven days after receipt. An application for payment returned pursuant to this paragraph shall be accompanied by a document setting forth in writing the reasons why the payment request is not proper.

The number of days available to the County to make a payment without incurring interest shall be reduced by the number of days by which the County exceeds the seven-day return requirement set forth above.

For purposes of this section of these special provisions, a "progress payment" includes all payments due the Contractor, except any portion of the final payment designated in the Standard Specifications or special provisions as retention earnings.

An application for payment shall be considered properly paid by the County if funds are available for payment of the payment request, and payment is not delayed due to an audit inquiry by the financial officer of the County.

Replace Section 9-1.16H with:

9-1.16H Rights Under Public Contract Code Section 22300

In accordance with the provisions of Public Contract Code Section 22300, substitution of securities for any moneys withheld under contract documents to ensure performance is permitted under following conditions:

1. At request and expense of Contractor, securities listed in Government Code Section 16430, bank or savings and loan certificates of deposit, interest bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by Contractor and County which are equivalent to the amount withheld under retention provisions of Contract shall be deposited with Controller or with a state or federally chartered bank in California, as the escrow agent, who shall then pay such moneys to Contractor. Upon satisfactory completion of Contract, securities shall be returned to Contractor.
2. Alternatively, Contractor may request and County shall make payment of retentions earned directly to the escrow agent at the expense of Contractor. At the expense of Contractor, Contractor may direct the investment of the payments into securities and receive the interest earned on the investments upon the same terms provided for securities deposited by Contractor. Upon satisfactory completion of the work of the contract documents, Contractor shall receive from escrow agent all securities, interest, and payments received by the escrow agent from County. Consistent with Public Contract Code Section 7107(d), Contractor shall then pay to each Subcontractor, not later than seven Days after receipt of the payment, the respective amount of interest earned, net of costs attributed to retention withheld from each Subcontractor, on the amount of retention withheld to insure the performance of Contractor.
3. Contractor shall be beneficial owner of securities substituted for moneys withheld and shall receive any interest thereon.

4. Contractor may enter into an escrow agreement, form included in contract documents, as authorized under Public Contract Code Section 22300, specifying amount of securities to be deposited, terms and conditions of conversion to cash in case of default of Contractor, and termination of escrow upon completion of contract documents.
5. Public Contract Code Section 22300, in effect on Bid day, is hereby incorporated in full by this reference and shall supersede anything inconsistent therewith

Replace Section 9-1.16I with:

9-1.16I Prompt Progress Payment

The prime contractor or subcontractor shall pay to any subcontractor, not later than seven days after receipt of each progress payment, unless otherwise agreed to in writing, the respective amounts allowed the contractor on account of the work performed by the subcontractors, to the extent of each subcontractor's interest therein. In the event that there is a good faith dispute over all or any portion of the amount due on a progress payment from the prime contractor or subcontractor to a subcontractor, the prime contractor or subcontractor may withhold no more than 150 percent of the disputed amount. Any violation of this requirement shall constitute a cause for disciplinary action and shall subject the licensee to a penalty, payable to the subcontractor, of 2 percent of the amount due per month for every month that payment is not made.

In any action for the collection of funds wrongfully withheld, the prevailing party shall be entitled to his or her attorney's fees and costs. The sanctions authorized under this requirement shall be separate from, and in addition to, all other remedies, either civil, administrative, or criminal. This clause applies to both DBE and non-DBE subcontractors.

Replace Section 9-1.16J with:

9-1.16J Prompt Payment from The Agency to The Contractors

The Agency shall make any progress payment within 30 days after receipt of an undisputed and properly submitted payment request from a contractor on a construction contract. If the Agency fails to pay promptly, the Agency shall pay interest to the contractor, which accrues at the rate of 10 percent per annum on the principal amount of a money judgment remaining unsatisfied. Upon receipt of a payment request, the Agency shall act in accordance with both of the following:

1. Each payment request shall be reviewed by the Agency as soon as practicable after receipt for the purpose of determining that it is a proper payment request.
2. Any payment request determined not to be a proper payment request suitable for payment shall be returned to the contractor as soon as practicable, but not later than seven (7) days, after receipt. A request returned pursuant to this paragraph shall be accompanied by a document setting forth in writing the reasons why the payment request is not proper.

Add the following to Section 9-1.17D(1):

The Director of the Public Works Department may withhold funds or, because of subsequently discovered facts, nullify the whole or any part of any certificate for payment, to such extent as may be necessary to protect the County from loss, due to causes including but not limited to the following:

1. Defective work not remedied;
2. Claims filed or information reasonably indicating probable filing of claims;
3. Failure of Contractor to make payment due for materials and/or labor;
4. Information causing reasonable doubt that the contract can be completed for any unpaid balance;
5. Damages to another contractor;
6. Liquidated Damages.

When any and all of such causes are removed, certificates shall be issued for amount withheld.

Replace the 4th paragraph of Section 9-1.17D(2)(b)(iii) with:

Failure to submit the audit report with an overhead claim with the claim statement is a waiver of the overhead claim and operates as a bar to submission of a valid claim under the Government Code or litigation of the overhead claim. Neither daily rate may include a markup for profit.

Replace the 3rd, 4th, 5th and 6th paragraphs of Section 9-1.17D(3) with:

The Director of the Public Works Department will make the final determination of any claims which remain in dispute after completion of claim review. A board or person designated by said Director will review such claims and make written recommendation thereon.

After the determination, the Engineer furnishes a final estimate to the Contractor and the Department pays the amount due within 30 days. The final estimate is conclusive as to the amount of work completed and the amount payable excepts as specified in Section 5-1.27, 5-1.47, and 9-1.21.

The Contractor's failure to comply with the claim procedures is a bar to submission of a valid claim under the Government Code or litigation of the claim.

Add the following to Section 9-1.17:

9-1.17E Agreement and Release of Any and All Claims

As a condition to final payment, Contractor shall submit a final statement of accounting to County, showing all adjustments to the contract price and complete and execute Agreement and Release of Claims. If so required, County shall prepare a final Change Order for submittal to Contractor, showing adjustments to the contract price that were not previously made into a Change Order.

Replace Section 9-1.22 with:

9-1.22 RESERVED

DIVISION II GENERAL CONSTRUCTION

10 GENERAL

Add the following to Section 10-1:

Procurement and Contracting Requirements must comply with Appendix A Division 00.

General Requirements must comply with Appendix A Division 01.

Concrete must comply with Appendix A Division 03.

Masonry must comply with Appendix A Division 04.

Metals must comply with Appendix A Division 05.

Wood, Plastics, and Composites must comply with Appendix A Division 06.

Thermal and Moisture Protection must comply with Appendix A Division 07.

Openings must comply with Appendix A Division 08.

Finishes must comply with Appendix A Division 09.

Specialties must comply with Appendix A Division 10.

Equipment must comply with Appendix A Division 11.

Furnishings must comply with Appendix A Division 12.

Fire Suppression must comply with Appendix A Division 21.

Plumbing must comply with Appendix A Division 22.

Heating, Ventilating, and Air Conditioning (HVAC) must comply with Appendix A Division 23.

Electrical must comply with Appendix A Division 26.

Earthwork must comply with Appendix A Division 31.

Exterior Improvements must comply with Appendix A Division 32.

Replace Section 10-1.03 with:

10-1.03 TIME CONSTRAINTS

Construction activity is only allowed between the working hours of 7:00 a.m. and 5:00 p.m. on working days using the Caltrans 5-Day working day calendar. Alternative working hours may be approved by the Engineer. Requests for alternative working hours must be received 30 days prior to the work beginning.

The day that the County observes for Christmas Eve through the day the County observes for New Years Day shall not be counted as working days and no work shall be performed on those days unless approved by the Engineer. If the Contractor is approved to work on any of these days, then the days worked shall be counted as working days.

Add the following to Section 10-5:

Areas of work with the potential to generate dust must be dampened in advance of the work and must be kept damp during the progress of the work.

Pursuant to section 6.4 of Air District rule 8021, you must submit a written construction notification to the air district at least 48 hours prior to your earthmoving activities. You must provide the Engineer a copy of the submitted written notification.

Pursuant to section 6.3 of Air District rule 8021, you must submit a Dust Control Plan to the Air District. You must provide the Engineer a copy of the approved Dust Control Plan. Dust Control Plan must be approved by the Air District prior to your construction activities. A copy of the approved Dust Control Plan must be retained at the project site and made available upon request by a District inspector.

The air district for the project is:

San Joaquin Valley Air Pollution Control District
34946 Flyover Ct
Bakersfield, CA 93308
661-392-5500
South@valleyair.org

All fees associated with obtaining the air district's approval is included in the payment for various contract items of work.

Replace the 8th paragraph in Section 10-6 with:

Keep at least 1 mobile unit with a capacity of at least 1,000 gal on the job site at all times for applying water. It must have the ability to apply water by both spray and hose.

Replace Section 10-7 with:

10-7 SUBMITTAL REQUIREMENTS

10-7.01 GENERAL

All project submittals shall be made promptly and in such a sequence as to cause no delay in the work. Schedule submission a minimum of 30 calendar days before reviewed submittals will be needed. Submittals may be submitted within 13 calendar days of the date of contract authorization.

Submittals shall contain the following information:

1. The project title, number, contract number and bid item number. This information shall be placed in the top right corner of every page or sheet of the submittal.
2. The date of submission and the dates of any previous submissions.
3. The names of the contractor, supplier and manufacturer.
4. Identification of the product, with the corresponding Special Provision and/or the Standard specification.
5. Field dimensions, clearly identified as such.
6. Relationship to adjacent or critical features of the work or materials.
7. Identification of deviations from contract documents.
8. Identification of revisions on resubmittals.
9. Contractor's stamp, initialed or signed, shall certify Contractor's review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal that the product meets the requirements of the work and of the contract documents.

10-7.02 SUBMITTAL FORMAT

Each submittal shall have a transmittal form and every page in a submittal shall be numbered in sequence (page ___ of ___ pages). Each copy of a submittal shall be collated and stapled or bound, as appropriate. Copies not collated will be rejected.

Where product data from a manufacturer is submitted, clearly mark which model is proposed with all pertinent data, capacities, dimensions, clearances, diagrams, controls, connections, anchorage, and supports. Present a sufficient level of detail for assessment of compliance with the contract documents.

Resubmittal of submittals shall be reviewed within 5 working days of the resubmittal. No additional working days will be allotted for incomplete or rejected submittals.

Submittals that do not meet the requirements of this section will be returned without review.

10-7.03 PAYMENT

The payment for conforming to this section is included in the various contract items of work.

Replace Section 10-8 with:

10-8 PRE-BID WALK THROUGH

10-8.01 GENERAL

You are invited to attend a pre-bid meeting and job walk through on Wednesday, June 24, 2026, at 10:00 a.m. at 6741 Downing Avenue, Bakersfield, CA 93308 in Kern County, California. At the pre-bid walk through, you must inspect the site. You are encouraged to ask questions and investigate to your satisfaction that you understand the task to be performed. The County's acceptance of your bid confirms your understanding of the work to be completed at the bid prices and you must hold the County harmless of financial damages.

10-8.02 PAYMENT

The payment for confirming to this section is included in the various contract items of work.

12 TEMPORARY TRAFFIC CONTROL

Add the following to Section 12-1.01:

Submit a temporary traffic control plan to the Engineer for approval. The plan must detail all measures that will be implemented to maintain traffic, control access through the construction site, and maintain access to adjacent properties during construction.

Traffic control plan must detail the traffic handling equipment and devices to be used and their location. The plan must describe the lane closures, pedestrian detours, and temporary pavement delineation necessary to complete the work as shown on the plans.

Replace Section 12-1.04 with:

12-1.04 PAYMENT

You are responsible for the cost of furnishing all flaggers, including transportation flaggers and furnishing stands and towers for flaggers to provide for the passage of traffic through the work as specified in Section 7-1.03 and 7-1.04.

Payment for implementing the requirements in Section 12 is included in the Temporary Traffic Control bid item, unless otherwise stated in these Special Provisions.

Replace the 3rd paragraph of Section 12-3.01C with:

Furnishing, installing, maintaining, moving and removing traffic control equipment and devices and performing lanes closures, if lane closures are allowed, is your responsibility. Traffic control ordered by the Engineer is only change order work if the character of the work changes. Providing for public safety and convenience under Section 7 is not change order work.

Replace the last paragraph of Section 12-3.10C with:

Moving barricades which are part of your temporary traffic control system is not change order work.

Add the following to Section 12-3.11B(2):

Sign substrates for stationary mounted construction area signs may be fabricated from fiberglass reinforced plastic as specified on Caltrans' Authorized Material List.

Delete the last paragraph of Section 12-3.11C(2)

Replace the last paragraph of Section 12-3.20C(1) with:

Moving of a temporary barrier system is not change order work.

Replace Section 12-3.20D with:

12-3.20D Payment

The payment quantity for the types of temporary barrier system is the length measured along the top of the barrier segments. If there is no bid item for the types of temporary barrier system, then the payment is included in the Temporary Traffic Control bid item.

Add the following to Section 12-3.32C:

Start displaying the message on the portable changeable message sign two working days before starting the work.

For one way reversing lane closures, place one (1) portable changeable message sign for each direction of travel. The exact locations will be designated by the Engineer.

Add the following to Section 12-4.01A:

Road closures are prohibited unless authorized by County Traffic Engineer. Lane closures must be as shown in the current California Manual on Uniform Traffic Control Devices.

You may move parked vehicles only in accordance with Section 22654©(d) of the State of California Vehicle Code. You must furnish, place and maintain signs required by said section of the Vehicle Code.

Add the following to Section 12-4.02A(2):

Special days are: Martin Luther King Jr. Day, Cesar Chavez Day, the Friday after Thanksgiving, and Easter Sunday weekend including the Friday prior.

Delete the 3rd and 4th paragraph of Section 12-4.02A(3)(a)

Replace Section 12-4.02A(3)(b) with:

12-4.02A(3)(b) Closure Schedules

Every Monday by noon, submit a closure schedule request for planned closures for the next week.

Submit closure schedule changes, including additional closures, by noon at least 3 business days before a planned closure.

The full width of the traveled way must be open to traffic when there are no active construction activities in the traveled way or within 6 feet of the traveled way and on:

1. Fridays after 3:00 p.m.
2. Saturdays
3. Sundays
4. Designated holidays
5. Special days

For a one-way reversing traffic-control lane closure, traffic may be stopped in 1 direction for periods not to exceed 15 minutes. After each stoppage, all accumulated traffic for that direction must pass through the work zone before another stoppage is made.

Add the following to Section 12-4.02C(1):

The maximum length of a single stationary one-way reversing traffic-control lane closure is 2 miles between flaggers.

Personal vehicles of your employees must not be parked within the right-of-way except in the areas designated by the Engineer.

If work vehicles or equipment are parked within 6 feet of a traffic lane, close the shoulder area with fluorescent orange traffic cones or portable delineators. Place the cones or delineators on a taper in advance of the parked vehicles or equipment and along the edge of the traveled way at 25-foot intervals to a point not less than 25 feet past the last vehicle or piece of equipment. Use at least 9 cones or delineators for the taper. Use a W20-1, "Road Work Ahead," W21-5b, "Right/Left Shoulder Closed Ahead," or C24(CA), "Shoulder Work Ahead," sign mounted on a crashworthy, portable sign support with flags. The sign must be 48 by 48 inches and placed as ordered by the

Engineer. If a cone or delineator is displaced or overturned, immediately restore the device to its original position or location.

Replace Section 12-4.02C(2) with:

RESERVED

Replace Section 12-4.02C(14) with:

12-4.02C(14) Shoulder Work

Furnish and place portable delineators and required shoulder signs off of and adjacent to the existing pavement and/or the new pavement surface, which is opened to public traffic, under any of the following conditions:

1. The LOW SHOULDER (W8-9) sign must be used where the edge of the new pavement surface is adjacent to existing unpaved shoulders.
2. The LOW SHOULDER (W8-9) sign must be used where either the new pavement surface or excavation adjacent to the existing pavement surface produces a drop-off of between 0.15 ft and 0.25 ft within 8 feet of the traveled way.
3. Any construction situation that produces a drop-off of greater than 0.25 ft within 8 feet of the travelled way is considered to be an open trench and; the OPEN TRENCH (C27(CA)) sign must be set 500 feet prior to the situation and; the NO SHOULDER (CA31A(CA)) sign must be set at the beginning of the situation and; thereafter, alternate the two signs at the interval listed below.

A portable delineator and the above required shoulder sign must be placed at the beginning of the drop-off in the direction of travel on the adjacent lane. Place successive signs a maximum of 2,000 feet apart, and place portable delineators a maximum of 100 feet apart along the drop-off. Maintain the portable delineators and required signs in place at each location until the drop-off is eliminated.

Required signs may be set on temporary portable supports or on barricades.

At the end of each workday, any construction situation that produces a drop-off greater than 0.05 feet within 8 feet of the travelled way must be backfilled with like material to 4:1 slope.

All open trenches within 8 feet of the travelled way must not exceed 10 days exposed to public.

All existing sidewalks or pathways must be maintained through the duration of construction in such a way as to allow the pedestrian access that meets ADA standards. You must backfill the excavated sidewalk sections with dirt and have it temporarily surfaced with cold mix asphalt concrete as soon as they are done with that section of sidewalk. By the end of the workday, pedestrian must have full access to the sidewalk area. Plywood and/or steel plates will be allowed at the Engineer's discretion.

Replace Section 12-4.02D with:

12-4.02D Payment

Traffic control system requirements are not change order work. All payment for work is included in the Temporary Traffic Control bid item.

Replace the 1st paragraph of Section 12-4.03C(2) with:

Install temporary barrier system on both sides of vehicular openings through falsework. If ordered, install temporary barrier system at other falsework less than 12 feet from the edge of a traffic lane.

Replace Section 12-4.03D with:

12-4.03D Payment

Payment for work performed according to Section 12-4.03 is included in the Temporary Traffic Control bid item.

Replace Section 12-5 with:

12-5 TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE

12-5.01 GENERAL

Section 12-5 includes specifications for closing traffic lanes with stationary and moving lane closures on 2-lane, 2-way highways. The traffic control system for a lane closure must comply with the details shown.

Traffic control system includes signs.

12-5.02 MATERIALS

Vehicles equipped with attenuators must comply with Section 12-3.23.

12-5.03 CONSTRUCTION

12-5.03A General

During traffic striping and pavement marker placement using bituminous adhesive, control traffic with a stationary or a moving lane closure. During other activities, control traffic with stationary lane closures.

Whenever components of the traffic control system are displaced or cease to operate or function as specified from any cause, immediately repair the components to the original condition or replace the components and restore the components to the original location.

12-5.03B Stationary Lane Closures

For a stationary lane closure made only for the work period, remove components of the traffic control system from the traveled way or shoulder, except for portable delineators placed along open trenches or excavation adjacent to the traveled way at the end of each work period. You may store the components at selected central locations designated by the Engineer with the limits of the highway.

You may use a pilot car to control traffic. If a pilot car is used for traffic control, the cones shown along the centerline need not be placed. The pilot car must have radio contact with personnel in the work area. Operate the pilot car through the traffic control zone at a speed not greater than 25 miles per hour.

12-5.03C Moving Lane Closures

A changeable message sign used in a moving lane closure must comply with section 12-3.32 except the sign must be truck-mounted. The full operation height to the bottom of the sign may be less than 7 feet above the ground but must be as high as practicable.

A flashing arrow sign used in a moving lane closure must be truck-mounted. Operate the flashing arrow sign in the caution display mode whenever it is being used on a 2-lane, 2-way highway.

12-5.04 Payment

All traffic control system components for lane closure is paid for under the Temporary Traffic Control bid item.

Replace the 1st paragraph of Section 12-6.01 with:

Section 12-6 includes specifications for placing, applying, maintaining and removing temporary pavement delineation except for delineation on a seal coat project. Nothing in these special provisions should be interpreted as to reduce the minimum standards specified in the current California MUTCD, or as relieving you from your responsibility as provided in Section 7-1.04, "Public Safety," of the Standard Specifications.

Replace the 1st paragraph of Section 12.6.03B with:

If lane lines or centerlines are obliterated and temporary pavement delineation to replace the lines is not shown, the minimum lane line and centerline delineation must consist of temporary pavement markers placed longitudinally at 12-foot maximum intervals on curves and 24-foot maximum intervals on tangents.

Replace Section 12-6.04 with:

12-6.04 PAYMENT

The Department does not pay for additional temporary pavement delineation used to replace temporary pavement markers.

All temporary pavement delineation is paid for under the Temporary Traffic Control bid item.

13 WATER POLLUTION CONTROL

Replace the 3rd and 4th paragraph of Section 13-1.01A with:

You may view these manuals at the Stormwater and Water Pollution Control Information link at the following website: <http://www.dot.ca.gov/construction/>

A WPCP and a SWPPP must comply with the Department's Stormwater Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual and must be prepared using the latest template posted on the following website:
<http://www.dot.ca.gov/construction/>

Replace the 1st paragraph of Section 13-1.01D(2) with:

Comply with the National Pollutant Discharge Elimination System (NPDES) Permit for General Construction Activities No. CAS000002, Order No. 2022-0057-DWQ, issued by the State Water Resources Control Board.

In addition to the above noted permit if the project is within the Bakersfield Urbanized Area, as defined by the Census 2010 Urban Area Map, then comply with the NPDES Permit for the County of Kern No. CA008339, Order No. R5-2013-0153 issued by the Central Valley Water Quality Control Board.

Add the following to Section 13-1.01D(4)(b):

Submit a statement of qualifications for the assigned WPC manager, including

1. Description of previous training
2. Previous work history
3. Individual expertise

Assign a different WPC manager if the County deems the qualifications of the original assigned WPC manager inadequate.

Replace the 4th paragraph of Section 13-1.03A with:

You may request or the Engineer may order changes to the WPC work. Changes may include additional or new WPC practices.

Replace the 1st paragraph of Section 13-1.03C with:

Use Caltrans form CEM-2030, "Stormwater Site Inspection Report" for documenting inspections.

Add the following to Section 13-1.04:

Payment for all water pollution control facilities, devices and measures required to implement the WPCP or SWPPP, whichever applies to the project, is included in lump sum price for Prepare Water Pollution Control Program or Prepare Stormwater Pollution Prevention Plan, whichever applies to the project.

Replace the 3rd paragraph of Section 13-2.01A with:

RESERVED

Replace Section 13-2.04 with:

RESERVED

Replace the 2nd paragraph of Section 13-3.01A with:

Stormwater pollution prevention plan includes developing and implementing the plan, providing a WPC manager, conducting WPC training, and monitoring, inspecting, and correcting WPC practices. It also includes uploading the stormwater pollution prevention plan to the State Water Board website at <https://smarts.waterboards.ca.gov> (SMARTS), submitting the Construction Stormwater General Permit on SMARTS, uploading Stormwater Site Inspection Reports to SMARTS, filling out and submitting a Change of Information (COI) on SMARTS if necessary, and filling out the required tabs and information on SMARTS to terminate the permit after completion of the project.

Add the following to Section 13-3.01A:

The environmental risk level for this project has been determined to be risk level 1. The submittal requirements for the determined environmental risk level are specified in Section 13.3.01C(1).

The County has started the Construction Stormwater General Permit application on the SMARTS website. Let the Engineer know the SMARTS User ID that will need to be linked to the application. The "Owner Info," "Developer Info," "Site Info," "Risk," and "Billing Info" tabs have all been completed. Verify all information on the SMARTS website is correct and matches the SWPPP you are required to provide per Section 13-3.01C(2)(a). Any additional tabs on the application which are required for submittal to the Water Board, must be done by you.

If any changes are made during construction which differ from the approved permit, you must fill out the necessary tabs and information required to submit for a COI. Submit the COI for certification within 5 days of any changes made during construction which differ from the approved permit. If the COI is required due to the completion date needing to be extended, submit the COI 5 days before the current completion date of the permit.

After construction of the project is complete, fill out all the necessary tabs and information required to submit for a Notice of Termination (NOT). Submit the NOT for certification within 15 days of project completion. If the RWQCB rejects the NOT, make all necessary changes and resubmit the NOT for certification. Resubmit the NOT for certification as many times as required by the RWQCB until the NOT is approved.

Replace the 4th, 5th, and 6th paragraphs of Section 13-3.01C(2)(a) with:

If revisions are required, the Engineer notifies you of the date when the review stopped and provides comments. Submit a revised SWPPP within 5 working days of receiving the comments. The Department's review resumes when a complete SWPPP has been resubmitted.

Submit an electronic copy of the authorized SWPPP to the Engineer.

Upload the authorized SWPPP to SMARTS and submit for certification. If the RWQCB rejects the application, make all necessary corrections, upload the new SWPPP, and resubmit for certification within 5 days.

Add the following to Section 13-3.01C(2)(b)(ii):

In addition to providing the Engineer the Stormwater Site Inspection Report, you must submit the site inspection reports to the Stormwater Multiple Application and Report Tracking System (SMARTS) website weekly. You must notify the Engineer 24 hours after you have submitted the site inspection reports to SMARTS.

Replace the 1st paragraph of Section 13-3.01D(2) with:

Comply with the National Pollutant Discharge Elimination System (NPDES) Permit for General Construction Activities No. CAS000002, Order No. 2022-0057-DWQ, issued by the State Water Resources Control Board.

Replace Section 13-3.04 with:

13-3.04 PAYMENT

Payment for the SWPPP is included in the lump sum price for Prepare Stormwater Pollution Prevention Plan.

Replace Section 13-5.04 with:

Not Used.

Replace Section 13-6.04 with:

Not Used.

Replace Section 13-7.03D with:

Not Used.

14 ENVIRONMENTAL STEWARDSHIP

Add to the end of 14-6.01:

It is anticipated that biological resources which may be listed species under the California and Federal Endangered Species Acts may be present within or near the project limits. Protective measures are included within the project to avoid "take," as defined by those laws. These measures may affect all work operations accordingly.

You must be fully informed of rules, regulations, conditions, and guidance as described in these special provisions and applicable sections of the California Endangered Species Act, the Federal Endangered Species Act (16 U.S.C. 1531-1543), and the Migratory Bird Treaty Act (16 U.S.C. 703-712).

Replace section 14-6.03A with:

The Contractor shall be fully informed of rules, regulations, provisions, and guidance as described in these special provisions and the applicable sections of the California Endangered Species Act (California Fish and Game Code 2050-2115.5) and Federal Endangered Species Act (16 U.S.C. 1531-1543). Specific measures for San Joaquin kit fox (*Vulpes macrotis mutica*), Burrowing owl (*Athene cunicularia*), and migratory birds are listed below.

Protect regulated species and their habitat that occur within or near the job site. This project is within or near habitat for the regulated species shown in the following table:

Regulated Species

San Joaquin kit fox (<i>Vulpes macrotis mutica</i>)
Burrowing owl (<i>Athene cunicularia</i>)

Protective Radius

Upon discovery of a regulated species, immediately:

1. Stop all work within a 100 -foot radius of the discovery, except as shown in the following table:

Regulated species	Protective radius (feet)
San Joaquin kit fox	150 ft.
Burrowing owl	250 ft.

2. Notify the Engineer

Species protection areas within the project limits are as specified in the following table:

Species Protection Areas

Identification	Location
Species Protection Area 1	Entire project limits

3. No work within the protective radius may resume until the contractor has received written notice from the Engineer.

Within Species Protection Area 1, implement the following protection measures:

1. Worker Training: Workers must receive a 1-hour maximum biological resource information training or equivalent that is provided by the County before performing onsite work. Workers include laborers, tradesmen, material suppliers, equipment maintenance personnel, supervisors, foremen, office personnel, food vendors, and other personnel who stay on the project longer than 30 minutes. Upon completion of the training, workers must sign a form stating that they received the training and understand the required protection measures.

Upon request by the Contractor, the County will provide up to three worker environmental awareness training sessions. All request for training, including cancellations, must be made in writing to the Engineer no fewer than 5 working days prior. Requests made less than 5 working days in advance are subject to biologist availability. The County will not be liable for delays, costs of cancellations, or other additional costs resulting from requests made less than 5 working days prior to the date the training is required.

The County may provide additional trainings to the Contractor. The Contractor is liable for any costs associated with the additional trainings.

2. Site Access: All construction-related access must be kept within project limits and to existing roadway and associated paved or graded shoulders or other designated areas clearly marked on the ground.
3. Speed Limit: Project-related traffic shall observe a 20 mile per hour speed limit except on roads or highways open for public use.
4. Species Discovery: If a dead, injured or entrapped regulated species is found in Kern County right-of-way, the Contractor shall immediately notify the Engineer. All construction activity within the protective radius of the regulated species shall be halted and may not resume until the Engineer provides written authorization. Any entrapped regulated species shall be permitted to escape. No injured or dead regulated species or other regulated species may be handled or otherwise disturbed.
5. Species Den: If a den of a regulated species is discovered in Kern County right-of-way, all construction activity within the protective radius of the den shall be halted and the Engineer shall be notified immediately. Work may not continue until the Engineer provides written authorization.
6. Trash Abatement: A trash abatement program must be initiated during the pre-construction phases of the project and must continue through the duration of the project. Trash and food items must be contained in closed (raven-proof) containers and removed daily. Upon project completion, construction refuse must be removed from the site and disposed of properly. All contractors are prohibited from feeding wildlife.
7. Fill Materials: Imported materials must be obtained from a source that is known to be free of invasive plant species, or the material must consist of purchased clean material. All erosion control materials, including straw bales, straw wattles, or mulch used onsite must be free of invasive species seed.
8. Material Inspections: The Contractor shall inspect all pipes and culverts with a diameter greater than or equal to 3 inches before burying, capping, or other use. If a regulated species is discovered during this inspection, the pipe or culvert shall not be disturbed until after the regulated species has escaped.
9. Excavation Inspections: At the end of each workday, excavations shall be inspected, the Contractor shall then take measures to prevent the entrapment of regulated species in all excavated, steep-walled holes or trenches more than or equal to 2 feet deep. Such measures shall include covering excavations or providing dirt or plank escape ramps every 200 feet.
10. Equipment Inspections: The Contractor shall inspect under vehicles and equipment before the vehicles and equipment are moved. If a regulated species is present, the worker shall wait for it to move unimpeded to a safe location.
11. Equipment Maintenance: Prior to staging, equipment must be cleaned of mud and/or debris that may contain invasive plants or seeds. All equipment and vehicles shall be checked and maintained daily to prevent leaks.
12. Staging and Storage: Any staging and/or storage locations within the Project area must be approved by the County. The Contractor shall request approval of these locations in writing no less than 5 days prior to their anticipated use.
13. Night Work: No Construction may occur during hours of "Darkness" (Night Work), as defined in the California Vehicle Code, Section 280. However, Night Work may be requested by the contractor, in writing, no less than 30 calendar days prior to the start of work. The County

will not be liable for delays or costs associated with additional environmental review, approvals, and avoidance measures necessary to allow for night work.

Monitor for regulated species according to the schedule shown in the following table:

Monitoring type	Schedule
Excavation Inspections	Daily
Material Inspections	Daily
Vehicle/Equipment Inspections	Daily

Full compensation for conforming to the provisions in this section shall be considered as included in the contract prices paid for the various contract items of work, and no additional compensation will be allowed.

Replace the 2nd paragraph of section 14-6.03B with:

The Department anticipates nesting or attempted nesting by migratory and nongame birds from February 1 to September 30.

Delete the 9th paragraph of section 14-6.03B

15 EXISTING FACILITIES

Add the following to Section 15-1.01:

The contractor is responsible for contacting the Kern County Building Department for all forms, inspections, and requirements to satisfy the permits. The contractor is responsible for any additional fees required to comply with the permits, and those costs are included in the bid price for Construct Warehouse Building and Installing Plumbing, and Construct Parking Garage.

Replace paragraph in Section 15-1.02 with:

Materials for adjusting facilities to grade must be similar in character to the existing materials or as shown on the Plans. You must use the materials for adjusting facilities to grade as shown on the plans if the material shown is different from existing materials.

Replace the 7th paragraph of Section 15-1.03A with:

All loop detectors shown or not shown on the plans must remain in place and operational until their non-usage and removal has been coordinated with the engineer. If you damage a part of a loop conductor and any associated components specified to remain in place, including the part leading to the adjacent pull box, replace the entire loop detector and any adjacent loops damaged during the replacement.

Replace the 1st paragraph of section 15-1.03B with:

Where concrete is described to be removed, remove the concrete to the grades and dimensions shown on the plans. Where no grades or dimensions are shown on the plans, remove concrete completely. Where new concrete is shown to be constructed on the plans, all existing concrete in conflict with the new concrete work must be removed completely.

Replace the 7th paragraph of section 15-1.03B with:

You are responsible for disposing of removed concrete at your costs. Removed concrete may not be incorporated into the project unless specifically detailed in the construction plans.

DIVISION III EARTHWORK AND LANDSCAPE

17 GENERAL

Replace the 4th paragraph in Section 17-2.03A with:

Clear and grub the area of vegetative, deleterious matter, and objectionable matter within the excavation and embankment slope lines.

Clear and grub the area of vegetative, deleterious matter, and objectionable matter within the cracks (all sizes) of the existing surface pavement prior to the application of crack seal and slurry seal.

Add to the 2nd paragraph in Section 17-2.03B with:

Trees must be trimmed by a certified arborist and as directed by the Engineer.

Clearing and grubbing includes the removal of any tree and stump that is in conflict with the improvements as shown on plans or as directed by the Engineer.

Clearing and grubbing includes removal of trash, broken concrete, asphalt concrete chunks, and any abandoned material as determined by the Engineer. The payment for removing and disposing trash, broken concrete, asphalt concrete chunks, and any abandoned material as determined by the Engineer is included in Clearing and Grubbing bid item.

Replace the 1st paragraph in Section 17-2.03D with:

Dispose of objectionable materials resulting from clearing and grubbing activities offsite. Do not incorporate objectionable material in or under the work.

19 EARTHWORK

19-1 GENERAL

Add the following to Section 19-1.01A:

Earthwork must comply with Appendix A Division 31.

Replace Section 19-1.04 with:

The payment for conforming to this section shall be considered as included in the prices paid for various items of work and no separate payment shall be considered for increase or decreases nor separate payment be made therefor.

20 LANDSCAPE

Add the following to Section 20-10.01C:

Work required for this project will affect existing landscaping within and adjacent to the project boundaries. Landscaping shall consist of regrading existing landscape areas, replacing lawns and plants and reconstructing existing sprinkler systems disturbed by new construction.

Existing plants disturbed must be replaced and relocated as directed by the Engineer. Mulch or a commercial plant mix must be mixed into the soil for replanting purposes.

All trees which are to remain must be protected from damage during construction and nominally trimmed for construction and "sight line" clearance as directed by the Engineer.

All existing sprinklers disturbed or interfering with the contract work, whether shown on the plans or not, shall be relocated, replaced, or extended as required to provide equal irrigation coverage for the existing landscape areas remaining.

Any grassy areas disturbed during construction must be replaced with new grass sod consistent with the existing grass type. Prior to placing sod, the existing ground must be re-graded uniformly, tilled to a depth of six inches, the top 2 inches of the finished grade must be raked clean of all debris and objectionable material, and a commercial fertilizer (16-6-8) must be applied at the rate of (20) twenty pounds per 1,000 square feet.

Replace Section 20-10.01D with:

20-10.01D Payment

Payment for performing work on existing planting and irrigation facilities is included in the payment for Landscaping.

Replace Section 22 with:

22 FINISHING PROJECT

Replace 10th paragraph in Section 22-1.03 with:

Dispose of material resulting from finishing activities. You must remove, from all affected areas, whether inside or outside the project limits, all excess and/or objectionable material originating within the project limits and transported by public traffic or by your operations. You may use any method, approved by the Engineer that does not create a dust problem, to remove the excess and/or objectionable material from the affected areas. However, in residential areas, when a broom is used, a self-contained, pick-up type, power broom with water distribution system must be used.

Replace paragraph in Section 22-1.04 with:

Payment for work performed according to Section 22 is included in lump sum price for Finishing Project.

DIVISION IV SUBBASES AND BASES

26 AGGREGATE BASES

Replace Section 26-1.04 with:

26-1.04 PAYMENT

Quantities of Class 2 Aggregate Base to be paid for by the cubic yard will be calculated on the basis of the dimensions shown on the plans and shall only be adjusted by any amount change ordered by the Engineer. No allowance will be made for Class 2 Aggregate Base placed outside the dimensions shown on the plans unless ordered by the Engineer.

DIVISION V SURFACING AND PAVEMENTS

39 ASPHALT CONCRETE

Replace Section 39-2 with:

39-2 HOT MIX ASPHALT

39-2.01 GENERAL

39-2.01A Summary

Section 39-2.01 includes general specifications for producing and placing HMA by mixing aggregate and asphalt binder at a mixing plant and spreading and compacting the HMA mixture.

39-2.01B Definitions

binder replacement: Amount of RAP binder in OBC in percent.

coarse aggregate: Aggregate retained on a no. 4 sieve.

fine aggregate: Aggregate passing the no. 4 sieve.

leveling course: Thin layer of HMA used to correct minor variations in the longitudinal and transverse profile of the pavement before placement of other pavement layers.

processed RAP: RAP that has been fractionated.

substitution rate: Amount of RAP aggregate substituted for virgin aggregate in percent.

supplemental fine aggregate: Aggregate passing the no. 30 sieve, including hydrated lime, portland cement, and fines from dust collectors.

surface course: Upper 0.2 feet of HMA.

39-2.01C Hot Mix Asphalt Mix Design Requirements

39-2.01C(1) General

Except for the HMA to be used in miscellaneous areas and dikes, submit in writing to the Engineer the combined aggregate gradations for each mix you propose to incorporate into the project. Aggregate gradation TVs must be within the TV limits specified in section 39-2.02D.

The Kern County Materials Laboratory will sample the aggregate from the plant in accordance with California Test 125 a minimum of 14 days before paving operations are to begin. The samples must have been processed in a manner representative of that for the material to be used in the work.

The Engineer will determine the OBC and mixture qualities in accordance with California Test 367 using samples of the aggregate obtained from the stockpiles you or your HMA supplier provides. The results become the project authorized JMF.

A new OBC must be determined, resulting in a new authorized JMF, if you change any of the following:

1. Asphalt binder supplier
2. Combined aggregate gradation
3. Aggregate sources
4. Liquid antistrip producer or dosage
5. Any material in the JMF

You will be responsible for the costs of developing 2 or more JMFs per aggregate size for the project.

Provide aggregate samples, as requested by the Engineer, for each JMF.

39-2.01C(2) Hot Mix Asphalt Mix Design

The mix design, composed of the aggregate proposed for use and the OBC as determined by California Test 367, must produce HMA with the values for the quality characteristics shown in the following table:

HMA Mix Design Requirements		
Quality characteristic	Test method	HMA type A
Air void content (%)	California Test 367	4.0±1.0
Voids in mineral aggregate (% min.) No. 4 grading 3/8" grading 1/2" grading 3/4" grading	California Test 367	17.0 15.0 14.0 13.0
Voids filled with asphalt (%) No. 4 grading 3/8" grading 1/2" grading 3/4" grading	California Test 367	76.0–80.0 73.0–76.0 65.0–75.0 65.0–75.0
Dust proportion No. 4 and 3/8" gradings 1/2" and 3/4" gradings	California Test 367	0.9–2.0 0.6–1.3
Stabilometer value (min.) ^a No. 4 and 3/8" gradings 1/2" and 3/4" gradings	California Test 366	30 37

^a California Test 304, Part 2.13.

39-2.01D Contractor Quality Control

39-2.01D(1) General

Establish, maintain, and change a quality control system to ensure materials and work comply with the specifications. Submit quality control test results within 3 days of a request.

You must identify the HMA sampling location at the prepaving conference. During production, take samples under California Test 125, except if you request and if authorized by the Engineer, sample HMA from any of the following locations:

1. Plant
2. Windrow
3. Mat behind the paver

39-2.01D(2) Prepaving Conference

Hold a prepaving conference with the Engineer at a mutually agreed time and place. Discuss methods of performing the production and paving work.

39-2.01D(3) Aggregate

Determine the aggregate moisture content in continuous or batch mixing plants at least twice a day during production and adjust the plant controller.

39-2.01E Acceptance Criteria

HMA acceptance is specified in the sections for HMA construction process.

The Department samples materials for testing under California Test 125 and the applicable test method. Samples may be taken from the mat behind the paver, windrow, or plant. Sampling must be independent of Contractor quality control, statistically based, and random. The material sampled

and tested by the Department will be the sole consideration for acceptance. The material sampled will be the property of the County.

The Department will reserve 50 percent of its sample for dispute resolution testing. The County's asphalt binder content test results can only be disputed if the Contractors quality control tests were taken from the same location (mat behind the paver, windrow, or plant) as the acceptance test, in the areas represented by the disputed test.

HMA acceptance is based on:

1. JMF compliance
2. Compliance with the HMA acceptance tables
3. Engineer's Visual inspection

39-2.01F Dispute Resolution

Work with the Engineer to avoid potential conflicts and to resolve disputes regarding test result discrepancies. Notify the Engineer within 3 days of receiving a test result if you dispute the test result.

If you dispute the Engineer's test results, submit quality control test results and copies of paperwork including worksheets used to determine the disputed test results, along with all laboratory certifications including personnel and equipment certifications. Use of an independent third party to perform dispute resolution testing using the Department's reserved samples from the disputed area is not allowed.

Personnel from Kern County Material Lab will perform the dispute resolution testing in your presence using the Department's reserved samples from the disputed area. The Material Lab will test the hot mix asphalt samples using test methods as described in Section 39-2.11B(1). If the dispute resolution testing is determined out of compliance, you must remove all material placed which is represented by the test. Deductions in accordance with Section 39-2.11B(1) may be allowed by the Engineer.

Dispute resolution does not apply to the test performed in Section 39-2.01C.

The Department will reserve 50 percent of its sample for dispute resolution testing. The County's asphalt binder content test results can only be disputed if the Contractors quality control tests were taken from the same location (mat behind the paver, windrow, or plant) as the acceptance test, in the areas represented by the disputed test.

39-2.02 MATERIALS

39-2.02A Geosynthetic Pavement Interlayer

Geosynthetic pavement interlayer must comply with the specifications for paving mat in Section 96.

Submit the proposed material to the Engineer for approval within 5 days of contract award.

39-2.02B Tack Coat

Tack coat must comply with the specifications for asphaltic emulsion or asphalts. Choose the type and grade.

Notify the Engineer if you dilute asphaltic emulsion with water. The weight ratio of added water to asphaltic emulsion must not exceed 1 to 1.

Measure added water either by weight or volume in compliance with section 9-1.02 or you may use water meters from water districts, cities, or counties. If you measure water by volume, apply a conversion factor to determine the correct weight.

With each dilution, submit:

1. Weight ratio of water to bituminous material in the original asphaltic emulsion
2. Weight of asphaltic emulsion before diluting
3. Weight of added water
4. Final dilution weight ratio of water to asphaltic emulsion

39-2.02C Asphalt Binder

Asphalt binder in HMA must comply with the section 92.

Asphalt binder for geosynthetic pavement interlayer must comply with the specifications for asphalts.

Asphalt binder used in HMA Type A must be PG 70-10.

The asphalt binder content percent by total weight of mix must not vary by more than 0.5-percent of asphalt above or 0.3-percent of asphalt below the amount designated by the Engineer.

39-2.02D Aggregate

Aggregate must be clean and free from deleterious substances.

The specified aggregate gradation must be determined before the addition of asphalt binder and includes supplemental fine aggregate. The Department tests for aggregate grading under California Test 202, modified by California Test 105 if there is a difference in specific gravity of 0.2 or more between the coarse and fine parts of different aggregate blends.

Choose a sieve size target value (TV) within the "Target Value Limits" as shown in the following tables:

Aggregate Gradation (Percentage Passing) HMA Type A

1-inch		
Sieve Sizes	Target Value Limits	Allowable Tolerance
1"	100	—
3/4"	88 - 93	TV ±5
1/2"	72 - 85	TV ±6
3/8"	55 - 70	TV ±6
No. 4	35 - 52	TV ±7
No. 8	22 - 40	TV ±5
No. 30	8 - 24	TV ±4
No. 50	5 - 18	TV ±4
No. 200	3 - 7	TV ±2

3/4-inch		
Sieve Sizes	Target Value Limits	Allowable Tolerance
1"	100	—
3/4"	90 - 98	TV ±5
1/2"	70 - 90	TV ±6
No. 4	45 - 55	TV ±7
No. 8	32 - 40	TV ±5
No. 30	12 - 21	TV ±4
No. 200	2 - 7	TV ±2

1/2-inch		
Sieve Sizes	Target Value Limits	Allowable Tolerance
3/4"	100	—
1/2"	95 - 99	TV \pm 6
3/8"	75 - 95	TV \pm 6
No. 4	55 - 66	TV \pm 7
No. 8	38 - 49	TV \pm 5
No. 30	15 - 27	TV \pm 4
No. 200	2 - 8	TV \pm 2

3/8-inch		
Sieve Sizes	Target Value Limits	Allowable Tolerance
1/2"	100	—
3/8"	95 - 100	TV \pm 6
No. 4	58 - 72	TV \pm 7
No. 8	34 - 48	TV \pm 6
No. 30	18 - 32	TV \pm 5
No. 200	2 - 9	TV \pm 2

No. 4		
Sieve Sizes	Target Value Limits	Allowable Tolerance
3/8"	100	—
No. 4	95 - 100	TV \pm 7
No. 8	72 - 77	TV \pm 7
No. 30	37 - 43	TV \pm 7
No. 200	2 - 12	TV \pm 4

Before the addition of asphalt binder and lime treatment, the aggregates must comply with requirements shown in the following table:

Aggregate Quality

Quality characteristic	Test method	HMA type A
Percent of crushed particles Coarse aggregate (% min.) One fractured face Two fractured faces Fine aggregate (% min) (Passing no. 4 sieve and retained on no. 8 sieve.) One fractured face	California Test 205	90 75 70
Los Angeles Rattler (% max.) Loss at 100 rev. Loss at 500 rev.	California Test 211	10 45
Sand equivalent (min.)	California Test 217	47
Fine aggregate angularity (% min.) ^a	California Test 234	45
Flat and elongated particles (% max. by weight @ 5:1)	California Test 235	10

^aThe Engineer waives this specification if HMA contains less than 10 percent of nonmanufactured sand by weight of total aggregate. Manufactured sand is fine aggregate produced by crushing rock or gravel.

All supplemental fine aggregates are to be authorized by the Engineer before incorporation into aggregate gradations.

Aggregate used in HMA Type A must comply with the ¾" gradation.

39-2.02E Reclaimed Asphalt Pavement (RAP)

39-2.02E(1) Submittals

Submit QC test results for RAP gradation with the combined aggregate gradation within 2 business days of taking RAP samples during Type A HMA production.

39-2.02E(2) Quality Assurance

Test the quality characteristics of aggregates under the test methods and frequencies shown in the following table:

Aggregate Testing Frequencies

Quality characteristic	Test method	Minimum testing frequency
Gradation ^a	CT 202 (AASHTO T-27)	1 per 750 tons and any remaining part
Sand equivalent ^{b,c}	CT 217 (AASHTO T-176)	
Moisture content ^d	CT 226 (AASHTO T-255)	
Crushed particles	CT 205 (AASHTO T-335)	1 per 10,000 tons or 2 per project whichever is greater
LA Rattler	CT 211 (AASHTO T-96)	
Flat and elongated particles	CT 235 (ASTM D4791)	
Uncompacted voids of fine aggregate	CT 234 (AASHTO T-304A)	

^aIf RAP is used, test the combined aggregate gradation under California Test 384.

^bReported value must be the average of 3 tests from a single sample.

^cUse of a sand reading indicator is required as shown in AASHTO T 176, Figure 1. Sections 4.7, "Manual Shaker," 7.1.2, "Alternate Method No. 2," and 8.4.3, "Hand Method," do not apply.

Prepare the stock solution as specified in section 4.8.1, "Stock solution with formaldehyde," except omit the addition of formaldehyde.

^dTest at continuous mixing plants only. If RAP is used, test the RAP moisture content at continuous mixing plant and batch mixing plant.

For lime treated aggregate, test aggregate before treatment and test for gradation and moisture content during HMA production.

Sample and test mix design RAP stockpile under California Test 384. Report the average AASHTO T 308 uncorrected binder content on page 4 of your Contractor Hot Mix Asphalt Design Data form. When the mix design RAP stockpile is augmented, sample RAP used to augment the stockpile at a minimum frequency of 1 sample per 1,000 tons under California Test 384 before augmenting the stockpile. Test each sample to determine the uncorrected binder content under AASHTO T 308. Average the results of the 3 tests. When tested under AASHTO T 308, the uncorrected binder content of each augmented RAP sample must be within ± 2.00 percent of the average uncorrected asphalt binder content reported on page 4 of your Contractor Hot Mix Asphalt Design Data form. You must use the same ignition oven used to determine the uncorrected asphalt binder content reported on page 4 of your Contractor Hot Mix Asphalt Design Data form.

The augmented RAP sample when tested under AASHTO T 209 must be within ± 0.06 of the average maximum specific gravity reported on page 4 of your Contractor Hot Mix Asphalt Design Data form.

During Type A HMA production, sample RAP twice daily and perform QC testing for:

1. Aggregate gradation at least once a day under California Test 384
2. Moisture content at least once a day

Test the quality characteristics of Type A HMA under the test methods and frequencies shown in the following table:

Type A HMA Production Testing Frequencies

Quality characteristic	Test method	Minimum testing frequency
Asphalt binder content	CT 382 (AASHTO T-308)	1 per 750 tons and any remaining part
HMA moisture content	CT 370 (AASHTO T-329)	1 per 2,500 tons but not less than 1 per paving day
In-place density and relative compaction of HMA using nuclear gauges	CT 375 (AASHTO T-355)	1 per paving job

The Department accepts Type A HMA based on compliance with:

1. Aggregate quality requirements shown in the following table:

Aggregate Quality

Quality characteristic	Test method	Requirement
Aggregate gradation ^a	CT 202 (AASHTO T-27)	JMF \pm Tolerance
Percent of crushed particles	CT 205 (AASHTO T-335)	95
Coarse aggregate (min, %)		
One-fractured face		90
Two-fractured faces		
Fine aggregate (min, %)		70
(Passing no. 4 sieve and retained on no. 8 sieve)		
One-fractured face		
Los Angeles Rattler (max, %)	CT 211 (AASHTO T-96)	12
Loss at 100 rev		
Loss at 500 rev		40
Sand equivalent (min) ^{b,c}	CT 217 (AASHTO T-176)	47
Flat and elongated particles (max, % by weight at 5:1)	CT 235 (ASTM D4791)	10
Fine aggregate angularity (min, %) ^d	CT 234 (AASHTO T-304A)	45

^aThe Engineer determines combined aggregate gradations containing RAP under California

Test 384. The Engineer uses the correlation factor from Contractor Hot Mix Asphalt Design Data form and mathematically combines the virgin and corrected RAP aggregate gradations at the correct proportions to obtain the combined gradation.

^bReported value must be the average of 3 tests from a single sample.

^cUse of a sand reading indicator is required as shown in AASHTO T 176, Figure 1. Sections 4.7, "Manual Shaker," 7.1.2, "Alternate Method No. 2," and 8.4.3, "Hand Method," do not apply. Prepare the stock solution as specified in section 4.8.1, "Stock solution with formaldehyde," except omit the addition of formaldehyde.

^dThe Engineer waives this specification if HMA contains 10 percent or less of nonmanufactured sand by weight of total aggregate. Manufactured sand is fine aggregate produced by crushing rock or gravel.

2. If RAP is used, RAP quality requirements shown in the following table:

Reclaimed Asphalt Pavement Quality

Quality characteristic	Test method	Requirement
Uncorrected binder content (% within the average value reported ^a)	CT 382 (AASHTO-T 308)	±2.00
Specific gravity (within the average value reported ^b)	CT 309 (AASHTO T-209)	±0.06

^aAverage uncorrected binder content of three ignition oven tests performed at JMF verification. The Engineer must use the same ignition oven used to determine the average uncorrected binder content at JMF verification.

^bAverage maximum specific gravity reported on page 4 of Contractor Hot Mix Asphalt Design Data form.

3. In place Type A HMA quality requirements shown in the following table:

Type A HMA Acceptance In Place

Quality characteristic	Test method	Requirement
Asphalt binder content (%)	CT 382 (AASHTO T-308A)	JMF -0.30, +0.50
HMA moisture content (max, %)	CT 370 (AASHTO T-329)	1.00
Air voids content at N _{design} (%) ^{a,b}	CT 367 (AASHTO T-269)	4.0 ± 1.5 (5.0 ± 1.5 for 1-inch aggregate)
Voids in mineral aggregate on laboratory-produced HMA (min, %) ^d Gradation: No. 4 3/8-inch 1/2-inch 3/4-inch 1-inch: with NMAS = 1-inch with NMAS = 3/4-inch	MS-2 Asphalt Mixture Volumetrics	16.5–19.5 15.5–18.5 14.5–17.5 13.5–16.5 13.5–16.5 14.5–17.5
Voids in mineral aggregate on plant-produced HMA (min, %) ^a Gradation: No. 4 3/8-inch 1/2-inch 3/4-inch 1-inch: with NMAS = 1-inch with NMAS = 3/4-inch	MS-2 Asphalt Mixture Volumetrics ^c	15.5–18.5 14.5–17.5 13.5–16.5 12.5–15.5 12.5–15.5 13.5–16.5
Dust proportion	MS-2 Asphalt Mixture Volumetrics	0.6–1.3 ^g
Density of core (% of max theoretical density) ^{e,f}	CT 375 (AASHTO T-355)	91.0–97.0
Hamburg wheel track (min number of passes at 0.5-inch rut depth) Binder grade: PG 58 PG 64 PG 70 PG 76 or higher	CT 389 (AASHTO T-324)	10,000 15,000 20,000 25,000
Hamburg wheel track (number of passes at inflection point)	CT 389 (AASHTO T-324)	Report only
For RAP substitution equal to or less than 15% moisture susceptibility (min, psi, dry strength)	ASTM D8225 (AASHTO T-283)	100
For RAP substitution greater than 15% moisture susceptibility (psi, dry strength)	ASTM D8225 (AASHTO T-283)	100-300 ^h
Moisture susceptibility (min, psi, wet strength)	ASTM D8225 (AASHTO T-283 ⁱ)	70

^aPrepare 3 briquettes. Report the average of 3 tests.

^bThe Engineer determines the bulk specific gravity of each lab-compacted briquette under AASHTO T 275, Method A, and theoretical maximum specific gravity under AASHTO T 209, Method A. ^cDetermine bulk specific gravity under AASHTO T 275, Method A.

^dThe Engineer determines the laboratory-prepared Type A HMA value for only mix design verification. ^eThe Engineer determines percent of theoretical maximum density under California Test 375 except the Engineer uses:

1. AASHTO T 275 to determine in-place density of each density core.
2. AASHTO T 209, Method A to determine theoretical maximum density instead of calculating test maximum density.

^fThe Engineer determines theoretical maximum density under AASHTO T 209, Method A,

at the frequency specified in California Test 375, part 5, section D.

^gFor lime-treated aggregates, the dust proportion requirement is 0.6–1.5.

^hNot required in the following areas:

1. Southern San Luis Obispo or Santa Barbara County in District 5.
2. Kern County in District 6.
3. Kings County in District 6: route 5, post mile 0 to 17; route 33, post mile 0 to 19; route 41, post mile 0 to 16.
4. Tulare County in District 6: route 65, post mile 0 to 10; route 99, post mile 0 to 10; route 43, post mile 0 to 15.

ⁱFreeze thaw required.

39-2.02E(2) Materials

You may substitute RAP for a part of the virgin aggregate to a maximum quantity of **15 percent** of the aggregate blend.

Provide enough space at your plant for complying with all RAP handling requirements. Provide a clean, graded base, well drained area for stockpiles.

If RAP is from multiple sources, blend the RAP thoroughly and completely before fractionating.

For RAP substitution greater than 15 percent of the aggregate blend, fractionate RAP stockpiles into 2 sizes, a coarse fraction RAP retained on 3/8-inch sieve and a fine fraction RAP passing 3/8-inch sieve. For RAP substitution of 15 percent of the aggregate blend or less, fractionation is not required.

The RAP fractionation must comply with the requirements shown in the following table:

RAP Stockpile Fractionation Gradation Requirements		
Size	Test method	Requirement
Coarse (% passing the 1-inch sieve)	CT 202 ^a (AASHTO T-27)	100
Fine (% passing the 3/8-inch sieve)	CT 202 ^a (AASHTO T-27)	98–100

^aMaximum mechanical shaking time is 10 minutes.

You may use the coarse fractionated stockpile, the fine fractionated stockpile, or a combination of the coarse and fine fractionated stockpiles.

Isolate the processed RAP stockpiles from other materials. Store processed RAP in conical or longitudinal stockpiles. Processed RAP must not be agglomerated or be allowed to congeal in large stockpiles.

39-2.03–39.2.07 RESERVED

39-2.08 HOT MIX ASPHALT ON BRIDGE DECKS

Aggregate must comply with the 1/2-inch HMA Types A gradation.

If authorized, aggregate may comply with the no. 4 HMA Types A gradation for a section or taper at a bridge end that is less than 1 inch in total depth.

If a concrete expansion dam is to be placed at a bridge deck expansion joint, tape oil-resistant construction paper to the deck over the area to be covered by the dam before placing the tack coat and HMA across the joint.

Do not leave a vertical joint more than 0.15 foot high between adjacent lanes open to traffic.

The tack coat application rate must be the minimum residual rate specified in section 39-2.11C. For HMA placed on a deck seal, use the minimum residual rate specified for a PCC underlying surface.

HMA placed on a deck seal must be placed in at least 2 approximately equal layers. The 1st layer must be at least 1 inch thick after compaction. Protect the deck seal throughout all operations.

For placement of the 1st HMA layer on a deck seal:

1. Comply with the HMA application temperature recommended by the deck seal manufacturer.
2. Deliver and place HMA using equipment with pneumatic tires or rubber-faced wheels. Do not operate other vehicles or equipment on the bare deck seal.
3. Deposit HMA on the deck seal in such a way that the deck seal is not damaged. Do not windrow the HMA material on the bridge deck seal.
4. Place HMA in a downhill direction on bridge decks with grades over 2 percent.
5. Spreading equipment need not be self-propelled.

39-2.09 MISCELLANEOUS AREAS AND DIKES

The following specifications in section 39 do not apply to miscellaneous areas and dikes:

1. HMA construction process
2. HMA mix design requirements
3. Contractor quality control

Miscellaneous areas are as shown on the project plans or as directed by the Engineer.

Spread miscellaneous areas in layers that do not exceed 0.20 foot, and compact to the specified lines and grades.

For miscellaneous areas and dikes:

1. Do not submit a JMF.
2. Choose the 3/8-inch or 1/2-inch HMA Type A aggregate gradations.
3. Minimum asphalt binder content must be 6.8 percent for 3/8-inch aggregate and 6.0 percent for 1/2-inch aggregate. If you request and if authorized, you may reduce the minimum asphalt binder content.
4. Choose asphalt binder Grade PG 70-10 or the same grade specified for HMA.
5. You may not produce HMA for Miscellaneous areas and dikes using RAP.

39-2.10 PRODUCTION

39-2.10A General

Do not start HMA production before authorization of JMF.

Before production, the HMA plant must have current qualification under the Caltrans Materials Plant Quality Program, or be approved by the Engineer.

Produce HMA in a batch or continuous mixing plant.

Proportion aggregate by hot or cold feed control.

During production, you may adjust hot or cold feed proportion controls for virgin aggregate.

Mix HMA ingredients into a homogeneous mixture of coated aggregates.

Asphalt binder must be from 275 to 375 degrees F when mixed with aggregate.

When mixed with asphalt binder, aggregate must not be more than 325 degrees F.

The temperature of HMA must not be more than 325 degrees F.

HMA must be produced at a temperature from 305 to 325 degrees F.

39-2.11 CONSTRUCTION PROCESS

39-2.11A General

Reserved.

39-2.11B Acceptance Criteria

39-2.11B(1) Testing

The Department samples for acceptance testing and tests for the quality characteristics shown in the following table:

HMA Acceptance

Quality characteristic	Test method	HMA type A
Aggregate gradation ^a	California Test 202	JMF \pm tolerance ^b
Sand equivalent (min) ^c	California Test 217	47
Asphalt binder content (%)	California Test 382 or AASHTO T308, T164	JMF -0.30, +0.50
HMA moisture content (% max)	California Test 226 or 370	1.0
Los Angeles Rattler (% max) Loss at 100 rev. Loss at 500 rev.	California Test 211	12 45
Smoothness	Section 39-2.12	12-foot straight-edge and must-grind
Asphalt binder	Various	Section 92

^a Hot Mix Asphalt mixtures used on this project may contain up to 15% Recycled Asphalt Products (RAP). See Section 39-2.02E.

^b The tolerances must comply with the allowable tolerances in section 39-2.02D.

^c The Engineer reports the average of 3 tests from a single split sample.

No single test result may represent more than 750 tons or 1 day's production, whichever is less.

For any single quality characteristic except smoothness, if 2 consecutive acceptance test results or any 3 acceptance test results for 1 day's production do not comply with the specifications:

1. Stop production.
2. Take corrective action.
3. The Kern County Materials Laboratory will sample after corrective action to determine compliance with the specifications.
4. Do not resume production and placement until authorized by the Engineer.

You will remove any HMA represented by aggregate grading or Sand Equivalent tests that do not meet the requirements specified in section 39-2.02D. If you request and the Engineer approves, the HMA may remain in place at no cost to the department.

The asphalt binder content will be determined by testing samples taken in accordance with California Test 125 at the locations shown in section 39-2.01E. If the results of these asphalt content tests do not meet the specified requirements, the material which is represented by these tests must be removed. However, if requested by you and approved by the Engineer, the material may remain in place, and the following deductions apply:

Asphalt Binder Content (%)	Deduction of HMA Contract Price (%)
JMF -0.60, +0.80	30
JMF -0.50, +0.70	20
JMF -0.40, +0.60	10

The Department may deduct this amount from any moneys due, or that may become due to the Contractor under the contract. No single asphalt content test shall represent more than 750 tons of material or one day's production, whichever is smaller.

39-2.11C Surface Preparation

39-2.11C(1) General

Prepare subgrade or apply tack coat to surfaces receiving HMA. If specified, place geosynthetic pavement interlayer over a coat of asphalt binder.

39-2.11C(2) Subgrade

Subgrade to receive HMA must comply with the compaction and elevation tolerance specifications in the sections for the material involved. Subgrade must be free of loose and extraneous material. If HMA is paved on existing base or pavement, remove loose paving particles, dirt, and other extraneous material by any means including flushing and sweeping.

39-2.11C(3) Tack Coat

Apply tack coat:

1. To existing pavement, including planed surfaces
2. Between HMA layers
3. To vertical surfaces of:
 - 3.1. Curbs
 - 3.2. Gutters
 - 3.3. Construction joints

Before placing HMA, apply tack coat in 1 application. The application rate must be the minimum residual rate specified for the underlying surface conditions shown in the following tables:

Tack Coat Application Rates for HMA Type A

HMA overlay over:	Minimum residual rates (gal/sq yd)		
	CSS-1/CSS-1h, SS-1/SS-1h and QS-1h/CQS-1h asphaltic emulsion	CRS-1/CRS-2, and QS-1/CQS-1 asphaltic emulsion	Asphalt binder and PMCRS-2/PMCRS-2h asphaltic emulsion
New HMA (between layers)	0.02	0.03	0.02
PCC and existing HMA (AC) surfaces	0.03	0.04	0.03
Planed PCC and HMA (AC) surfaces	0.05	0.06	0.04

If you dilute asphaltic emulsion, mix until homogeneous before application.

For vertical surfaces, apply a residual tack coat rate that will thoroughly coat the vertical face without running off.

If you request and if authorized, you may change tack coat application rates.

Immediately in advance of placing HMA, apply additional tack coat to damaged areas or where loose or extraneous material is removed.

Close areas receiving tack coat to traffic. Do not track tack coat onto pavement surfaces beyond the job site.

Asphalt binder tack coat must be from 285 to 350 degrees F when applied.

39-2.11C(4) Geosynthetic Pavement Interlayer

Place geosynthetic pavement interlayer under the manufacturer's instruction.

Before placing the geosynthetic pavement interlayer and asphalt binder:

1. Repair cracks 1/4 inch and wider, spalls, and holes in the pavement.
2. Clean the pavement of loose and extraneous material.

Immediately before placing the interlayer, apply 0.25 ± 0.03 gal of asphalt binder per square yard of interlayer or until the fabric is saturated. Apply asphalt binder the width of the geosynthetic pavement interlayer plus 3 inches on each side. At interlayer overlaps, apply asphalt binder on the lower interlayer the same overlap distance as the upper interlayer.

Asphalt binder must be from 285 to 350 degrees F and below the minimum melting point of the geosynthetic pavement interlayer when applied.

Align and place the interlayer with no folds that result in a triple thickness, except that triple thickness layers less than 1 inch in width may remain if less than 1/2 inch in height. Folds that result in a triple layer greater than a 1 inch width must be cut and overlapped in a double thickness at least 2 inches in width.

The minimum HMA thickness over the interlayer must be 0.12 foot thick, including conform tapers. Do not place the interlayer on a wet or frozen surface.

Overlap the interlayer borders from 2 to 4 inches. In the direction of paving, overlap the following roll with the preceding roll at any break.

You may use rolling equipment to correct distortions or wrinkles in the interlayer.

If asphalt binder tracked onto the interlayer or brought to the surface by construction equipment causes interlayer displacement, cover it with a small quantity of HMA.

Before placing HMA on the interlayer, do not expose the interlayer to:

1. Traffic, except for crossings under traffic control, and only after you place a small HMA quantity.
2. Sharp turns from construction equipment.
3. Damaging elements.

Pave HMA on the interlayer during the same work shift. Trim any areas where the interlay remains exposed after paving operations.

39-2.11D Spreading And Compacting Equipment

Paving equipment for spreading must be:

1. Self-propelled.
2. Mechanical.
3. Equipped with a screed or strike-off assembly that can distribute HMA the full width of a traffic lane.
4. Equipped with a full-width compacting device.
5. Equipped with automatic screed controls and sensing devices that control the thickness, longitudinal grade, and transverse screed slope.

Install and maintain grade and slope references. The screed must produce a uniform HMA surface texture without tearing, shoving, or gouging.

The paver must not leave marks such as ridges and indentations, unless you can eliminate them by rolling.

Rollers must be equipped with a system that prevents HMA from sticking to the wheels. You may use a parting agent that does not damage the HMA or impede the bonding of layers.

In areas inaccessible to spreading and compacting equipment:

1. Spread the HMA by any means to obtain the specified lines, grades, and cross sections.
2. Use a pneumatic tamper, plate compactor, or equivalent to achieve thorough compaction.

Each paver spreading HMA Type A must be followed by 3 rollers as follows:

1. One vibratory roller specifically designed to compact HMA. The roller must be capable of at least 2,500 vibrations per minute and must be equipped with amplitude and frequency controls. The roller's gross static weight must be at least 12 tons.
2. One oscillating type pneumatic-tired roller at least 4 feet wide. Pneumatic tires must be of equal size, diameter, type, and ply. The tires must be inflated to 60 psi minimum and maintained so that the air pressure does not vary more than 5 psi.
3. One steel-tired, 2-axle tandem roller. The roller's gross static weight must be at least 8 tons.

Each roller must have a separate operator. Rollers must be self-propelled and reversible.

Any deviation from the above requirements must be approved in writing by the Engineer.

39-2.11E Transporting, Spreading, And Compacting

Do not pave HMA on wet pavement or a frozen surface.

You may deposit HMA in a windrow and load it in the paver if:

1. Paver is equipped with a hopper that automatically feeds the screed
2. Loading equipment can pick up the windrowed material and deposit it in the paver hopper without damaging base material
3. Activities for deposit, pickup, loading, and paving are continuous
4. HMA temperature in the windrow does not fall below 260 degrees F

HMA placed in a windrow on the roadway surface must not extend more than 250 feet in front of the loading equipment or material transfer vehicle.

You may use mechanical equipment other than a paver for areas less than 5 feet wide and outside the traveled way. The equipment must produce uniform smoothness and texture.

HMA handled, spread, or windrowed must not stain the finished surface of any improvement, including pavement.

Do not use petroleum products such as kerosene or diesel fuel to release HMA from trucks, spreaders, or compactors.

HMA must be free of:

1. Segregation
2. Coarse or fine aggregate pockets
3. Hardened lumps

When placing Hot Mix Asphalt to lines and grades established by the Engineer, the automatic controls must control the longitudinal grade and transverse slope of the screed. You may elect to use ski device, the minimum length of the ski device must be 30 feet. The ski device must be a rigid one-piece unit and the entire 30-foot length must be utilized in activating the sensor.

When placing the initial mat of Hot Mix Asphalt on existing pavement, the end of the screed nearest the centerline must be controlled by a sensor activated by a ski device not less than 30 feet long. The end of the screed farthest from centerline must be controlled by an automatic transverse slope device set to reproduce the cross slope designated by the Engineer or manually, as directed by the Engineer. When paving contiguously with previously placed mats, the end of the screed adjacent to the previously placed mat must be controlled by a sensor that responds to the grade of the previously placed mat and will reproduce the grade in the new mat within a 0.01-foot tolerance. The end of the screed farthest from the previously placed mat must be controlled in the same manner as when placing the initial mat.

If the automatic screed controls fail to operate properly during any day's work, you may use manual control of the spreading equipment for the remainder of that day; however, the finished layers of Hot Mix Asphalt must conform in all respects to the requirements in said Section 39. If the automatic screed controls fail to operate on two successive days, the paving operations must be temporarily discontinued and you must modify your equipment or furnish substitute equipment without delay so that Hot Mix Asphalt that conforms to the required specifications can be placed.

Longitudinal joints in the top layer must match specified lane edges or be offset 0.5 foot, if ordered, to avoid permanent pavement delineation conflicts. Alternate the longitudinal joint offsets in the lower layers at least 0.5 foot from each side of the specified lane edges. You may request other longitudinal joint placement patterns.

Until the adjoining through lane's top layer has been paved, do not pave the top layer of:

1. Shoulders
2. Tapers
3. Transitions
4. Road connections
5. Driveways
6. Curve widenings
7. Chain control lanes
8. Turnouts
9. Turn pockets

If the number of lanes change, pave each through lane's top layer before paving a tapering lane's top layer. Simultaneous to paving a through lane's top layer, you may pave an adjoining area's top layer, including shoulders. Do not operate spreading equipment on any area's top layer until completing final compaction.

If leveling with HMA is specified, fill and level irregularities and ruts with HMA before spreading HMA over the base, existing surfaces, or bridge decks. You may use mechanical equipment other than a paver for these areas. The equipment must produce uniform smoothness and texture. HMA used to change an existing surface's cross slope or profile is not paid for as HMA (leveling).

If placing HMA against the edge of existing pavement, sawcut or grind the pavement straight and vertical along the joint and remove extraneous material.

Rolling must leave the completed surface compacted and smooth without tearing, cracking, or shoving. Complete finish rolling activities before the pavement surface temperature is:

1. Below 150 degrees F for HMA with unmodified binder.

2. Below 140 degrees F for HMA with modified binder.

If a vibratory roller is used as a finish roller, turn the vibrator off.

Do not allow traffic on new HMA pavement until its mid-depth temperature is below 160 degrees F.

If you request and if authorized, you may cool HMA Type A with water when rolling activities are complete. Apply water under section 10-6.

Unless specified on the project plans no lift shall be more than the following:

Maximum Lift Requirements

Thickness (ft)	Aggregate Gradation
0.20	1/2 inch
0.25	3/4 inch
0.30	1 inch

Unless specified on the project plans no lift shall be less than the following:

Minimum Lift Requirements

Thickness (ft)	Aggregate Gradation
0.15	1/2 inch
0.20	3/4 inch
0.25	1 inch

Spread HMA Type A at the atmospheric and surface temperatures shown in the following table:

Minimum Atmospheric and Surface Temperatures

Compacted lift thickness, feet				
	Atmospheric, °F		Surface, °F	
	Unmodified asphalt binder	Modified asphalt binder ^a	Unmodified asphalt binder	Modified asphalt binder ^a
< 0.15	55	50	60	55
0.15–0.20	50	50	50	50

^a Except asphalt rubber binder.

If the surface to be paved is both in sunlight and shade, pavement surface temperatures must be taken in the shade.

If the asphalt binder for HMA Type A is unmodified asphalt binder, complete:

1. First coverage of breakdown compaction before the surface temperature drops below 250 degrees F
2. Breakdown and intermediate compaction before the surface temperature drops below 200 degrees F
3. Finish compaction before the surface temperature drops below 150 degrees F

If the asphalt binder for HMA Type A is modified asphalt binder, complete:

1. First coverage of breakdown compaction before the surface temperature drops below 240 degrees F
2. Breakdown and intermediate compaction before the surface temperature drops below 180 degrees F
3. Finish compaction before the surface temperature drops below 140 degrees F

HMA compaction coverage is the number of passes needed to cover the paving width. A pass is 1 roller's movement parallel to the paving in either direction. Overlapping passes are part of the coverage being made and are not a subsequent coverage. Do not start a coverage until completing the prior coverage.

Start rolling at the lower edge and progress toward the highest part.

Perform breakdown compaction of each layer of HMA Type A with 1 coverage using a vibratory roller. The speed of the vibratory roller in miles per hour must not exceed the vibrations per minute divided by 1,000.

Perform intermediate compaction of each layer of HMA Type A with 6 coverages using a pneumatic-tired roller at a speed not exceeding 5 mph. For HMA Type A with unmodified asphalt binder, coverages with a pneumatic-tired roller must start when the temperature of the mixture is above 200 degrees F., unless otherwise permitted by the Engineer, and must be completed while the temperature of the mixture is at or above 150 degrees F. For HMA Type A with modified asphalt binder, coverages with a pneumatic-tired roller must start when the temperature of the mixture is above 180 degrees F., unless otherwise permitted by the Engineer, and must be completed while the temperature of the mixture is at or above 140 degrees F.

Perform finish compaction of HMA Type A with 1 coverage using a steel-tired roller.

When ordered by the Engineer, breakdown compaction and final rolling of shoulders and other areas off the traveled way having a width of 4 feet or less must be performed by using a steel-tired roller weighting at least 8 tons and having rolling wheels with a width of not more than 60 inches.

Any deviation from the above requirements must be approved in writing by the engineer.

Unless otherwise shown on the plans or typical cross sections, the existing pavement must be saw cut where new hot mix asphalt pavement is to conform to existing paved surfaces.

39-2.11F Smoothness

39-2.11F(1) General

Determine HMA smoothness with a straightedge.

If concrete pavement is placed on HMA:

1. Cold plane the HMA finished surface to within specified tolerances if it is higher than the grade ordered.
2. Remove and replace HMA if the finished surface is lower than 0.05 foot below the grade ordered.

39-2.11F(2) Straightedge

The top layer of HMA pavement must not vary from the lower edge of a 12-foot straightedge:

1. More than 0.01 foot when the straightedge is laid parallel with the centerline.
2. More than 0.02 foot when the straightedge is laid perpendicular to the centerline and extends from edge to edge of a traffic lane.
3. More than 0.02 foot when the straightedge is laid within 24 feet of a pavement conform.

When ordered by the Engineer, the paving operations must be temporarily discontinued to allow the Engineer to check for compliance with the above requirements. If excessive deviations are found, you must take whatever actions necessary to eliminate them prior to continuing the paving operations.

39-2.11F(3) Smoothness Correction

If the top layer of HMA Type A pavement does not comply with the smoothness specifications, grind the pavement to within specified tolerances, remove and replace it, or place an overlay of HMA. Do not start corrective work until your choice of methods is authorized.

Corrected HMA pavement areas must be uniform rectangles with edges:

1. Parallel to the nearest HMA pavement edge or lane line.
2. Perpendicular to the pavement centerline.

Measure the corrected HMA pavement surface with a 12-foot straightedge and correct the pavement to within specified tolerances. If a pavement cannot be corrected to within specified tolerances, remove and replace the pavement.

On areas ground but not overlaid with OGFC, apply fog seal coat under section 37-2.

39-2.12 PAYMENT

The quantity of Hot Mix Asphalt to be paid for will be the quantity computed using the dimensions of the area to be surfaced, as shown on the project plans or as directed by the Engineer, multiplied by the thickness specified on the plans for that area and by a weight of 150 pounds per cubic foot, or the actual quantity placed, whichever is the lesser.

The payment for hot mix asphalt is included in the contract unit price paid for Hot Mix Asphalt (Type A).

The payment for tack coat, asphalt binder, and asphaltic emulsion for hot mix asphalt are included in the payment for Hot Mix Asphalt (Type A).

No payment shall be made for smoothness correction as described in section 39-2.11F of these special provisions.

DIVISION VIII MISCELLANEOUS CONSTRUCTION

80 FENCES

Replace the definition of fence, Type BW in Section 80-2.01B with:

fence, Type BW: Barbed wire fence must conform to Standard Plan A86, except that only three fence wires are required instead of five, and the wire must be barbless.

Replace item 2 in the first paragraph of Section 80-2.02D with:

2. Be barbless

Add the following to Section 80-3.02A:

Chain link fence must be Type CL-6.

Replace Section 80-3.04 with:

80-3.04 PAYMENT

The payment quantity for chain link fence is the length measured:

1. Parallel to the ground slope
2. Along the fence

The payment quantity does not include the width of openings.

Replace Section 80-10.04 with:

80-10.04 PAYMENT

Payment for installing gates is included in the payment of Chain Link Gate (Type CL-6, Slatted), Wrought Iron Gate, and Wrought Iron Man Gate.

An installed gate of the specified type and kind is 1 measurement unit.

The cost to construct concrete curb is included in the payment for the installed gate of the specified type and kind as shown on the bid items.

Replace Section 80-15.02D with:

80-15.02D Payment

Payment for installing fences is included in the payment of Chain Link Fence (Type CL-6, Slatted). The payment quantity for installing fences of the specified type and kind is the length measured:

1. Parallel to the ground slope
2. Along the fence

The cost to construct concrete curb is included in the payment for installed fence of the specified type and kind as shown on the bid items.

The cost to make modifications to connect the property boundary fence to the installed fence is included in the payment for installed fence of the specified type and kind.

DIVISION XII BUILDING CONSTRUCTION

99 BUILDING CONSTRUCTION

99-1 GENERAL

99-1.01 GENERAL

99-1.01A Summary

Section 99-1 includes general specifications for performing building construction work.

Work required by Contract must comply with Appendix A.

99-1.01D Payment

The payment for conforming to this section is included in the lump sum price paid for Construct Warehouse Building and Installing Plumbing.

All work associated with the warehouse is included in the lump sum price paid for Construct Warehouse Building and Installing Plumbing.

The payment for conforming to this section is included in the lump sum price paid for Construct Parking Garage.

All work associated with the parking garage is included in the lump sum price paid for Construct Parking Garage.

THIS PAGE LEFT INTENTIONALLY BLANK

BID DOCUMENTS
FOR CONTRACT 26016

THIS PAGE LEFT INTENTIONALLY BLANK

BID FORM

TO THE BOARD OF SUPERVISORS OF KERN COUNTY

Contract No. 26016

THIS BID IS SUBMITTED BY:

(Firm/Company Name)

Re: **BUILDING AND SITE IMPROVEMENTS AT 6741 DOWNING AVENUE, BAKERSFIELD, CA**

- I. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement for Construction with the **COUNTY OF KERN** in the form included in the Bid Book (**Agreement**), to perform and furnish all work as specified or indicated in the contract documents for the contract price indicated in this bid and in accordance with all other terms and conditions of the contract documents.
- II. Bidder accepts all of the terms and conditions of the contract documents, Notice to Bidders and special provisions, including without limitation, those dealing with the disposition of bid security. This Bid will remain subject to acceptance for 60 days after the day of Bid opening, unless there is a bid protest, then 90 days after the day of bid opening.
- III. In submitting this Bid, Bidder represents that Bidder has examined all of the contract documents, performed all necessary pre-Bid investigations, attended all required pre-bid meetings, received the pre-bid meeting minutes (if any), and received the following Addenda:

Addendum Number	Addendum Date	Signature of Bidder

- IV. Based on the foregoing, Bidder proposes and agrees to fully perform the work within the time stated and in strict accordance with the contract documents for the following sums of money listed in the following Schedule of Bid Prices:

(Continued on next page)

SCHEDULE OF BID PRICES

The bidder shall set forth, for each and every, item of work listed, a "Unit Price" and an "Extension Price" in clearly legible figures, in the respective spaces provided for this purpose. The bidder's attention is directed to Section 2, "Bidding," of the special provisions. All Bid items, including lump sums, unit prices and extension prices, must be filled in completely. Bid items are described in Contract Documents. Quote in figures only, unless words are specifically requested.

BUILDING AND SITE IMPROVEMENTS AT 6741 DOWNING AVENUE, BAKERSFIELD, CA 1789CC-C00027						
Item No.	Estimated Quantity	Item Code	Unit of Measure	Item	Unit Price (in figures)	Extension Price (in figures)
1	1	100100	LS	Develop Water Supply		
2	1	120100	LS	Temporary Traffic Control		
3	1	130300	LS	Prepare Stormwater Pollution Prevention Plan		
4	1	170103	LS	Clearing and Grubbing		
5	1	220102	LS	Finishing Project		
6	2,395	260203	CY	Class 2 Aggregate Base		
7	2,343	390132	TON	Hot Mix Asphalt (Type A)		
8	95	888888	CY	Core Concrete (5")		
9	787	888888	CY	Core Concrete (7")		
10	1,250	731504	LF	Minor Concrete (Curb and Gutter)		
11	132	731521	CY	Minor Concrete (Sidewalk)		
12	1	760080	LS	Water Supply System		
13	841	800365	LF	Chain Link Fence (Type CL-6, Slatted)		
14	5	888888	EA	Chain Link Gate (Type CL-6, Slatted)		
15	25	860010	EA	Solar Street Light		
16	69,734	888888	SQFT	Landscape		
17	177 (F)	888888	CY	Loading Dock (Earthwork)		
18	2,485 (F)	888888	CY	Retention Basin		
19	1,507	888888	LF	Wrought Iron Fencing		
20	3	888888	EA	Wrought Iron Gate		

(F) = Final Pay

Subtotal Page Total Extension Price (Items 1 thru 20):

\$ _____

**BUILDING AND SITE IMPROVEMENTS AT 6741 DOWNING AVENUE, BAKERSFIELD, CA
1789CC-C00027**

Item No.	Estimated Quantity	Item Code	Unit of Measure	Item	Unit Price (in figures)	Extension Price (in figures)
21	5	888888	EA	Wrought Iron Man Gate		
22	149,744	888888	SQFT	Undeveloped Area		
23	1	888888	EA	Monument Signage		
24	3	888888	EA	Directional Signage		
25	355	888888	SQFT	Truncated Domes		
26	4	888888	EA	EV Dual Chargers		
27	8	888888	EA	EV Pedestal with Receptacles		
28	1	888888	LS	Septic Tank (3,000 Gallon, 3 – 60 FT Long Special Trench)		
29	1	888888	LS	Construct Warehouse Building and Installing Plumbing		
30	1	888888	LS	Construct Parking Garage		
31	1	999990	LS	Mobilization		

(F) = Final Pay

Subtotal Page Total Extension Price (Items 21 thru 31):

\$ _____

Total Bid Price:

\$ _____

(Indicate Bid Price in Words)

- V. Each Extension Price has been calculated by multiplying the Estimated Quantity by the Unit Price. In the case of lump sum items, the Estimated Quantity shall be unity. The Bid Total is the sum of all Extension Prices. Bidder agrees that in case of any discrepancy between the Unit Price(s) and the respective Extension Price(s) and/or the Total Price Bid, the Unit Price(s) shall prevail, and the bid submitted shall be the correctly computed sum of all correctly computed Extension Prices, provided, however, if the amount set forth as a Unit Price is illegible, omitted, or identical to the amount set forth as an Extension Price, then the amount set forth in the Extension Price column for the item shall be used to determine the correct Unit Price in accordance with the following.
- A. As to lump sum items, the amount set forth in the Extension Price column shall be the Unit Price.
 - B. As to unit basis items, the amount set forth in the Extension Price column shall be divided by the Estimated Quantity for the item and the price thus obtained shall be the Unit Price.
 - C. As to items where the amount set forth as a Unit Price is identical to the amount set forth as an Extension Price, the amount set forth in the Extension Price column shall prevail.
- VI. Subcontractors for work are listed on Subcontractors List, submitted herewith.
- VII. The undersigned Bidder understands that County reserves the right to reject this Bid.
- VIII. If written notice of the identification of low bid, hereinafter referred to as Notice of Intent to Award, is mailed or delivered to the undersigned Bidder within the time described in Paragraph 2 of this Bid Form or at any other time thereafter before it is withdrawn, the undersigned Bidder will execute and deliver the documents required by Section 3-1.18, "Contract Execution," of the special provisions within the times specified therein.
- IX. If this Bid is accepted and the undersigned fails to execute the aforesaid contract and to provide surety bonds and evidence of insurance acceptable to the County as is required within the time specified, the County may, at its option, determine that the bidder has abandoned the bid and the bidder's security shall be forfeited and shall become the property of the County of Kern. County shall then be free to accept the bid of another bidder.
- X. Notice of Intent to Award or request for additional information may be addressed to the undersigned Bidder at the address set forth below.
- XI. The undersigned Bidder herewith encloses cash, a cashier's check, or certified check of or on a responsible bank in the United States, or a corporate surety bond furnished by a surety admitted to do a surety business in the State of California, in form specified in the bid book, in the amount of 10% of the Total Bid Price and made payable to the **COUNTY OF KERN**.
- XII. The undersigned Bidder agrees to commence work on the date established in, and to complete all work within the time specified in contract documents.
- XIII. The undersigned Bidder agrees that, liquidated damages for failure to complete all work in the Contract within the time specified in contract documents shall be as set forth in the contract.

IMPORTANT NOTICE:

If Bidder or other interested person is a corporation, give the legal name of corporation, state where incorporated, and names of president and secretary thereof. If a partnership, give name of the firm and names of all individual co-partners composing the firm. If Bidder or other interested person is an individual, give first and last names in full.

Accompanying this proposal is * _____ in an amount equal to at least ten percent of the Bid Total.

The names of all persons ** interested in the foregoing proposal as principals are as follows:

_____	_____
_____	_____
_____	_____

The bidder is _____, is not _____, licensed in accordance with California law providing for the licensing of Contractors:

License No. _____ License Class _____ Expiration Date _____

DIR Registration No. _____

By signature on this proposal, I certify, under penalty of perjury under the laws of the State of California, that the foregoing proposal is true and correct, including, but not limited to: a) the Equal Employment Opportunity Certification, b) the Debarment and Suspension Certification, and c) the Certification With Regard to Lobbying Activities.

Date: _____

*** Signature of Bidder

* Insert the words "cash (\$ _____)," "Cashier's check," "certified check," or "bidder's bond" as the case may be.

** If the bidder or other interested person is a corporation, state above the legal name of the corporation and the names of the president, treasurer and manager thereof; if a co-partnership, state above the true name of the firm and the names of all individual co-partners composing firm; if bidder or other interested person is an individual, state above first and last name(s) in full.

*** If bidder is a corporation, the legal name of the corporation shall be set forth above together with the signature of the officer(s) authorized to sign contracts on behalf of the corporation; if bidder is a co-partnership, the true name of the firm shall be set forth above together with the signature of the partner(s) authorized to sign contracts in behalf of the co- partnership; and if bidder is an individual, his signature shall be placed above. If signature is by an agent, other than an officer of a corporation or a member of a partnership, a Power of Attorney must be on file with the Department prior to opening bids or submitted with the bid; otherwise, the bid will be disregarded as irregular and unauthorized.

THIS PAGE INTENTIONALLY LEFT BLANK

SUBCONTRACTOR'S LIST

The Subcontractors List must include the names of all subcontractors for those subcontractors who will perform any portion of work, including labor, rendering of service, or specially fabricating and installing a portion of the work or improvement according to detailed drawings contained in the plans and specifications, in excess of one half of one percent (0.5%) of the total Bid amount or \$10,000, whichever is greater (Pub Cont Code § 4100 et seq.).

Subcontractors Information			Work Portion		
Full Name of Subcontractor and Address of Mill or Shop	Subcontractor's License No.	DIR Registration No.	Bid Item No.	Description	% of Bid Item

(Bidder to attach additional sheets if necessary)

END OF SUBCONTRACTOR'S LIST

THIS PAGE INTENTIONALLY LEFT BLANK

BID BOND

KNOW ALL BY THESE PRESENTS:

That the undersigned

(Name of Contractor)

as Principal and the undersigned as Surety are held and firmly bound unto Owner, **COUNTY OF KERN**, as obligee, in the penal sum of **(Dollar Amount In Words)** _____ Dollars (\$_____) lawful money of the United States of America being at least ten percent (10%) of the aggregate amount of said Principal's base Bid, for the payment of which, well and truly to be made, we bind ourselves, our successors, executors, administrators, and assigns, jointly and severally, firmly by these presents.

WHEREAS, said Principal is submitting a Bid for Owner Contract Number **26016, BUILDING AND SITE IMPROVEMENTS AT 6741 DOWNING AVENUE, BAKERSFIELD, CA.**

THE CONDITION OF THIS OBLIGATION IS SUCH that if the Bid submitted by the said Principal be accepted and the Contract be awarded to said Principal and said Principal shall within the required periods enter into the Contract so awarded and provide the required Construction Performance Bond, Construction Labor and Material Payment Bond, insurance certificates, Guaranty, and all other endorsements, forms, and documents required under Notice to Bidders and Special Provisions, then this obligation shall be void, otherwise to remain in full force and effect.

IN WITNESS WHEREOF, the above bounden parties have executed this instrument this _____ day of _____, 20____.

(Month)

Contractor as Principal

Surety

By: _____ (Seal)
Signature

By: _____ (Seal)
Signature

Typed Name and Title

Typed Name and Title

Surety

Surety

By: _____ (Seal)
Signature

By: _____ (Seal)
Signature

Typed Name and Title

Typed Name and Title

NOTE: *Signatures of those executing for the Surety must be sworn to before a notary public and a Power of Attorney attached, if applicable.*

Correspondence or claims relating to this bond should be sent to the Surety at the following address:

Agency: _____

Agency: _____

Contact: _____

Contact: _____

Address: _____

Address: _____

Phone: _____

Phone: _____

Fax No: _____

Fax No: _____

NON-COLLUSION DECLARATION

PUBLIC CONTRACT CODE SECTION 7106

NON-COLLUSION DECLARATION TO BE EXECUTED BY CONTRACTOR/SUBCONTRACTOR AND
SUBMITTED WITH BID

_____,
(Name of Principal of Contractor/Subcontractor)

says that I am the _____
(Office of Affiant)

of _____, the party
(Name of Bidder)

making the foregoing Bid. The Bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The Bid is genuine and not collusive or sham. The Bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham Bid, and has not directly or indirectly colluded, conspired, connived or agreed with any bidder or anyone else to put in a sham Bid, or to refrain from bidding. The Bidder has not in any manner, directly or indirectly, sought by agreement, communication or conference with anyone to fix the Bid price of Bidder or any other bidder, or to fix any overhead, profit or cost element of the Bid price, or of that of any other bidder, or to secure any advantage against Owner, or anyone interested in the proposed contract. All statements contained in the Bid are true. The Bidder has not, directly or indirectly, submitted its Bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, Bid depository, or to any member or agent thereof to effectuate a collusive or sham Bid, and has not paid, and will not pay any person or entity for such purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on _____[date], at _____[city], _____[state].

(Name of Bidder)

(Signature of Principal)

PRIME AND ALL SUBCONTRACTORS MUST SUBMIT THIS FORM

END OF NON-COLLUSION DECLARATION

THIS PAGE LEFT INTENTIONALLY BLANK

BIDDER CERTIFICATIONS

The undersigned Bidder certifies to the County of Kern (**County** or **Owner**) as set forth in sections 1 through 8 below.

1. STATEMENT OF CONVICTIONS

By my signature hereunder, I hereby swear, under penalty of perjury, that no more than one final, unappealable finding of contempt of court by a Federal Court has been issued against Bidder within the past two years because of failure to comply with an order of a Federal Court or to comply with an order of the National Labor Relations Board.

2. CERTIFICATION OF WORKER'S COMPENSATION INSURANCE

By my signature hereunder, as the Contractor, I certify that I am aware of the provisions of Labor Code Section 3700 that require every employer to be insured against liability for worker's compensation or to undertake self-insurance in accordance with the provisions of that Code, and I will comply with such provisions before commencing the performance of the work of this Contract.

3. CERTIFICATION OF PREVAILING WAGE RATES AND RECORDS

By my signature hereunder, as the Contractor, I certify that I am aware of the provisions of Labor Code Section 1773 that require the payment of prevailing wage on public projects. Contractor and any subcontractors under the Contractor shall comply with Labor Code Section 1776, regarding wage records, and with Labor Code Section 1777.5, regarding the employment and training of apprentices. Contractor is responsible to ensure compliance by any and all subcontractors performing work under this Contract.

4. CERTIFICATION OF COMPLIANCE WITH PUBLIC WORKS CHAPTER OF LABOR CODE

By my signature hereunder, as the Contractor, I certify that I am aware of Labor Code Sections 1777.1 and 1777.7 and Contractor and Subcontractors are eligible to bid and work on public works projects.

5. CERTIFICATION OF NON-DISCRIMINATION

By my signature hereunder, as the Contractor, I certify that there will be no discrimination in employment with regard to race, color, religion, gender, sexual orientation, age or national origin; that all federal, state, and local directives and executive orders regarding non-discrimination in employment will be complied with; and that the principal of equal opportunity in employment will be demonstrated positively and aggressively.

6. CERTIFICATION OF NON-DISQUALIFICATION

By my signature hereunder, as the Contractor, I swear, under penalty of perjury, that the below indicated Bidder, any officer of Bidder, or any employee of Bidder who has a proprietary interest in such Bidder, has never been disqualified, removed, or otherwise prevented from bidding on, or completing a Federal, State, or local government project because of a violation of law or safety regulation, except as indicated on the separate sheet attached hereto entitled "Previous Disqualifications." If a statement of "Previous Disqualifications" is attached, please explain the circumstances.

7. CERTIFICATION OF ADEQUACY OF CONTRACT AMOUNT

By my signature hereunder, as the Contractor, pursuant to Labor Code Section 2810(a), I certify that, if awarded the Contract based on the undersigned's Bid, the Contract will include funds sufficient to allow the Contractor to comply with all applicable local, state, and federal laws or regulations governing the labor or services to be provided. I understand that Owner will be relying on this certification if it awards the Contract to the undersigned.

8. CERTIFICATION REGARDING DIR CONTRACTOR / SUBCONTRACTOR REGISTRATION

By my signature hereunder, as the Contractor, I certify that Contractor, and all Subcontractors listed on the Subcontractors List are the subject of current and active contractor registrations pursuant to Division 2, Part 7, Chapter 1 (commencing with section 1720) of the California Labor Code. Contractor's registration number is **[please complete]** _____. Subcontractors' registration numbers are as indicated in Subcontractors List.

BIDDER:

(Name of Bidder)

Date: _____, [20__]

By: _____
(Signature)

Name: _____
(Print Name)

Its: _____
(Title)

END OF BIDDER CERTIFICATIONS

COUNTY OF KERN BIDDERS LIST

All bidders are required to provide the following information for all DBE and non-DBE contractors, who provided a proposal, bid, quote, or were contacted by the prime. This information is also required from the proposed prime contractor, and must be submitted with their bid. The County will use this information to maintain and update a "Bidders" List to assist in the overall annual goal DBE goal setting process.

Firm Name: _____ Phone: _____

Address: _____ Fax: _____

Contact Person: _____ No. of Years in Business: _____

Email Address: _____

Is the firm currently certified as a DBE under the new regulations (49 CFR Part 26)?

Yes _____ No _____

Type of work/services/materials provided by firm: _____

Gross Annual Receipts _____

This form may be duplicated, if necessary, to report all bidders (DBE's and non-DBE's) information.

(FORM TO BE SUBMITTED WITH BID FOR PRIME AND ALL LISTED SUBCONTRACTORS)

THIS PAGE INTENTIONALLY LEFT BLANK

**Public Works Department
County of Kern, State of California**

AGREEMENT FOR CONSTRUCTION

THIS AGREEMENT, is made and entered into on _____, by and between _____ whose place of business is located at _____ (Contractor), and the COUNTY OF KERN (hereinafter **County**), acting under and by virtue of the authority vested in County by the laws of the State of California.

WHEREAS, County, awarded to Contractor the following Contract:

CONTRACT NUMBER 26016

BUILDING AND SITE IMPROVEMENTS AT 6741 DOWNING AVENUE, BAKERSFIELD, CA

NOW, THEREFORE, in consideration of the mutual covenants hereinafter set forth, Contractor and County agree as follows:

1. SCOPE OF WORK OF THE CONTRACT

a. Work of the Contract

- i. Contractor shall complete all work specified in the Contract Documents, in accordance with the notice to bidders, plans, specifications, special provisions, this Agreement, and all other terms and conditions of contract documents.

b. Price for Completion of the Work

- i. County shall pay Contractor the following amount \$ _____ (original contract price) for completion of work in accordance with contract documents as set forth in Contractor's Bid, attached hereto.
- ii. The original contract price includes all allowances (if any).

[ATTACH BID]

2. COMMENCEMENT AND COMPLETION OF WORK; LIQUIDATED DAMAGES

a. Commencement of Work and Contract Time

- i. As provided by special provision section 8-1.04B, Contractor's working days shall begin 13 calendar days after the date this Agreement has been executed by County (Commencement Date). Contractor shall begin work within 15 calendar days after the Commencement Date and shall diligently prosecute the same to completion.
- ii. County reserves the right to modify or alter the Commencement Date.

b. Completion of Work

- i. Contractor shall achieve contract completion of the entire work within 360 working days from the Commencement Date.

c. Liquidated Damages

- i. As liquidated damages for delay Contractor shall pay County \$2,000.00 for each calendar day that expires after the time specified herein for Contractor to achieve contract completion of the entire work, until achieved.
- ii. Limitations and stipulations regarding liquidated damages are set forth in contract documents.

3. PROJECT REPRESENTATIVES

a. County's Project Manager

- i. County has designated **Joshua Champlin** as its Project Manager to act as County's Representative in all matters relating to the contract documents.
- ii. Project Manager shall have final authority over all matters pertaining to the Contract Documents and shall have sole authority to modify the contract documents on behalf of County, to accept work, and to make decisions or actions binding on County, and shall have sole signature authority on behalf of County.
- iii. County may assign all or part of the Project Manager's rights, responsibilities and duties to a Construction Manager, or other County Representative.

b. Contractor's Project Manager

- i. Contractor has designated _____ as its Project Manager to act as Contractor's Representative in all matters relating to the Contract Documents.

c. Design Engineer

- i. **Mark Ensminger** furnished the project-specific plans and specifications and shall have the rights assigned to Design Engineer in the Contract Documents.
- ii. Design Engineer has designated **Jeff Davis** as its project manager, to act as its representative for receiving and making communications authorized under the Contract Documents.

4. MISCELLANEOUS

- a. To induce Owner to enter into this Agreement, Contractor represents that it is duly organized, existing and in good standing under applicable state law; is licensed to perform all aspects of the work; will employ only persons and subcontractors and designers with all required licenses and certifications; that Contractor is duly qualified to conduct business in the State of California; that Contractor has duly authorized the execution, delivery and performance of this Agreement, the other Contract Documents and the work to be performed herein; and that the Contract Documents do not violate or create a default under any instrument, agreement, order or decree binding on Contractor.
- b. Contractor shall not assign any portion of the Contract Documents.
- c. It is understood and agreed that in no instance are the persons signing this Agreement for or on behalf of County or acting as an employee, agent, or representative of County, liable on this Agreement or any of the Contract Documents, or upon any warranty of authority, or otherwise, and it is further understood and agreed that liability of County is limited and confined to such liability as authorized or imposed by the Contract Documents or applicable law.
- d. In entering into a public works contract or a subcontract to supply goods, services or materials pursuant to a public works contract, Contractor or Subcontractor offers and agrees to assign to the awarding body all rights, title and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. §15) or under the Cartwright Act (Chapter 2 (commencing with §16700) of Part 2 of Division 7 of the Business

and Professions Code), arising from purchases of goods, services or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time County tenders final payment to Contractor, without further acknowledgment by the parties.

- e. Copies of the general prevailing rates of per diem wages for each craft, classification, or type of worker needed to execute the Contract, as determined by Director of the State of California Department of Industrial Relations, are deemed included in the Contract Documents and on file at County's Office, and shall be made available to any interested party on request. Pursuant to California Labor Code §§ 1860 and 1861, in accordance with the provisions of Section 3700 of the Labor Code, every contractor will be required to secure the payment of compensation to his employees. Contractor represents that it is aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that Code, and Contractor shall comply with such provisions before commencing the performance of the work of the Contract Documents.
- f. In accordance with Labor Code Section 1771(a), Contractor represents that it and all of its Subcontractors are currently registered and qualified to perform public work pursuant to Labor Code Section 1725.5. Contractor covenants that any additional or substitute Subcontractors will be similarly registered and qualified.
- g. Should any part, term or provision of this Agreement or any of the Contract Documents, or any document required herein or therein to be executed or delivered, be declared invalid, void or unenforceable, all remaining parts, terms and provisions shall remain in full force and effect and shall in no way be invalidated, impaired or affected thereby. If the provisions of any law causing such invalidity, illegality or unenforceability may be waived, they are hereby waived to the end that this Agreement and the Contract Documents may be deemed valid and binding agreements, enforceable in accordance with their terms to the greatest extent permitted by applicable law. In the event any provision not otherwise included in the Contract Documents is required to be included by any applicable law, that provision is deemed included herein by this reference (or, if such provision is required to be included in any particular portion of the Contract Documents, that provision is deemed included in that portion).
- h. Electronic and facsimile signatures may be used for all pay estimates and contract change orders, and shall have the same effect as an original signature.
- i. This Agreement and the Contract Documents shall be deemed to have been entered into in the County of Kern, State of California, and governed in all respects by California law (excluding choice of law rules). The exclusive venue for all disputes or litigation hereunder shall be in the Superior Court for the County of Kern.

//

//

//

IN WITNESS WHEREOF the parties have executed this Agreement in quadruplicate the day and year first above written.

RECOMMENDED AND APPROVED
AS TO CONTENT:
COUNTY OF KERN

Firm's Name

By: _____
Public Works Department

Type of Entity (corporation, partnership,
individual, etc.)

(Printed Name)

By: _____
(Signature)

(Title)

(Typed Name)

APPROVED AS TO FORM:
Office of the County Counsel

By: _____

Title of Individual Executing Document on behalf
of Firm

"COUNTY"

By: _____

"Contractor"

NOTICE: CONTRACTORS ARE REQUIRED BY LAW TO BE LICENSED AND REGULATED BY CONTRACTOR'S STATE LICENSE BOARD. QUESTIONS CONCERNING A CONTRACTOR MAY BE REFERRED TO THE REGISTRAR OF THAT BOARD, WHOSE ADDRESS IS: CONTRACTORS' STATE LICENSE BOARD, 1020 "N" STREET, SACRAMENTO, CA 95814.

END OF AGREEMENT

CONSTRUCTION PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS:

1. **COUNTY OF KERN, (County)** has awarded to _____ as Principal, a Contract dated the _____ day of _____, 20____ (**Contract**), for the **BUILDING AND SITE IMPROVEMENTS AT 6741 DOWNING AVENUE, BAKERSFIELD, CA** in the amount of \$ _____, which Contract is by this reference made a part hereof.
2. AND WHEREAS, Principal is required to furnish a bond in connection with the Contract, guaranteeing the faithful performance thereof;
3. NOW, THEREFORE, we, the undersigned Principal and _____ as Surety are held and firmly bound unto County in the sum of 100% OF THE CONTRACT SUM to be paid to County or its successors and assigns; for which payment, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.
4. THE CONDITION OF THIS OBLIGATION IS SUCH, that if Principal, or its heirs, executors, administrators, successors, or assigns approved by County, shall promptly and faithfully perform the covenants, conditions, and agreements of the Contract during the original term and any extensions thereof as may be granted by County, with or without notice to Surety, and during the period of any guarantees or warranties required under the Contract, and shall also promptly and faithfully perform all the covenants, conditions, and agreements of any alteration of the Contract made as therein provided, notice of which alterations to Surety being hereby waived, on Principal's part to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify, defend, protect, and hold harmless County as stipulated in the Contract, then this obligation shall become and be null and void; otherwise it shall be and remain in full force and effect.
5. No extension of time, change, alteration, modification, or addition to the Contract, or of the work required thereunder, shall release or exonerate Surety on this bond or in any way affect the obligation of this bond; and Surety does hereby waive notice of any such extension of time, change, alteration, modification, or addition.
6. Whenever Principal shall be and declared by County in default under the Contract, Surety shall promptly remedy the default, or shall promptly:
 - a. Undertake through its agents or independent contractors, reasonably acceptable to County, to complete the Contract in accordance with its terms and conditions and to pay and perform all obligations of Principal under the Contract including, without limitation, all obligations with respect to warranties, guarantees, indemnities, and the payment of liquidated damages; or
 - b. Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and, upon determination by County of the lowest responsible bidder, reasonably acceptable to County, arrange for a contract between such bidder and County and make available as work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the Contract Sum, and to pay and perform all obligations of Principal under the Contract including, without limitation, all obligations with respect to warranties, guarantees, and the payment of liquidated damages; but, in any event, Surety's total obligations hereunder shall not exceed the amount set forth in the third paragraph hereof. The term "balance of the Contract Sum," as used in this paragraph, shall mean the total amount payable by County to the Principal under the Contract and any amendments thereto, less the amount County paid to Principal.
7. Surety's obligations hereunder are independent of the obligations of any other surety for the performance of the Contract, and suit may be brought against Surety and such other sureties, jointly and severally, or against any one or more of them, or against less than all of them without impairing County's rights against the others. Surety may not use the above-named Principal to complete the Contract absent County's written consent.
8. No right of action shall accrue on this bond to or for the use of any person or corporation other than County or its successors or assigns.

9. Surety may join in any proceedings brought under the Contract and shall be bound by any judgment.
10. Correspondence or claims relating to this bond shall be sent to Surety at the address set forth below.

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

Contractor as Principal

Surety

By: _____ (Seal)
Signature

By: _____ (Seal)
Signature

Typed Name and Title

Typed Name and Title

Surety

Surety

By: _____ (Seal)
Signature

By: _____ (Seal)
Signature

Typed Name and Title

Typed Name and Title

NOTE: *Signatures of those executing for the Surety must be sworn to before a notary public and a Power of Attorney attached, if applicable.*

Correspondence or claims relating to this bond should be sent to the Surety at the following address:

Agency: _____

Agency: _____

Contact: _____

Contact: _____

Address: _____

Address: _____

Phone: _____

Phone: _____

Fax No: _____

Fax No: _____

END OF CONSTRUCTION PERFORMANCE BOND

CONSTRUCTION LABOR AND MATERIAL PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS:

1. THAT WHEREAS, the **COUNTY OF KERN, (County)** has awarded to _____ as Principal, a Contract dated the _____ day of _____, 20____ (**Contract**), for the **BUILDING AND SITE IMPROVEMENTS AT 6741 DOWNING AVENUE, BAKERSFIELD, CA** in the amount of \$ _____, which Contract is by this reference made a part hereof.
2. AND WHEREAS, Principal is required to furnish a bond in connection with the Contract to secure the payment of claims of laborers, mechanics, material suppliers, and other persons as provided by law;
3. NOW, THEREFORE, we, the undersigned Principal and _____ as Surety, are held and firmly bound unto County in the sum of 100% OF THE CONTRACT SUM (\$ _____), for which payment well and truly to be made we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.
4. THE CONDITION OF THIS OBLIGATION IS SUCH, that if Principal, or its heirs, executors, administrators, successors, or assigns approved by County, or its subcontractors shall fail to pay any of the persons named in California Civil Code Section 9100, or amounts due under the State of California Unemployment Insurance Code with respect to work or labor performed under the Contract, or for any amounts required to be deducted, withheld, and paid over to the State of California Employment Development Department from the wages of employees of Principal and subcontractors pursuant to California Unemployment Insurance Code Section 13020 with respect to such work and labor, that Surety will pay for the same in an amount not exceeding the sum specified in this bond, plus reasonable attorneys' fees, otherwise the above obligation shall become and be null and void.
5. This bond shall inure to the benefit of any of the persons named in California Civil Code Section 9100, as to give a right of action to such persons or their assigns in any suit brought upon this bond. The intent of this bond is to comply with the California Mechanic's Lien Law.
6. Surety, for value received, hereby expressly agrees that no extension of time, change, modification, alteration, or addition to the undertakings, covenants, terms, conditions, and agreements of the Contract, or to the work to be performed thereunder, shall in any way affect the obligation of this bond; and it does hereby waive notice of any such extension of time, change, modification, alteration, or addition to the undertakings, covenants, terms, conditions, and agreements of the Contract, or to the work to be performed thereunder.
7. Surety's obligations hereunder are independent of the obligations of any other surety for the payment of claims of laborers, mechanics, material suppliers, and other persons in connection with Contract; and suit may be brought against Surety and such other sureties, jointly and severally, or against any one or more of them, or against less than all of them without impairing County's rights against the other.
8. Correspondence or claims relating to this bond shall be sent to Surety at the address set forth below.

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

Contractor as Principle

Surety

By: _____ (Seal)
Signature

By: _____ (Seal)
Signature

Typed Name and Title

Typed Name and Title

Surety

Surety

By: _____ (Seal)
Signature

By: _____ (Seal)
Signature

Typed Name and Title

Typed Name and Title

NOTE: Signatures of those executing for the Surety must be sworn to before a notary public and a Power of Attorney attached, if applicable.

Correspondence or claims relating to this bond should be sent to the Surety at the following address:

Agency: _____

Agency: _____

Contact: _____

Contact: _____

Address: _____

Address: _____

Phone: _____

Phone: _____

Fax No: _____

Fax No: _____

END OF CONSTRUCTION LABOR AND MATERIAL PAYMENT BOND

IN-USE OFF-ROAD DIESEL-FUELED VEHICLE LIST

Complete and submit the In-Use Off-Road Diesel-Fueled Vehicle List form under section 2-1.33.

On the In-Use Off-Road Diesel-Fueled Vehicle List form, list each fleet used by you or your subcontractor to perform work and is subject to 13 CCR § 2449 et seq. Submit a copy of a valid Certificate of Reported Compliance (13 CCR § 2449, subdivision (n)) for each fleet listed on the form within 10 days of bid opening. Failure to list a fleet used by you or your subcontractor to perform work on the In-Use Off-Road Diesel-Fueled Vehicle List form may result in a nonresponsive bid. Failure to submit the Certificate of Reported Compliance for a fleet listed on the In-Use Off-Road Diesel-Fueled Vehicle List form may result in a nonresponsive bid.

Contract No.

(Firm/Company Name):

26016

Under 13 CCR § 2449 et seq., list the fleet name and Off-Road Diesel Fleet Identification (DOORS ID) number for every fleet used by you or your subcontractor to perform the work below.

☐ Check here if all fleets used to perform work are not subject to 13 CCR § 2449 et seq. Submit the blank form as part of the bid.

Fleet Name	DOORS ID Number

THIS PAGE LEFT INTENTIONALLY BLANK



ADMINISTRATIVE BULLETIN NO. 19

Issued: January 23, 2024

SUBJECT: FREE SPEECH POLICY

Purpose

The purpose of this Free Speech Policy is to inform all employees, employment applicants, and contractors of their constitutional rights to free speech, to petition the government for redress of grievances, to instruct representatives, and to freely associate and assemble. Unlawful discrimination based on the exercise of these rights is unacceptable and incompatible with the County's standards, as well as being a violation of the law. This Free Speech Policy also establishes the complaint and investigation procedure for alleged violations of these rights.

First Amendment Rights

Every County employee, employment applicant, and contractor has a constitutional right to free speech, to petition the government for redress of grievances, to instruct representatives, and to freely associate and assemble. ¹ For simplicity, this policy shall refer to such rights as "First Amendment Rights."

Every County employee, employment applicant, and contractor shall be free from any unlawful discrimination or retaliation by the County of Kern for exercising their First Amendment Rights while employed, while seeking employment, or while doing or seeking to do business for or with the County.

Free Speech Policy

The County of Kern remains committed to creating a professional environment in which the First Amendment Rights of all County employees, employment applicants, and contractors are protected.

It is a violation of the Constitutions of the United States and California for the County to unlawfully discriminate against County employees, employment applicants, or contractors because they exercised their First Amendment Rights.

Every County employee, and other person acting on behalf of the County, including members of the Board of Supervisors, is prohibited from unlawfully discriminating against, harassing, or retaliating against an employee, employment applicant, or contractor because the employee, employment applicant, or contractor exercised their First Amendment Rights, or because they filed a complaint or participated in an investigation under this Free Speech Policy.

All County employees and other persons acting on behalf of the County, including members of the Board of Supervisors, shall uphold and abide by this Free Speech Policy by cooperating fully in any investigation of a complaint of unlawful discrimination, harassment, or retaliation under this Free Speech Policy.

¹ California Constitution, article I, sections 2(a) and 3(a); U.S. Constitution, amend. I.

Persons in positions of authority, including managers and supervisors, shall act immediately on potential violations of this Free Speech Policy. They are responsible for knowing and enforcing this Policy and creating and maintaining a workplace free of discrimination, harassment, and retaliation, and should address potential problems before they become serious.

This Free Speech Policy applies at every level of the County and to every aspect of the workplace environment, including but not limited to, County events that occur outside of the physical workplace.

This Free Speech Policy shall be posted on the Kern County websites and in designated physical locations, and shall be attached to all County-issued Requests for Proposals (RFPs) and other solicitations for contract or grant proposals, County contracting forms and templates, and relevant notices to employees, employment applicants, and contractors.

Examples of unlawful discrimination:

- A department head recommends that a contract not be renewed because the contractor is politically active, regardless of their political position.
- A supervisor declines to recommend a supervisee for a promotion, or assigns a supervisee to less favorable job duties or to a less favorable location, because of the supervisee's union activity.
- A manager gives a supervisee poor job evaluations because the manager does not agree with their supervisee's political views.
- A county decision-maker declines to award a contract to provide social services to a particular community based organization because that organization actively campaigns for a particular bill or social movement.
- A county decision maker stops communicating with a potential contractor about a contract because the contractor has threatened to file lawsuit against the County in an unrelated case.

The California and U.S. Constitutions also provide specific First Amendment protection for County elected officials and other persons acting on behalf of the County, including volunteers and interns. This policy does not address such persons' rights.

Complaint and Investigation Procedure

Each employee, employment applicant, or contractor who believes that they have experienced unlawful discrimination or harassment described in this Policy may file a written complaint setting forth the specific facts and evidence supporting the complaint with the County Complaint Coordinator (see below). Such complaints shall be promptly forwarded to the Free Speech Retained Expert (see below). The complainant shall provide all documentary evidence, names of potential witnesses, and any other information believed by the complainant to be relevant to the complaint.

The County Complaint Coordinator shall initiate a formal investigation of the allegations in the complaint, interview all witnesses to the incident giving rise to the complaint (including the complainant and the person(s) against whom the complaint is directed), and issue written findings as to the merits of the complaint and the remedies that should be implemented to resolve the complaint under existing County ordinances, policies, and procedures. The County Complaint Coordinator shall have a period of not more than 75 business days from receipt of the complaint to conduct the investigation and to issue appropriate draft findings and recommended remedies. The 75-day time period may be extended due to the unavailability of a material witness, or with the written agreement of the complainant.

The County Complaint Coordinator shall provide the draft findings and recommended remedies to the Free Speech Retained Expert for review and approval. The County Complaint Coordinator shall also provide the Free Speech Retained Expert with a copy of the complaint, all information and documentary evidence provided by the complainant, all witness interview materials and documents provided by witnesses, and all information and documentary evidence developed by the County Complaint Coordinator in conducting the investigation.

In the event that the Free Speech Retained Expert does not approve the County Complaint Coordinator's draft findings and recommended remedies, the Free Speech Retained Expert shall prepare a written explanation of the reasons for non-approval. The Free Speech Retained Expert and County Complaint Coordinator shall meet and confer to resolve any disagreement or deficiencies, and both parties shall state their positions in writing. The County Complaint Coordinator shall then take all necessary steps to correct any deficiencies and re-submit the draft findings and recommended remedies to the Free Speech Retained Expert for review and approval.

In the case of any complaints in which there is an appearance of bias, conflict of interest, or insufficient independence with regard to the handling of the complaint by the County Complaint Coordinator, the Backup Complaint Coordinator (see below) shall conduct the investigation, and the Free Speech Retained Expert shall review and approve in the same manner as any investigation conducted by the County Complaint Coordinator.

The Free Speech Retained Expert shall conduct the investigation if both the Complaint Coordinator and the Backup Complaint Coordinator are conflicted. The County shall implement the Free Speech Retained Expert's findings and remedies.

Department heads shall be responsible for ensuring that all new employees and contract staff in their department receive a copy of this policy and sign an acknowledgment which shall be retained in the employee's personnel file (or a similar file for contract staff). In addition, department heads shall ensure that, on an annual basis, each employee in their department receives a copy of this policy and that an acknowledgment of receipt is contained in each employee's personnel file.

Department heads may establish departmental policies and internal complaint procedures provided that those policies and procedures are consistent with this Policy.

Nothing in this Policy shall abrogate any legal evidentiary standards in a court of law.

Complaints Within the Scope of Civil Service Commission Rule 1810.00. et seq.

The Kern County Rules of the Civil Service Commission ("Civil Service Rules") provide a voluntary complaint procedure for some complaints that fall within the scope of this Policy. These Civil Service Rules apply to civil service employees or applicants for civil service employment complaining of unlawful discrimination, harassment, or retaliation based on religious, union, or political affiliation, or due to their participation in a government investigation.

A complainant whose complaint falls within the scope of both the Civil Service Rules and this Policy may choose to file their complaint using the procedure described in the Civil Service Rules, commencing at section 1820.00, or using the procedure otherwise described in this Policy, but not both. If a complainant invokes both procedures for the same complaint, the complainant shall be required to make a written election of which procedure they wish to have apply.

The Free Speech Retained Expert will review all such complaints consistent with the time limitations, procedure, and appellate rights set forth in Civil Service Rule 1820.00. The Free Speech Retained Expert will review and approve findings of fact and recommended remedies issued by the Equal Employment Opportunity Officer.

Under Civil Service Rule 1830.00-1830.02, either the complainant or the County may request a hearing before the Civil Service Commission. The Free Speech Retained Expert does not review the Civil Service Commission's decision for approval but will provide a report to the County and complainant regarding any comments, concerns, or recommendations related to the Commission's final decision, within 60-120 days of that decision.

County Complaint Coordinator: Sarah Gutierrez, Director of Diversity, Equity and Inclusion; (661) 868-3919; gutierrezsa@kerncounty.com

Backup County Complaint Coordinator: Mercedes Perez, Senior Human Resources Specialist; (661) 868-3915; perezmer@kerncounty.com

Free Speech Retained Expert:

Barry McDonald, (310) 506-4668; barry.mcdonald@pepperdine.edu

By my signature below, I acknowledge that I have received and reviewed this Free Speech Policy (AB19) and I understand that a copy must be submitted with the bid documents.

Printed Name and Title

Signature

Date

APPENDIX A

PROJECT MANUAL

THIS PAGE LEFT INTENTIONALLY BLANK

PROJECT MANUAL

Kern County Household Hazardous Waste Facility Bakersfield, California

Prepared by
Skarphol/Frank Associates

SE Corner of Downing Avenue and Wear Street
Bakersfield California 93308
Project Number: 7005

TABLE OF CONTENTS

PROCUREMENT AND CONTRACTING REQUIREMENTS GROUP

DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

INTRODUCTORY INFORMATION

00 0101	PROJECT TITLE PAGE
00 0107	SEALS PAGE
00 0110	Table of Contents

SPECIFICATIONS GROUP

GENERAL REQUIREMENTS SUBGROUP

DIVISION 01 - GENERAL REQUIREMENTS

01 1000	SUMMARY
01 3100	PROJECT MANAGEMENT AND COORDINATION
01 3300	SUBMITTAL PROCEDURES
01 4000	QUALITY REQUIREMENTS
01 5000	TEMPORARY FACILITIES AND CONTROLS
01 6000	PRODUCT REQUIREMENTS
01 7700	CLOSEOUT PROCEDURES
01 7823	OPERATION AND MAINTENANCE DATA
01 7839	PROJECT RECORD DOCUMENTS

FACILITY CONSTRUCTION SUBGROUP

DIVISION 03 - CONCRETE

03 1000	CONCRETE FORMING AND ACCESSORIES
03 2000	CONCRETE REINFORCING
03 3000	CAST-IN-PLACE CONCRETE
03 3300	ARCHITECTURAL CONCRETE

DIVISION 04 - MASONRY

04 2200	CONCRETE UNIT MASONRY
---------	-----------------------

DIVISION 05 - METALS

05 1200	STRUCTURAL STEEL FRAMING
05 5000	METAL FABRICATIONS
05 5213	PIPE AND TUBE RAILINGS

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

06 1000	ROUGH CARPENTRY
06 4116	PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

07 2100	THERMAL INSULATION
07 4116	INSULATED METAL ROOF PANELS
07 4213.13	FORMED METAL WALL PANELS
07 6200	SHEET METAL FLASHING AND TRIM
07 9200	JOINT SEALANTS

DIVISION 08 - OPENINGS

08 1113	HOLLOW METAL DOORS AND FRAMES
08 1116.13	INTERIOR ALUMINUM DOORS AND FRAMES
08 1416	FLUSH WOOD DOORS
08 3323	OVERHEAD COILING DOORS
08 4113	ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS
08 6200	UNIT SKYLIGHTS
08 8813	FIRE-RATED GLAZING

DIVISION 09 - FINISHES

09 2900	GYPSUM BOARD
09 5123	ACOUSTICAL TILE CEILINGS
09 6513	RESILIENT BASE AND ACCESSORIES
09 6516	RESILIENT SHEET FLOORING
09 6519	RESILIENT TILE AND PLANK FLOORING
09 7200	WALL COVERINGS
09 9123	INTERIOR PAINTING
09 9726	CEMENTITIOUS COATINGS

DIVISION 10 - SPECIALTIES

10 2113.13	METAL TOILET COMPARTMENTS
10 2800	TOILET, BATH, AND LAUNDRY ACCESSORIES
10 5113	METAL LOCKERS

DIVISION 11 - EQUIPMENT

11 1136	VEHICLE CHARGING EQUIPMENT
11 1200	PARKING CONTROL EQUIPMENT

DIVISION 12 - FURNISHINGS

12 3661	SIMULATED STONE COUNTERTOPS
---------	-----------------------------

FACILITY SERVICES SUBGROUP

DIVISION 21 - FIRE SUPPRESSION

21 0000	FIRE SPRINKLERS
---------	-----------------

DIVISION 22 - PLUMBING

22 0000	PLUMBING
---------	----------

DIVISION 23 - HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

23 0000 HVAC

DIVISION 26 - ELECTRICAL

26 0000 ELECTRICAL

DIVISION 31 - EARTHWORK

31 1000 SITE CLEARING

31 2000 EARTH MOVING

DIVISION 32 - EXTERIOR IMPROVEMENTS

32 1216 ASPHALT PAVING

32 1313 CONCRETE PAVING

32 1373 CONCRETE PAVING JOINT SEALANTS

32 1713 PARKING BUMPERS

32 1716 MANUFACTURED TRAFFIC-CALMING
DEVICES

32 1723 PAVEMENT MARKINGS

32 1726 TACTILE WARNING SURFACING

32 3113 CHAIN LINK FENCES AND GATES

32 3119 DECORATIVE METAL FENCES AND GATES

32 3300 SITE FURNISHINGS

32 8400 PLANTING IRRIGATION

32 9300 PLANTS

END OF TABLE OF CONTENTS

SECTION 00 0101 - PROJECT TITLE PAGE

PART 1 - GENERAL

1.1 PROJECT MANUAL

A. VOLUME 1.

1. Kern County Special Waste Facility.
2. Kern County Public Works.
3. Bakersfield, California.
4. Skarphol Frank Associates.
5. 925 17th Street.
6. Bakersfield, CA.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 00 0101

DOCUMENT 00 0107 - SEALS PAGE

PART 1 - GENERAL

1.1 DESIGN PROFESSIONALS OF RECORD

A. Architect:

1. Gregory Frank.
2. No. C-31980.

B. Civil Engineer:

1. Robert T. Swanson.
2. No. 43032.

C. Landscape Architect:

1. Michael O. McDonnell.
2. No. LA 5669.

D. Structural Engineer:

1. Les E Schulz.
2. No. SE2570.

E. Mechanical Engineer, Plumbing:

1. Mark James Baskin.
2. No. M26578.

F. Mechanical Engineer, HVAC:

1. Mark James Baskin.
2. No. M26578.

G. Electrical Engineer:

1. John Maloney.
2. No. E013083.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF DOCUMENT 00 0107

SECTION 03 1000 - CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Form-facing materials.

B. Related Requirements:

1. Section 321313 "Concrete Paving" for formwork related to concrete pavement and walks.

1.2 DEFINITIONS

- A. Form-Facing Material: The temporary form materials that come in direct contact with the concrete as part of the formwork components in supporting the concrete while the concrete is setting and gaining sufficient strength to be self-supporting. The most common materials are steel, aluminum, and wood.
- B. Formwork: The total system of support of freshly placed concrete, including the mold or sheathing that contacts the concrete, as well as supporting members, hardware, and necessary bracing.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 QUALITY ASSURANCE

- A. Perform work in accordance with ACI 301, ACI 318 and other applicable codes.
- B. Design formwork under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of California.

1.5 PAYMENT PROCEDURES

- A. The payment quantity of earthwork shown in the Bid Item List will be paid for at the contract unit price per cubic yard for Item No. 17 – Loading Dock (Earthwork).

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

- A. Except as specifically noted on drawings, all forming materials shall be new material at beginning of project. Materials may be reused during progress of the job, provided they are reconditioned, recoated, and are capable of producing the formwork requirements for that use.
- B. As-Cast Surface Form-Facing Material:
 - 1. Provide continuous, true, and smooth concrete surfaces.
 - 2. Furnish in largest practicable sizes to minimize number of joints.
 - 3. Acceptable Materials: As required to comply with Surface Finish designations specified in Section 033000 "Cast-in-Place Concrete, and as follows:
 - a. Plywood: Douglas Fire Plywood, B-B plyform as classified by the American Plywood Association. Class I exterior, PS 1-76, 3/4-inch minimum thickness.
 - b. Lumber: "Standard" grade or better Douglas Fir, boards and framing or other suitable species as approved, S1S1E or S4S, unless other wise specified and of designed adequate sizes; but not less than 2" x 4" size.

2.2 RELATED MATERIALS

- A. Form-Release Agent: Chemical, surface conversion type from coating. Re-apply to cleaned forms before each reuse.
- B. Form Ties: Use snapties with cone spreaders or tapered formbolts and metal spreaders. Do not use wood or other absorbent material for spreaders. Ties for walls against grade shall not leave holes through entire wall section and shall break back not closer to exterior surface than 1-1/2 inches.
- C. Sealant: Clear, penetrating, synthetic resin sealer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.
- B. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until detrimental conditions are corrected.

3.2 EARTH FORMS

- A. Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.

3.3 INSTALLATION OF FORMWORK

- A. Comply with **ACI 301**.
- B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of **ACI 117** and to comply with the Surface Finish designations specified in Section 033000 "Cast-in-Place Concrete" for as-cast finishes.
- C. Limit concrete surface irregularities as follows:
 - 1. Surface Finish-3.0: **ACI 117** Class A, **1/8 inch**.
- D. Construct forms tight enough to prevent loss of concrete mortar.
 - 1. Minimize joints.
 - 2. Exposed Concrete: Symmetrically align joints in forms.
- E. Construct removable forms for easy removal without hammering or prying against concrete surfaces.
 - 1. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces.
 - 2. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 - 3. Install keyways, reglets, recesses, and other accessories, for easy removal.
- F. Do not use rust-stained, steel, form-facing material.
- G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces.
 - 1. Provide and secure units to support screed strips
 - 2. Use strike-off templates or compacting-type screeds.
- H. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible.
 - 1. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar.
 - 2. Locate temporary openings in forms at inconspicuous locations.
- I. Chamfer exterior corners and edges of permanently exposed concrete.
- J. At construction joints, overlap forms onto previously placed concrete not less than **12 inches**.

- K. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work.
 - 1. Determine sizes and locations from trades providing such items.
 - 2. Obtain written approval of Architect prior to forming openings not indicated on Drawings.
- L. Construction and Movement Joints:
 - 1. Construct joints true to line with faces perpendicular to surface plane of concrete.
 - 2. Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 3. Place joints perpendicular to main reinforcement.
 - 4. Locate joints for beams, slabs, joists, and girders in the middle third of spans.
 - a. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 - 5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
- M. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection.
 - 1. Locate ports and openings in bottom of vertical forms, in inconspicuous location, to allow flushing water to drain.
 - 2. Close temporary ports and openings with tight-fitting panels, flush with inside face of form, and neatly fitted, so joints will not be apparent in exposed concrete surfaces.
- N. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- O. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- P. Coat contact surfaces of forms with form-release agent, in accordance with manufacturer's written instructions, before placing reinforcement.

3.4 REMOVING FORMS

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads. Columns and walls shall not be stripped in less than 5 days, floor slabs in less than 7 days, beams and girders in less than 15 days. Metal pan forms for joists may be removed after 3 days, but joist centering shall not be removed until after 15 days. Ramp, landing, steps and floor slabs shall not be stripped in less than 7 days. Shoring shall not be removed until member has acquired sufficient strength to support its weight, load upon it, and added load of construction.
- B. Compressive strength of in-place concrete shall be determined by testing field-cured

specimens representative of concrete location or members, as specified in Section 03 30 00.

- C. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- D. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.

3.5 APPLICATION OF FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
- C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings which are affected by agent. Soak inside surfaces or untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.6 INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Provide formed openings where required for items to be embedded in passing through concrete work.
- B. Locate and set in place items which will be cast directly into concrete.
- C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.
- D. Install accessories in accordance with manufacturer's instructions, straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- E. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
- F. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.7 FORM CLEANING

- A. Clean and repair surfaces of forms to be reused in the Work.
 - 1. Split, frayed, delaminated, or otherwise damaged form-facing material are unacceptable for exposed surfaces.
 - 2. Apply new form-release agent.
- B. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close

joints.

1. Align and secure joints to avoid offsets.
2. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.8 FORMWORK TOLERANCES

- A. Construct formwork to maintain tolerances required by ACI 301.

3.9 FIELD QUALITY CONTROL

- A. Inspect erected formwork and bracing to ensure that work is in accordance with formwork design, and that supports fastenings, wedges, ties and items are secure.

END OF SECTION 03 1000

SECTION 03 2000 - CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel reinforcement bars.
2. Welded-wire reinforcement.

B. Related Requirements:

1. Section 321313 "Concrete Paving" for reinforcing related to concrete pavement and walks.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Each type of steel reinforcement.
2. Epoxy repair coating.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

1. Store reinforcement to avoid contact with earth.
2. Do not allow epoxy-coated reinforcement to be stored outdoors for more than 60 days without being stored under an opaque covering.
3. Do not allow dual-coated reinforcement to be stored outdoors for more than 60 days without being stored under an opaque covering.
4. Do not allow stainless steel reinforcement to come into contact with uncoated reinforcement.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A615/A615M.

B. Plain-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from as-drawn steel wire into flat sheets.

2.2 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.
 - 1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.
 - b. For epoxy-coated reinforcement, use CRSI Class 1A epoxy-coated or other dielectric-polymer-coated wire bar supports.
 - c. For dual-coated reinforcement, use CRSI Class 1A epoxy-coated or other dielectric-polymer-coated wire bar supports.
 - d. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.
 - e. For stainless steel reinforcement, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.
- B. Welding Electrodes: Comply with AWS D1.4, E90XX Series.
- C. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than **0.0508 inch** in diameter.
 - 1. Finish: Unfinished.
- D. Cleaning: Before placing and again before concrete is placed.
 - 1. Remove all loose mill scale and rust.
 - 2. Remove oil, grease, paint and any other coating that would reduce bond.
- E. Dowels: ASTM A615.

2.3 FABRICATING REINFORCEMENT

- A. Fabricate concrete reinforcing in accordance with ACI 318.
- B. Weld reinforcement in accordance with AWS D1.4.
- C. Locate reinforcing splices not indicated on drawings, at point of minimum stress.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protection of In-Place Conditions:

1. Do not cut or puncture vapor retarder.
 2. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.2 INSTALLATION OF STEEL REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.
- B. Accurately position, support, and secure reinforcement against displacement.
1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
 2. Do not tack weld crossing reinforcing bars.
- C. Preserve clearance between bars of not less than **1 inch**, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.
- D. Provide concrete coverage in accordance with **ACI 318**.
- E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- F. Splices: Lap splices as indicated on Drawings.
1. Bars indicated to be continuous, and all vertical bars to be lapped not less than 36 bar diameters at splices, or **24 inches**, whichever is greater.
 2. Stagger splices in accordance with **ACI 318**.
 3. Mechanical Splice Couplers: Install in accordance with manufacturer's instructions.
 4. Weld reinforcing bars in accordance with AWS D1.4/D 1.4M, where indicated on Drawings.
- G. Install welded-wire reinforcement in longest practicable lengths.
1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."
 - a. For reinforcement less than W4.0 or D4.0, continuous support spacing to not exceed **12 inches**.
 2. Lap edges and ends of adjoining sheets at least one wire spacing plus **2 inches** for plain wire and **8 inches** for deformed wire.
 3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.
 4. Lace overlaps with wire.

3.3 JOINTS

- A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 1. Place joints perpendicular to main reinforcement.
 - 2. Continue reinforcement across construction joints unless otherwise indicated.
 - 3. Do not continue reinforcement through sides of strip placements of floors and slabs.
- B. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length, to prevent concrete bonding to one side of joint.

3.4 INSTALLATION TOLERANCES

- A. Comply with **ACI 117**.

END OF SECTION 03 2000

SECTION 03 3000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete standards.
2. Concrete materials.
3. Admixtures.
4. Vapor retarders.
5. Curing materials.
6. Accessories.
7. Repair materials.
8. Concrete mixture materials.
9. Concrete mixture class types.
10. Concrete mixing.

B. Related Requirements:

1. Section 031000 "Concrete Forming and Accessories" for form-facing materials.
2. Section 032000 "Concrete Reinforcing" for steel reinforcing bars and welded-wire reinforcement.
3. Section 033300 "Architectural Concrete" for general building applications of specially finished formed concrete.
4. Section 321313 "Concrete Paving" for concrete pavement and walks.

1.2 DEFINITIONS

A. Cementitious Materials: Portland cement or blended hydraulic cement alone or in combination with one or more of the following:

1. Fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. Water/Cementitious Materials (w/cm) Ratio: The ratio by weight of mixing water to cementitious materials.

1.3 ACTION SUBMITTALS

A. Design Mixtures: For each concrete mixture, include the following:

1. Mixture identification.
2. Compressive strength at 28 days or other age as specified.
3. Compressive strength required at stages of construction.

4. Durability exposure classes for Exposure Categories F, S, W, and C.
5. Maximum w/cm ratio.
6. Calculated equilibrium and fresh density for lightweight concrete.
7. Slump or slump flow limit.
8. Air content.
9. Nominal maximum aggregate size.
10. Steel-fiber reinforcement content.
11. Synthetic microfiber content.
12. Synthetic macrofiber content.
13. Intended placement method.
14. Submit adjustments to design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant changes.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified Installer who employs Project personnel qualified as an ACI-certified Concrete Flatwork Associate and Concrete Flatwork Finisher and a supervisor who is a certified ACI Advanced Concrete Flatwork Finisher/Technician or an ACI Concrete Flatwork Finisher with experience installing and finishing concrete.
 1. Post-Installed Concrete Anchors Installers: ACI-certified Adhesive Anchor Installer.
- B. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
 1. Manufacturer's production facilities and delivery vehicles certified in accordance with NRMCA's certification requirements or equivalent approval by a State DOT.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with ASTM C94/C94M and **ACI 301**.

1.6 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with **ACI 301**.
- B. Hot-Weather Placement: Comply with **ACI 301** and **ACI 305.1**.

1.7 PAYMENT PROCEDURES

- A. The payment quantity of the loading dock shown in the Bid Item List will be paid for at the contract unit price per cubic yard for Item No. 17 – Loading Dock (Earthwork)
- B. The payment quantity of core concrete shown in the Bid Item List will be paid for at the contract unit price per cubic yard for Item No. 8 – Core Concrete (5”).

- C. The payment quantity of core concrete shown in the Bid Item List will be paid for at the contract unit price per cubic yard for Item No. 9 – Core Concrete (7”).

PART 2 - PRODUCTS

2.1 CONCRETE STANDARDS

- A. ACI Publications: Comply with **ACI 301** unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

A. Source Limitations:

1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.
2. Obtain each type of admixture from single source from single manufacturer.

B. Cementitious Materials:

1. Portland Cement: ASTM C150/C150M, Type I or II.
2. Pozzolans: ASTM C618, Class C, F, or N.
3. Slag Cement: ASTM C989/C989M, Grade 100 or 120.
4. Ground Glass Pozzolan: ASTM C1866/C1866M, Type GS or GE.
5. Silica Fume: ASTM C1240.

C. Normal-Weight Aggregates:

1. Coarse Aggregate: ASTM C33/C33M.
2. Fine Aggregate: ASTM C33/C33M.

D. Lightweight Aggregate: ASTM C330/C330M.

1. Limit lightweight aggregate for internal curing to prewetted lightweight fine aggregate in accordance with ASTM C1761/C1761M.

2.3 ADMIXTURES

- A. Vapor Retarder: Stego Wrap Vapor Barrier (15-mil) by Stgo Industries LLC below concrete slabs on grade. Install per manufacturer's instructions. Provide all accessories required for complete installation including but not limited to seam tape, capor proofing mastic, pipe boots, etc. Provide an 8-ounce nonwoven geotextile fabric cover over vapor retarder where a sand layer is not used below the slab. Refer to the Geotechnical Engineering Investigation Report for requirements.
- B. Air-Entraining Admixture: ASTM C260/C260M.

- C. Mixing Water for Concrete Mixtures and Water Used to Make Ice: ASTM C1602/C1602M. Include documentation of compliance with limits for alkalis, sulfates, chlorides, or solids content of mixing water from Table 2 in ASTM C1602/C1602M.

2.4 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately **9 oz./sq. yd.** when dry.
- B. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.
- C. Water: Potable water that does not cause staining of the surface.

2.5 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from **1/8 inch** and that can be feathered at edges to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
 - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, **1/8 to 1/4 inch** or coarse sand, as recommended by underlayment manufacturer.
 - 4. Compressive Strength: Not less than **4100 psi** at 28 days when tested in accordance with ASTM C109/C109M.

2.6 CONCRETE MIXTURE MATERIALS

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with **ACI 301**.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland or hydraulic cement in concrete assigned to Exposure Class F3 as follows:
 - 1. Fly Ash or Other Pozzolans: 25 percent by mass.
 - 2. Slag Cement: 50 percent by mass.
 - 3. Silica Fume: 10 percent by mass.
 - 4. Total of Fly Ash or Other Pozzolans, Slag Cement, and Silica Fume: 50 percent by mass, with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.
 - 5. Total of Fly Ash or Other Pozzolans and Silica Fume: 35 percent by mass with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.
- C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.

1. Use corrosion-inhibiting admixture in concrete mixtures where indicated.
2. Use permeability-reducing admixture in concrete mixtures where indicated.

2.7 CONCRETE MIXTURE CLASS TYPES

A. Class C: Normal-weight concrete used for interior slabs-on-ground.

1. Exposure Class: **ACI 318** F0.
2. Minimum Compressive Strength: 2500 psi at 28 days.
3. Maximum w/cm Ratio : 0.50.
4. Air Content:
 - a. Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished floors.

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M and furnish delivery ticket.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1. Before placing concrete, verify that installation of concrete forms, accessories, reinforcement, and embedded items is complete and that required inspections have been performed.
2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:

1. Daily access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.
4. Security and protection for test samples and for testing and inspection equipment at Project site.

3.3 TOLERANCES

- A. Comply with **ACI 117**.

3.4 INSTALLATION OF EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.
 - 1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 2. Install reglets to receive waterproofing and through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3.5 INSTALLATION OF VAPOR RETARDERS

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.
 - 1. Install vapor retarder with longest dimension parallel with direction of concrete pour.
 - 2. Face laps away from exposed direction of concrete pour.
 - 3. Lap vapor retarder over footings and grade beams not less than **6 inches**, sealing vapor retarder to concrete.
 - 4. Lap joints **6 inches** and seal with manufacturer's recommended tape.
 - 5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.
 - 6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
 - 7. Protect vapor retarder during placement of reinforcement and concrete.
 - a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by **6 inches** on all sides and sealing to vapor retarder.

3.6 INSTALLATION OF CAST-IN-PLACE CONCRETE

- A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.
 - 1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
 - 2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.
- B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.

- C. Water addition in transit or at the Project site must be in accordance with ASTM C94/C94M and must not exceed the permitted amount indicated on the concrete delivery ticket.
- D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.
 - 1. If a section cannot be placed continuously, provide construction joints as indicated.
 - 2. Deposit concrete to avoid segregation.
 - 3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
 - 4. Consolidate placed concrete with mechanical vibrating equipment in accordance with **ACI 301**.
 - a. Do not use vibrators to transport concrete inside forms.
 - b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least **6 inches** into preceding layer.
 - c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
 - d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 - 1. Do not place concrete floors and slabs in a checkerboard sequence.
 - 2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 3. Maintain reinforcement in position on chairs during concrete placement.
 - 4. Screed slab surfaces with a straightedge and strike off to correct elevations.
 - 5. Level concrete, cut high areas, and fill low areas.
 - 6. Slope surfaces uniformly to drains where required.
 - 7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
 - 8. Do not further disturb slab surfaces before starting finishing operations.

3.7 INSTALLATION OF JOINTS

- A. Construct joints true to line, with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.
 - 1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
 - 2. Place joints perpendicular to main reinforcement.

- a. Continue reinforcement across construction joints unless otherwise indicated.
 3. Form keyed joints as indicated. Embed keys at least **1-1/2 inches** into concrete.
 4. Locate joints for beams, slabs, joists, and girders at third points of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 6. Space vertical joints in walls **[as indicated on Drawings]**<Insert spacing>. Unless otherwise indicated on Drawings, locate vertical joints beside piers integral with walls, near corners, and in concealed locations where possible.
 7. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 8. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:
1. Grooved Joints: Form control joints after initial floating by grooving and finishing each edge of joint to a radius of **1/8 inch**. Repeat grooving of control joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 2. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut **1/8-inch** wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.
- D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.
 2. Terminate full-width joint-filler strips not less than **1/2 inch** or more than **1 inch** below finished concrete surface, where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- 3.8 APPLICATION OF FINISHING FLOORS AND SLABS
- A. Float Finish:
1. When bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats.
 2. Repeat float passes and restraightening until surface is left with a uniform,

smooth, granular texture and complies with **ACI 117** tolerances for conventional concrete.

3.9 APPLICATION OF FINISHING FORMED SURFACES

A. As-Cast Surface Finishes:

1. ACI 301 (ACI 301M) Surface Finish SF-2.0: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams.
 - a. Patch voids larger than **3/4 inch** wide or **1/2 inch** deep.
 - b. Remove projections larger than **1/4 inch**.
 - c. Patch tie holes.
 - d. Surface Tolerance: **ACI 117**, Class B.
 - e. Locations: Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete.

3.10 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

A. Filling in:

1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
2. Mix, place, and cure concrete, as specified, to match color and texture with in-place construction exposed to view.
3. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Equipment Bases and Foundations:

1. Coordinate sizes and locations of concrete bases with actual equipment provided.
2. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
3. Prior to pouring concrete, place and secure anchorage devices.

3.11 APPLICATION OF CONCRETE CURING

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

1. Comply with **ACI 301** for cold weather protection during curing.
2. Comply with **ACI 301** and **ACI 305.1** for hot-weather protection during curing.
3. Maintain moisture loss no more than **0.2 lb/sq. ft. x h**, calculated in accordance with ACI 305R, before and during finishing operations.

B. Curing Formed Surfaces: Comply with **ACI 308.1** as follows:

1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.
2. If forms remain during curing period, moist cure after loosening forms.
3. If removing forms before end of curing period, continue curing for remainder of curing period as follows:
 - a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
 - b. Continuous Sprinkling: Maintain concrete surface continuously wet.
 - c. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.

C. Curing Unformed Surfaces: Comply with **ACI 308.1** as follows:

1. Begin curing after finishing concrete.
2. Interior Concrete Floors:
 - a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:
 - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than **12 inches**.
 - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least **12 inches**, and sealed by waterproof tape or adhesive.
 - a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - b) Cure for not less than seven days.
 - 3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following not in cold weather:
 - a) Water.
 - b) Continuous water-fog spray.
 - b. Floors To Receive Curing Compound:
 - 1) Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 2) Recoat areas subjected to heavy rainfall within three hours after initial application.

- 3) Maintain continuity of coating, and repair damage during curing period.
- 4) Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.

c. Floors To Receive Curing and Sealing Compound:

- 1) Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller in accordance with manufacturer's written instructions.
- 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
- 3) Repeat process 24 hours later, and apply a second coat. Maintain continuity of coating, and repair damage during curing period.

3.12 APPLICATION OF LIQUID FLOOR TREATMENTS

- A. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller in accordance with manufacturer's written instructions.

3.13 INSTALLATION OF JOINT FILLING

- A. Prepare, clean, and install joint filler in accordance with manufacturer's written instructions.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.

3.14 INSTALLATION OF CONCRETE SURFACE REPAIRS

- A. Defective Concrete:
1. Repair and patch defective areas when approved by Architect.
 2. Remove and replace concrete that cannot be repaired and patched to meet specification requirements.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a **No. 16** sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks in excess of **0.01 inch** spalls, air bubbles exceeding surface finish limits, honeycombs, rock pockets, fins and other projections on the surface exceeding surface finish limits, and stains and other discolorations that cannot be removed by cleaning.
1. Immediately after form removal, cut out honeycombs, rock pockets, and voids

more than **1/2 inch** in any dimension to solid concrete.

- a. Limit cut depth to **3/4 inch**.
 - b. Make edges of cuts perpendicular to concrete surface.
 - c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.
 - d. Fill and compact with patching mortar before bonding agent has dried.
 - e. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement, so that, when dry, patching mortar matches surrounding color.
 - a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.
 - b. Compact mortar in place and match surrounding surface.
 3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance, as determined by Architect.

D. Repairing Unformed Surfaces:

1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.
 - a. Correct low and high areas.
 - b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of **0.01 inch** wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width.
3. After concrete has cured at least 14 days, correct high areas by grinding.
4. Correct localized low areas during, or immediately after, completing surface-finishing operations by adding patching mortar.
 - a. Finish repaired areas to blend into adjacent concrete.
5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.
 - a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 - b. Feather edges to match adjacent floor elevations.
6. Repair defective areas, except random cracks and single holes **1 inch** or less in diameter, by cutting out and replacing with fresh concrete.

- a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a **3/4-inch** clearance all around.
 - b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
 - c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
 - d. Place, compact, and finish to blend with adjacent finished concrete.
 - e. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes **1 inch** or less in diameter with patching mortar.
 - a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
 - b. Dampen cleaned concrete surfaces and apply bonding agent.
 - c. Place patching mortar before bonding agent has dried.
 - d. Compact patching mortar and finish to match adjacent concrete.
 - e. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.15 PROTECTION

- A. Protect concrete surfaces as follows:
 1. Protect from petroleum stains.
 2. Diaper hydraulic equipment used over concrete surfaces.
 3. Prohibit vehicles from interior concrete slabs.
 4. Prohibit use of pipe-cutting machinery over concrete surfaces.
 5. Prohibit placement of steel items on concrete surfaces.
 6. Prohibit use of acids or acidic detergents over concrete surfaces.
 7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.
 8. Protect concrete surfaces scheduled to receive surface hardener or polished concrete finish using floor slab protective covering.

END OF SECTION 03 3000

SECTION 03 3300 - ARCHITECTURAL CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Form-facing materials.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for concrete that apply to architectural concrete.

1.2 DEFINITIONS

- A. Aggregate Exposure: Projection of coarse aggregate from matrix or mortar after completion of exposure operations.
- B. Cast-in-Place Architectural Concrete: Concrete that is exposed to view, is designated as architectural concrete, and that requires special concrete materials, formwork, placement, or finishes to obtain specified architectural appearance.
- C. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.
- D. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.3 ACTION SUBMITTALS

A. Design Mixtures: For each concrete mixture, include the following:

1. Mixture identification.
2. Minimum 28-day compressive strength.
3. Durability exposure class.
4. Maximum w/cm.
5. Calculated equilibrium unit weight, for lightweight concrete.
6. Slump limit.
7. Air content.
8. Nominal maximum aggregate size.
9. Steel-fiber reinforcement content.
10. Synthetic microfiber content.
11. Amounts of mixing water to be withheld for later addition at Project site if permitted.

12. Intended placement method.
13. Alternative design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.4 QUALITY ASSURANCE

- A. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
 1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- B. Installer Qualifications: An experienced cast-in-place architectural concrete installer, as evidenced by not less than five consecutive years' experience, specializing in installing cast-in-place architectural concrete similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
 1. Provide written evidence of qualifications and experience.
 2. Include locations, descriptions, and photographs of completed projects, including name of architect, substantiating the quality of the installer's experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with ASTM C94/C94M and **ACI 301**.

1.6 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with Section 033000 "Cast-in-Place Concrete."
- B. Hot-Weather Placement: Comply with Section 033000 "Cast-in-Place Concrete."

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with **ACI 301** unless modified by requirements in the Contract Documents.

2.2 FORM-FACING MATERIALS

- A. Comply with Section 031000 "Concrete Forming and Accessories" for formwork and other form-facing material requirements, and as specified in this Section.

- B. Source Limitations: Obtain each type of form-facing material from single source from single manufacturer.
- C. Form-Facing Panels:
 - 1. Finishes: As cast.
 - a. Steel- and glass-fiber-reinforced plastic, or other approved nonabsorptive panel materials that provide continuous, true, and smooth architectural concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
 - b. Exterior-grade plywood panels, nonabsorptive, that will provide continuous, true, and smooth architectural concrete surfaces, high-density overlay, Class 1, or better, complying with DOC PS 1.
- D. Chamfer Strips: Metal, rigid plastic, elastomeric rubber, or dressed wood, **3/4 by 3/4 inch**, minimum; nonstaining; in longest practicable lengths.
- E. Form Joint Tape: Compressible foam tape; pressure sensitive; AAMA 800; minimum **1/4 inch** thick.
- F. Form Joint Sealant: Elastomeric sealant complying with ASTM C920, Type M or Type S, Grade NS, that adheres to form joint substrates, does not stain, does not adversely affect concrete surfaces, and does not impair subsequent treatments and finishes of concrete surfaces.
- G. Form-Release Agent: Commercially formulated, colorless form-release agent that does not bond with, stain, or adversely affect architectural concrete surfaces and will not impair subsequent treatments and finishes of architectural concrete surfaces.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
 - 2. Form-release agent for form liners to be acceptable to form-liner manufacturer.
- H. Surface Retarder: Water-soluble chemical liquid set retarder, for application on form-facing materials, capable of temporarily delaying final hardening of newly placed architectural concrete surface to depth of aggregate exposure specified.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **[Euclid Chemical Company (The); a subsidiary of RPM International, Inc.]**
 - b. **[Master Builders Solutions]**
 - c. **[W. R. Meadows, Inc]**
 - 2. Source Limitations: Obtain surface retarder from single source from single manufacturer.
- I. Form Ties: Factory-fabricated ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish ties with tapered tie cone spreaders that, when removed, will leave holes no larger than 1 inch in diameter on architectural concrete surface.
2. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.3 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire fabric in place.

1. Manufacture bar supports in accordance with CRSI's "Manual of Standard Practice."

2.4 CONCRETE MATERIALS

- A. Cementitious Materials:

1. Portland Cement: ASTM C150/C150M, Type I or II.
2. Pozzolans: ASTM C618, Class F.
3. Slag Cement: ASTM C989/C989M, Grade 100 or Grade 120.
4. Silica Fume: ASTM C1240.

- B. Normal-Weight Aggregates: ASTM C33/C33M, Class 1N coarse aggregate or better, graded. Provide aggregates from single source from single manufacturer.

1. Maximum Coarse-Aggregate Size: 1 inch.
2. Gradation: Uniformly graded.

- C. Normal-Weight Fine Aggregate: ASTM C33/C33M, manufactured or natural sand, free of materials with deleterious reactivity to alkali in cement, from same source for entire Project.

- D. Air-Entraining Admixture: As specified in Section 033000 "Cast-in-Place Concrete."

- E. Water and Water Used to Make Ice: ASTM C94/C94M, potable.

2.5 CURING MATERIALS

- A. Comply with Section 0330000 "Cast-in-Place Concrete."

1. For integrally colored concrete, curing materials to be approved by color pigment manufacturer.
2. For concrete indicated to be sealed, curing materials to be compatible with sealer.

2.6 REPAIR MATERIALS

- A. Bonding Agent: ASTM C1059/C1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.
- B. Epoxy Bonding Adhesive: ASTM C881/C881M two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade and class to suit requirements.
 - 1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.7 CONCRETE MIXTURES, GENERAL

- A. Obtain each color, size, type, and variety of concrete mixture from single manufacturer with resources to provide cast-in-place architectural concrete of consistent quality in appearance and physical properties.
- B. Prepare design mixtures for each type and strength of cast-in-place architectural concrete proportioned on basis of laboratory trial mixture or field test data, or both, in accordance with **ACI 301**.
 - 1. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs, based on laboratory trial mixtures.
- C. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 - 1. Fly Ash or Other Pozzolans: 25 percent by mass.
 - 2. Slag Cement: 50 percent by mass.
 - 3. Silica Fume: 10 percent by mass.
 - 4. Total of Fly Ash or Other Pozzolans, Slag Cement, and Silica Fume: 50 percent by mass, with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.
 - 5. Total of Fly Ash or Other Pozzolans and Silica Fume: 35 percent by mass with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.
- D. Admixtures: Use admixtures in accordance with manufacturer's written instructions.

2.8 CONCRETE MIXING

- A. Architectural Concrete:
 - 1. Ready mixed. Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M, and furnish batch ticket information.
 - a. Clean equipment used to mix and deliver cast-in-place architectural concrete to prevent contamination from other concrete.
 - b. For mixer capacity of **1 cu. yd.** or smaller, continue mixing at least 1-1/2 minutes, but not more than five minutes after ingredients are in mixer,

before any part of batch is released.

- c. For mixer capacity larger than **1 cu. yd.**, increase mixing time by 15 seconds for each additional **1 cu. yd.**
- d. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 INSTALLATION OF FORMWORK

- A. Comply with Section 031000 "Concrete Forming and Accessories" for formwork, embedded items, and shoring and reshoring, and as specified in this Section.
- B. Limit deflection of form-facing panels to not exceed **ACI 301** requirements.
- C. Limit cast-in-place architectural concrete surface irregularities, as follows:
 - 1. Surface Finish-3.0: **ACI 117** Class A, **1/8 inch**.
- D. Construct forms to result in cast-in-place architectural concrete that complies with **ACI 117**.
- E. Seal form joints, chamfers, rustication joints, and penetrations at form ties with form joint tape or form joint sealant to prevent cement paste leakage.
 - 1. Provide closure backing materials if indented rustication is used over a ribbed form line, and seal joint between rustication strip and form with joint sealant.
- F. Chamfer exterior corners and edges of cast-in-place architectural concrete.
- G. Coat contact surfaces of wood rustications and chamfer strips with wood sealer before placing reinforcement, anchoring devices, and embedded items.
- H. Coat contact surfaces of forms with surface retarder, in accordance with manufacturer's written instructions, before placing reinforcement, anchoring devices, and embedded items.

3.2 INSTALLATION OF REINFORCEMENT AND ACCESSORIES

- A. Comply with Section 032000 "Concrete Reinforcing" for fabricating and installing steel reinforcement and accessories.

3.3 REMOVING AND REUSING FORMS

- A. Formwork for sides of beams, walls, columns, and similar parts of the Work that does

not support weight of concrete may be removed after cumulatively curing at not less than **50 deg F** for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.

1. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work.
 1. Split, frayed, delaminated, or otherwise damaged form-facing material are unacceptable for exposed surfaces.
 2. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints.
 1. Align and secure joints to avoid offsets.
 2. Do not use patched forms for cast-in-place architectural concrete surfaces.

3.4 JOINTS

- A. Construction Joints: Install construction joints true to line, with faces perpendicular to surface plane of cast-in-place architectural concrete, so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated.
 2. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at top of footings or floor slabs.
 3. Space vertical joints in walls as indicated on Drawings. Unless otherwise indicated on Drawings, locate joints beside piers integral with walls, near corners, and in concealed locations where possible.

3.5 CONCRETE PLACEMENT

- A. Comply with Section 033000 "Cast-in-Place Concrete."

3.6 FINISHING FORMED SURFACES

- A. Comply with Section 033000 "Cast-in-Place Concrete."
- B. As-Cast Surface Finishes: Comply with Section 033000 "Cast-in-Place Concrete" for the following:
 1. **ACI 301** Surface Finish-3.0 (SF-3.0).
- C. Final Concrete Finish: Comply with Section 033000 "Cast-in-Place Concrete" for the

following:

1. Smooth-rubbed finish.

- D. Maintain uniformity of architectural concrete finishes over construction joints unless otherwise indicated.

3.7 CONCRETE CURING

- A. Comply with Section 033000 "Cast-in-Place Concrete".

3.8 REPAIR

- A. Comply with **ACI 301**.
- B. Repair damaged finished surfaces of cast-in-place architectural concrete when repairing is approved by Architect.
- C. Remove and replace cast-in-place architectural concrete that cannot be repaired to Architect's approval.

3.9 FIELD QUALITY CONTROL

- A. Comply with Section 033000 "Cast-in-Place Concrete."

3.10 CLEANING

- A. Clean cast-in-place architectural concrete surfaces after finish treatment to remove stains, markings, dust, and debris.
- B. Wash and rinse surfaces in accordance with concrete finish applicator's written instructions.
1. Protect other Work from staining or damage due to cleaning operations.
2. Do not use cleaning materials or processes that could change the appearance of cast-in-place architectural concrete finishes.

3.11 PROTECTION

- A. Protect corners, edges, and surfaces of cast-in-place architectural concrete from damage; use guards and barricades.
- B. Protect cast-in-place architectural concrete from staining, laitance, and contamination during remainder of construction period.

END OF SECTION 03 3300

SECTION 04 2200 - CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Lintels.
3. Mortar and grout materials.
4. Reinforcement.
5. Ties and anchors.
6. Embedded flashing.
7. Accessories.
8. Mortar and grout mixes.

1.2 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.
- C. Exposed: Weather-exposed side of a constructed wall.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of specified product.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: All masonry flashing installers must complete the International Masonry Institute Flashing Upgrade training course.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained

and contamination avoided.

- D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.6 FIELD CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of **24 inches** down both sides of walls, and hold cover securely in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 402/602.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is **40 deg F** and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 402/602.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain exposed masonry units, cementitious mortar components, and mortar aggregate from single source.

2.2 CONCRETE UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 402/602 except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.

2.3 CONCRETE MASONRY UNITS

- A. General: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
 - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 - 2. Provide square-edged units for outside corners unless otherwise indicated.
- B. CMUs: ASTM C90, normal weight.
 - 1. Size (Width): Manufactured to dimensions **3/8 inch** less-than-nominal dimensions.
 - 2. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.

2.4 LINTELS

- A. Solid Concrete Masonry Lintels: ASTM C1623, matching CMUs in color, texture, and density classification; and with reinforcing bars indicated. Provide lintels with net-area compressive strength of not less than that of CMUs.
- B. Concrete Lintels: Precast or formed-in-place concrete lintels complying with requirements in Section 033000 "Cast-in-Place Concrete" and with reinforcing bars indicated.
- C. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.5 MORTAR AND GROUT MATERIALS

- A. General: Provide mortar and grout materials to achieve performance requirements as specified in mortar and grout mixes.
- B. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
 - 1. Alkali content is not more than 0.1 percent when tested in accordance with ASTM C114.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Aggregate for Mortar: ASTM C144.
 - 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
 - 2. For joints less than **1/4 inch** thick, use aggregate graded with 100 percent passing the **No. 16** sieve.
 - 3. White-Mortar Aggregates: Natural white sand or crushed white stone.
 - 4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- E. Aggregate for Grout: ASTM C404.
- F. Water: Potable.

2.6 REINFORCEMENT

- A. Uncoated-Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, **Grade 60**.

2.7 TIES AND ANCHORS

- A. General: Ties and anchors extend at least **1-1/2 inches** into masonry but with at least a **5/8-inch** cover on outside face.
- B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
 - 1. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304.
 - a. sheet may be used at interior walls unless otherwise indicated.
- C. Partition Top Anchors: **0.105-inch-** thick metal plate with a **3/8-inch-** diameter metal rod **6 inches** long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.

- D. Rigid Anchors: Fabricate from steel bars **1-1/2 inches** wide by **1/4 inch** thick by **24 inches** long, with ends turned up **2 inches** or with cross pins unless otherwise indicated.

1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A153M.

2.8 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
1. Do not use calcium chloride in mortar or grout.
 2. Use portland cement-lime mortar unless otherwise indicated.
 3. For exterior masonry, use portland cement-lime mortar.
 4. For reinforced masonry, use portland cement-lime mortar.
 5. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.
1. For masonry below grade or in contact with earth, use Type S.
 2. For reinforced masonry, use Type S.
 3. For mortar parge coats, use Type S.
 4. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type S.
- D. Grout for Unit Masonry: Comply with ASTM C476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 402/602 for dimensions of grout spaces and pour height.
 2. Proportion grout in accordance with ASTM C476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than **2000 psi**.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
 2. Verify that foundations are within tolerances specified.
 3. Verify that reinforcing dowels are properly placed.
 4. Verify that substrates are free of substances that would impair mortar bond.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.
- B. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- C. Exposed Masonry: Mix units to produce uniform blend of colors and textures.
- D. Masonry Protection: Protect completed masonry and masonry not being worked on in the following manner. Temperature ranges indicated apply to mean daily air temperatures except for grouted masonry. For grouted masonry, temperature ranges apply to anticipated minimum night temperatures.
1. 40 to 32 Deg F (4 to 0 Deg C): Protect masonry from rain or snow for at least 24 hours by covering with weather-resistive membrane.
 2. 32 to 25 Deg F (0 to Minus 4 Deg C): Completely cover masonry with weather-resistive membrane for at least 24 hours.
 3. 25 to 20 Deg F (Minus 4 to 7 Deg C): Completely cover masonry with weather-resistive insulating blankets or similar protection for at least 24 hours, 48 hours for grouted masonry.
 4. 20 Deg F (Minus 7 Deg C) and Below: Except as otherwise indicated, maintain masonry temperature above 32 deg F (0 deg C) for 24 hours using enclosures and supplementary heat, electric heating blankets, infrared lamps or other methods proven to be satisfactory. For grouted masonry, maintain heated enclosure to **40 deg F** for 48 hours.

3.3 TOLERANCES

- A. Dimensions and Locations of Elements:
1. For dimensions in cross section or elevation, do not vary by more than plus **1/2 inch** or minus **1/4 inch**.

2. For location of elements in plan, do not vary from that indicated by more than plus or minus **1/2 inch**.
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus **1/4 inch** in a story height or **1/2 inch** total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than **1/4 inch in 10 ft.**, or **1/2 inch** maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than **1/8 inch in 10 ft.**, **1/4 inch in 20 ft.**, or **1/2 inch** maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than **1/4 inch in 10 ft.**, **3/8 inch in 20 ft.**, or **1/2 inch** maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than **1/8 inch in 10 ft.**, **1/4 inch in 20 ft.**, or **1/2 inch** maximum.
5. For lines and surfaces, do not vary from straight by more than **1/4 inch in 10 ft.**, **3/8 inch in 20 ft.**, or **1/2 inch** maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than **1/4 inch in 10 ft.** or **1/2 inch** maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than **1/16 inch**.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus **1/8 inch**, with a maximum thickness limited to **1/2 inch**.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than **1/8 inch**.
3. For head and collar joints, do not vary from thickness indicated by more than plus **3/8 inch** or minus **1/4 inch**.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus **1/8 inch**.

3.4 INSTALLATION OF MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in stacked bond; do not use units with less-than-nominal **4-inch** horizontal face dimensions at corners or jambs.
- C. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

- D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

3.5 INSTALLATION OF MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
1. Bed face shells in mortar and make head joints of depth equal to bed joints.
 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
 3. Bed webs in mortar in grouted masonry, including starting course on footings.
 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
- B. Lay solid CMUs with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- D. Cut joints flush where indicated to receive waterproofing unless otherwise indicated.

3.6 INSTALLATION OF CONTROL JOINTS

- A. General: Install control joint materials in CMUs as masonry progresses. Do not allow materials to span control joints without provision to allow for in-plane wall or partition movement.
- B. Locate control joints. **Comply with CMU-TEC-009-25.**
- C. Form control joints in CMUs as follows:
1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.
 2. Install preformed control joint gaskets designed to fit standard sash block.
 3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake out joint for application of sealant.
 4. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.

3.7 INSTALLATION OF LINTELS

- A. Install lintels over openings as indicated.
- B. Provide concrete or formed-in-place masonry lintels where shown and where openings of more than **12 inches** for brick-size units and **24 inches** for block-size units are

shown without structural steel or other supporting lintels. Provide minimum bearing of **8 inches** at each jamb unless otherwise indicated.

3.8 INSTALLATION OF REINFORCED UNIT MASONRY

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
 - 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 402/602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
 - 1. Comply with requirements in TMS 402/602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

3.9 REPAIRING AND POINTING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

3.10 CLEANING

- A. In-Progress Cleaning: Clean unit masonry as Work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.

3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid-strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean concrete masonry by applicable cleaning methods indicated in TEK 08-04A.

3.11 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
 1. Crush masonry waste to less than **4 inches** in each dimension.
 2. Mix masonry waste with at least 2 parts of specified fill material for each part of masonry waste. Fill material is specified in Section 312000 "Earth Moving."
 3. Do not dispose of masonry waste as fill within **18 inches** of finished grade.
- C. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.
- D. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 04 2200

SECTION 05 1200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural-steel materials.
2. Shrinkage-resistant grout.
3. Prefabricated building columns.
4. Shear stud connectors.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for **miscellaneous steel fabrications** and other steel items not defined as structural steel.
2. **Section 099113 "Exterior Painting" and Section 099123 "Interior Painting"** for painting requirements.

1.2 DEFINITIONS

A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in ANSI/AISC 303.

B. Seismic-Load-Resisting System: Elements of structural-steel frame designated as "SLRS" or along grid lines designated as "SLRS" on Drawings, including columns, beams, and braces and their connections.

C. Heavy Sections: Rolled and built-up sections as follows:

1. Shapes included in ASTM A6/A6M with flanges thicker than **1-1/2 inches**.
2. Welded built-up members with plates thicker than **2 inches**.
3. Column base plates thicker than **2 inches**.

D. Protected Zone: Structural members or portions of structural members indicated as "protected zone" on Drawings. Connections of structural and nonstructural elements to protected zones are limited.

E. Demand-Critical Welds: Those welds, the failure of which would result in significant degradation of the strength and stiffness of the seismic-load-resisting system and which are indicated as "demand critical" or "seismic critical" on Drawings.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Structural-steel materials.
2. High-strength, bolt-nut-washer assemblies.
3. Shear stud connectors.
4. Anchor rods.
5. Threaded rods.
6. Shop primer.
7. Galvanized-steel primer.
8. Etching cleaner.
9. Galvanized repair paint.
10. Shrinkage-resistant grout.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category BU or is accredited by the IAS Fabricator Inspection Program for Structural Steel (Acceptance Criteria 172).
- B. Installer Qualifications: A qualified Installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, [**Category ACSE**] [**Category CSE**].
- C. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.1/D1.1M.
 1. Welders and welding operators performing work on bottom-flange, demand-critical welds are to pass the supplemental welder qualification testing, as required by AWS D1.8/D1.8M. FCAW-S and FCAW-G are to be considered separate processes for welding personnel qualification.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
 1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
 2. Clean and relubricate bolts and nuts that become dry or rusty before use.
 3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F3125/F3125M, Grade F1852 bolt assemblies and for retesting bolt

assemblies after lubrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with applicable provisions of the following specifications and documents:
 - 1. ANSI/AISC 303.
 - 2. ANSI/AISC 341.
 - 3. ANSI/AISC 360.
 - 4. RCSC's "Specification for Structural Joints Using High-Strength Bolts."
- B. Connection Design Information:
 - 1. Option 1: Connection designs have been completed and connections indicated on the Drawings.

2.2 STRUCTURAL-STEEL MATERIALS

- A. W-Shapes: ASTM A992/A992M.
- B. Channels, Angles, M-Shapes: ASTM A36/A36M.
- C. Channels, Angles, S-Shapes: ASTM A36/A36M.
- D. Plate and Bar: [ASTM A36/A36M
- E. Cold-Formed Hollow Structural Sections: ASTM A500/A500M, Grade B structural tubing.
- F. Steel Pipe: ASTM A53/A53M, Type E or Type S, Grade B.
- G. Welding Electrodes: Comply with AWS requirements.

2.3 BOLTS AND CONNECTORS

- A. High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, **Grade A325**, Type 1, heavy-hex steel structural bolts; **ASTM A563, Grade DH**, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.
 - 1. Direct-Tension Indicators: ASTM F959/F959M, **Type 325-1**, compressible-washer type with plain finish.
- B. High-Strength A490 Bolts, Nuts, and Washers: ASTM F3125/F3125M, **Grade A490**, Type 1, heavy-hex steel structural bolts; **ASTM A563, Grade DH**, heavy-hex carbon-

steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.

1. Direct-Tension Indicators: ASTM F959/F959M, **Type 490-1**, compressible-washer type with plain finish.

- C. Zinc-Coated High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, **Grade A325**, Type 1, heavy-hex steel structural bolts; **ASTM A563, Grade DH**, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.

1. Finish: Hot-dip zinc coating.
2. Direct-Tension Indicators: ASTM F959/F959M, **Type 325-1**, compressible-washer type with mechanically deposited zinc coating finish.

- D. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F3125/F3125M, Grade F1852, Type 1, heavy-hex head assemblies, consisting of steel structural bolts with splined ends; **ASTM A563, Grade DH**, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.

1. Finish: Plain.

2.4 RODS

- A. Unheaded Anchor Rods: ASTM F1554, Grade 55, weldable.

1. Configuration: Straight.
2. Nuts: **ASTM A563** heavy-hex carbon steel.
3. Plate Washers: ASTM A36/A36M carbon steel.
4. Washers: **ASTM F436**, Type 1, hardened carbon steel.
5. Finish: Plain.

- B. Headed Anchor Rods: ASTM F1554, Grade 55, weldable, straight.

1. Nuts: **ASTM A563** heavy-hex carbon steel.
2. Plate Washers: ASTM A36/A36M carbon steel.
3. Washers: **ASTM F436**, Type 1, hardened carbon steel.
4. Finish: Plain.

- C. Threaded Rods: ASTM A36/A36M.

1. Nuts: **ASTM A63** heavy-hex carbon steel.
2. Washers: ASTM A36/A36M carbon steel.
3. Finish: Plain.

2.5 PRIMER

- A. Steel Primer:

1. Comply with Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
2. SSPC-Paint 23, latex primer.
3. Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

2.6 SHRINKAGE-RESISTANT GROUT

- A. Metallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, metallic aggregate grout, mixed with water to consistency suitable for application and a 30-minute working time.
- B. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.7 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate in accordance with ANSI/AISC 303 and to ANSI/AISC 360.
 1. Camber structural-steel members where indicated.
 2. Fabricate beams with rolling camber up.
 3. Identify high-strength structural steel in accordance with ASTM A6/A6M and maintain markings until structural-steel framing has been erected.
 4. Mark and match-mark materials for field assembly.
 5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
 1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.
- C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted in accordance with SSPC-SP 1.
- F. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.
 1. Cut, drill, or punch holes perpendicular to steel surfaces.
 2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.

- G. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.8 SHOP PRIMING

- A. Shop prime steel surfaces, except the following:
 - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of **2 inches**.
 - 2. Surfaces to be field welded.
 - 3. Surfaces of high-strength bolted, slip-critical connections.
 - 4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
 - 5. Corrosion-resisting (weathering) steel surfaces.
 - 6. Surfaces enclosed in interior construction.
- B. Surface Preparation of Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the following specifications and standards:
 - 1. SSPC-SP 2.
 - 2. SSPC-SP 3.
 - 3. SSPC-SP 7 (WAB)/NACE WAB-4.
 - 4. SSPC-SP 14 (WAB)/NACE WAB-8.
 - 5. SSPC-SP 11.
 - 6. SSPC-SP 6 (WAB)/NACE WAB-3.
 - 7. SSPC-SP 10 (WAB)/NACE WAB-2.
 - 8. SSPC-SP 5 (WAB)/NACE WAB-1.
 - 9. SSPC-SP 8.
- C. Priming: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of **1.5 mils**. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
 - 2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
 - 1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions,

locations, angles, and elevations.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated on Drawings.
 - 1. Do not remove temporary shoring supporting composite deck construction and structural-steel framing until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and in accordance with ANSI/AISC 303 and ANSI/AISC 360.
- B. Baseplates, Bearing Plates, and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Weld plate washers to top of baseplate.
 - 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 - 4. Promptly pack shrinkage-resistant grout solidly between bearing surfaces and plates, so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for grouting.
- C. Maintain erection tolerances of structural steel within ANSI/AISC 303.
- D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure. Slope roof framing members to slopes indicated on Drawings.
 - 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E. Splice members only where indicated.

- F. Do not use thermal cutting during erection.
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt and joint type specified.
 - 1. Joint Type: Pretensioned.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Comply with ANSI/AISC 303 and ANSI/AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
 - 2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
 - 3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.

3.5 INSTALLATION OF PREFABRICATED BUILDING COLUMNS

- A. Install prefabricated building columns to comply with ANSI/AISC 360, manufacturer's written recommendations, and requirements of testing and inspecting agency that apply to the fire-resistance rating indicated.

END OF SECTION 05 1200

SECTION 05 5000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal ladders.
2. Metal downspout boots.

B. Products Furnished, but Not Installed, under This Section:

1. Steel Weld Plates and Angles: For casting into concrete for applications where they are not specified in other Sections.
2. Cast-in-Place Anchors in Concrete: Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.

C. Related Requirements:

1. Section 042000 "Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.
2. Section 051200 "Structural Steel Framing" for steel framing, supports, elevator machine beams, hoist beams, divider beams, door frames, and other steel items attached to the structural-steel framing.

1.2 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.3 ACTION SUBMITTALS

- A. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide for the following:
1. Metal ladders.

1.4 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with the following welding codes:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.5 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance of Metal Ladders: Ladders are to withstand the effects of loads and stresses within limits and under conditions specified in ANSI/ASC A14.3.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 METAL MATERIALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- C. Steel Tubing: ASTM A500/A500M, cold-formed steel tubing.
- D. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.

2.3 FASTENERS

- A. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563; and, where indicated, flat washers.
- B. Steel High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 3, heavy-hex steel structural bolts; ASTM A563, Grade DH3, heavy-hex carbon-steel nuts; and where indicated, flat washers.

- C. Steel Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, **ASTM A563**; and, where indicated, flat washers.
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- D. Anchors, General: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing in accordance with ASTM E488/E488M, conducted by a qualified independent testing agency.
- E. Post-Installed Anchors: Torque-controlled expansion anchors.

2.4 MISCELLANEOUS MATERIALS

- A. Shrinkage-Resistant Grout: Factory-packaged, nonmetallic, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- B. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained concrete with a minimum 28-day compressive strength of **3000 psi**.

2.5 FABRICATION OF METAL, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately **1/32 inch** unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed

fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, **1/8 by 1-1/2 inches**, with a minimum **6-inch** embedment and **2-inch** hook, not less than **8 inches** from ends and corners of units and **24 inches** o.c., unless otherwise indicated.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. Miscellaneous Framing and Supports, General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
 - 1. Fabricate units from slotted channel framing where indicated.
 - 2. Furnish inserts for units installed after concrete is placed.
- C. Galvanize miscellaneous framing and supports where indicated.

2.7 METAL LADDERS

- A. Metal Ladders, General:
 - 1. Comply with ANSI/ASC A14.3.
- B. Steel Ladders:
 - 1. Space siderails **16 inches** apart unless otherwise indicated.
 - 2. Siderails: Continuous, **1/2-by-2-1/2-inch** steel flat bars, with eased edges.
 - 3. Rungs: **3/4-inch-** diameter, steel bars.
 - 4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
 - 5. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.
 - 6. Support each ladder at top and bottom and not more than **60 inches** o.c. with

- welded or bolted steel brackets.
- 7. Galvanize exterior ladders, including brackets.

2.8 METAL DOWNSPOUT BOOTS

- A. Prime cast-iron downspout boots with zinc-rich primer.

2.9 GENERAL FINISH REQUIREMENTS

- A. Finish metal fabrications after assembly.
- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.10 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.
 - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

PART 3 - EXECUTION

3.1 INSTALLATION OF METAL FABRICATIONS, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:
 - 1. Cast Aluminum: Heavy coat of bituminous paint.
 - 2. Extruded Aluminum: Two coats of clear lacquer.

3.2 INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Steel Pipe Columns: Install columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installation of Loose Bearing and Leveling Plates" Article.
 - 1. Grout baseplates of columns supporting steel girders after girders are installed and leveled.

3.3 INSTALLATION OF PREFABRICATED BUILDING COLUMNS

- A. Install prefabricated building columns to comply with AISC 360 and with requirements applicable to listing and labeling for fire-resistance rating indicated.

3.4 INSTALLATION OF METAL LADDERS

- A. Secure ladders to adjacent construction with the clip angles attached to the stringer.
- B. Install brackets as required to secure ladders welded or bolted to structural steel or built into masonry or concrete.

3.5 INSTALLATION OF METAL DOWNSPOUT BOOTS

- A. Anchor metal downspout boots to concrete or masonry construction to comply with manufacturer's written instructions.
- B. Secure downspouts terminations to downspouts and substrate per manufacturer's written instructions.

3.6 REPAIRS

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas; repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION 05 5000

SECTION 05 5213 - PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel railings.

1.2 COORDINATION

- A. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Manufacturer's product lines of mechanically connected railings.
2. Metal finishes.

- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1.4 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect mechanical finishes on exposed surfaces of railings from damage by applying a strippable, temporary protective covering before shipping.

1.6 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.
 - 1. Provide type of bracket with predrilled hole for exposed bolt anchorage and that provides 1-1/2-inch clearance from inside face of handrail to finished wall surface.

2.3 STEEL RAILINGS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. [Hollaender Mfg. Co.]
 - 2. [Kee Safety, Inc.]
 - 3. [Trex Commercial Products, Inc.]
 - 4. [TrueNorth Steel]
 - 5. [VIVA Railings, LLC]
 - 6. [Wagner Companies (The); R&B Wagner, Inc.]
- B. Source Limitations: Obtain each type of railing from single source from single manufacturer.
- C. Tubing: ASTM A500/A500M (cold formed) or ASTM A513/A513M, Type 5.
- D. Pipe: ASTM A53/A53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
 - 1. Provide galvanized finish for exterior installations and where indicated.
- E. Plates, Shapes, and Bars: ASTM A36/A36M.
- F. Cast Iron Fittings: Either gray iron, ASTM A48/A48M, or malleable iron, ASTM A47/A47M, unless otherwise indicated.

2.4 FASTENERS

A. Fastener Materials:

1. Ungalvanized-Steel Railing Components: Plated steel fasteners complying with ASTM F1941/F1941M, Class Fe/Zn 5 for zinc coating.
2. Hot-Dip Galvanized Railing Components: Type 304 stainless steel or hot-dip zinc-coated steel fasteners complying with ASTM A153/A153M or ASTM F2329/F2329M for zinc coating.
3. Finish exposed fasteners to match appearance, including color and texture, of railings.

B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction.

C. Fasteners for Interconnecting Railing Components:

1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
2. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method for railings indicated.

D. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193 [or ICC-ES AC308].

1. Material for Exterior Locations: Alloy Group 1 stainless steel bolts, ASTM F593, and nuts, ASTM F594.

2.5 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage .

B. Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations.

1. Clearly mark units for reassembly and coordinated installation.
2. Use connections that maintain structural value of joined pieces.

C. Cut, drill, and punch metals cleanly and accurately.

1. Remove burrs and ease edges to a radius of approximately **1/32 inch** unless otherwise indicated.
2. Remove sharp or rough areas on exposed surfaces.

D. Form work true to line and level with accurate angles and surfaces.

- E. Fabricate connections that are exposed to weather in a manner that excludes water.
 - 1. Provide weep holes where water may accumulate.
 - 2. Locate weep holes in inconspicuous locations.
- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Connections: Fabricate railings with welded connections unless otherwise indicated.
- H. Gates: Form gates from steel tube of same size and shape as top rails.
- I. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove flux immediately.
 - 4. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Finish #2 welds; good appearance, completely sanded joint, some undercutting and pinholes okay.
- J. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work.
 - 1. Fabricate anchorage devices capable of withstanding loads imposed by railings.
 - 2. Coordinate anchorage devices with supporting structure.

2.6 STEEL FINISHES

- A. Galvanized Railings:
 - 1. Hot-dip galvanize exterior steel railings, including hardware, after fabrication.
 - 2. Comply with ASTM A123/A123M for hot-dip galvanized railings.
 - 3. Comply with ASTM A153/A153M for hot-dip galvanized hardware.
 - 4. Fill vent and drain holes that are exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
- B. For galvanized railings, provide hot-dip galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Perform cutting, drilling, and fitting required for installing railings.

1. Fit exposed connections together to form tight, hairline joints.
 2. Install railings level, plumb, square, true to line; without distortion, warp, or rack.
 3. Set railings accurately in location, alignment, and elevation; measured from established lines and levels.
 4. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 5. Set posts plumb within a tolerance of **1/16 inch in 3 feet**.
 6. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed **1/4 inch in 12 feet**.
- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
1. Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- C. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.2 RAILING CONNECTIONS

- A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article, whether welding is performed in the shop or in the field.
- B. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve, extending **2 inches** beyond joint on either side; fasten internal sleeve securely to one side; and locate joint within **6 inches** of post.

3.3 CLEANING

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas, and repair galvanizing to comply with ASTM A780/A780M.

3.4 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.
- B. Restore finishes damaged during installation and construction period, so no evidence remains of correction work. Return items that cannot be refinished in the field to the

shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 05 5213

SECTION 06 1000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Wood products.
 - 2. Dimension lumber framing.
 - 3. Miscellaneous lumber.

1.2 DEFINITIONS

- A. Boards or Strips: Lumber of less than **2 inches nominal** size in least dimension.
- B. Dimension Lumber: Lumber of **2 inches nominal** size or greater but less than **5 inches nominal** size in least dimension.
- C. Exposed Framing: Framing not concealed by other construction.
- D. Lumber grading agencies, and abbreviations used to reference them, include the following:
 - 1. NeLMA: Northeastern Lumber Manufacturers' Association.
 - 2. NLGA: National Lumber Grades Authority.
 - 3. RIS: Redwood Inspection Service.
 - 4. SPIB: The Southern Pine Inspection Bureau.
 - 5. WCLIB: West Coast Lumber Inspection Bureau.
 - 6. WWPA: Western Wood Products Association.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS

- A. Lumber: Comply with DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by

the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece and provide certificates of grade compliance issued by grading agency.
3. Dress lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content:

1. Dimension Lumber: 15 percent for **2-inch nominal** thickness or less; 19 percent for more than **2-inch nominal** thickness unless otherwise indicated.

2.2 DIMENSION LUMBER FRAMING

A. Non-Load-Bearing Interior Partitions by Grade:

1. Grade: Construction or No. 2.
2. Application: All interior partitions.
3. Species:
 - a. Douglas fir-larch; WCLIB or WWP.

B. Load-Bearing Partitions by Grade:

1. Grade: No. 1.
2. Application: Exterior walls and interior load-bearing partitions.
3. Species:
 - a. Douglas fir-larch; WCLIB or WWP.

C. Joists, Rafters, and Other Framing by Grade:

1. Grade: No. 1.
2. Species:
 - a. Douglas fir-larch; WCLIB or WWP.

D. Exposed Framing: Hand-select material for uniformity of appearance and freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot-holes, shake, splits, torn grain, and wane.

1. Species and Grade:
 - a. As indicated above for load-bearing construction of same type.

2.3 MISCELLANEOUS LUMBER

A. Provide miscellaneous lumber indicated and lumber for support or attachment of other

construction, including the following:

1. Blocking.
2. Nailers.
3. Rooftop equipment bases and support curbs.

B. Dimension Lumber Items:

1. Grade: Construction or No. 2.
2. Species:
 - a. Douglas fir-larch; WCLIB or WWP.

C. Roofing Nailers: Structural- or No. 2-grade lumber or better; kiln-dried Douglas fir, southern pine, or wood having similar decay-resistant properties.

D. Wood Blocking: For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

2.4 FASTENERS

A. General: Fasteners are to be of size and type indicated and comply with requirements specified in this article for material and manufacture. Provide nails or screws, in sufficient length, to penetrate not less than **1-1/2 inches** into wood substrate.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M or ASTM F2329.

B. Nails, Brads, and Staples: ASTM F1667.

C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

2.5 INSTALLATION OF ROUGH CARPENTRY, GENERAL

A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

B. Set work to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.

C. Do not splice structural members between supports unless otherwise indicated.

D. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than **16 inches** o.c.
- E. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:
 1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than **96 inches** o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
 2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than **96 inches** o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and **2-inch nominal** thickness.
 3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than **100 sq. ft.** and to solidly fill space below partitions.
 4. Fire block concealed spaces behind combustible cornices and exterior trim at not more than **20 ft.** o.c.
- F. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- G. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 1. Table 2304.10.1, "Fastening Schedule," in ICC's "International Building Code" (IBC).
 2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's "International Residential Code for One- and Two-Family Dwellings."
 3. ICC-ES evaluation report for fastener.
- H. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

2.6 INSTALLATION OF ROOFING NAILERS

- A. Install roofing nailers where indicated on Drawings and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Securely attach roofing nailers to substrates by anchoring and fastening to withstand bending, shear, or other stresses imparted by Project wind loads and fastener-resistance loads as designed in accordance with ASCE/SEI 7.

- C. Securely attach roofing nailers to substrate to resist the designed outward and upward wind loads indicated on Drawings and in accordance with SPRI ED-1, Tables A6 and A7.

2.7 INSTALLATION OF WOOD BLOCKING

- A. Install wood blocking where indicated on Drawings and where required for [**screeding or**] attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than **1-1/2 inches** wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

END OF SECTION 06 1000

SECTION 06 4116 - PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plastic-laminate-clad architectural cabinets.
2. Cabinet hardware and accessories.
3. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-clad architectural cabinets that are not concealed within other construction.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.

B. Shop Drawings:

1. Include plans, elevations, sections, and attachment details.
2. Apply AWI Quality Certification Program label to Shop Drawings.

C. Samples: For each exposed product and for each color and texture specified.

1.3 FIELD CONDITIONS

- A. Environmental Limitations without Humidity Control: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of cabinets indicated for construction, finishes, installation, and other requirements.

1. Provide labels from AWI certification program indicating that woodwork complies with requirements of grades specified.

- B. Architectural Woodwork Standards Grade: Custom .
- C. Type of Construction: Frameless .
- D. Door and Drawer-Front Style: Flush overlay.
 - 1. Reveal Dimension: **1/2 inch** .
- E. Refer to architectural drawings for material and finish information.

2.2 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
 - 1. Wood Moisture Content: 8 to 13 percent.
- B. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
 - 1. Particleboard (Medium Density): ANSI A208.1, Grade M-2 .

2.3 CABINET HARDWARE AND ACCESSORIES

- A. Cabinet Hardware: Provide cabinet hardware and accessory materials associated with architectural cabinets.
- B. Butt Hinges: **2-3/4-inch**, five-knuckle steel hinges made from **0.095-inch**- thick metal, and as follows:
 - 1. Semiconcealed Hinges for Overlay Doors: ANSI/BHMA A156.9, B01521.
- C. Frameless Concealed Hinges (European Type): ANSI/BHMA A156.9, B01602, 135 degrees of opening , self-closing.
- D. Wire Pulls: Back mounted, solid metal , **3 inches** long, **2-1/2 inches** deep, and **5/16 inch** in diameter.
- E. Catches: Roller catches, ANSI/BHMA A156.9, B03071 .
- F. Adjustable Shelf Standards and Supports: ANSI/BHMA A156.9, B04071; with shelf rests, B04081 .
- G. Drawer Slides: ANSI/BHMA A156.9.
 - 1. Standard Duty (Grade 1 and Grade 2): Side mount .
 - 2. Heavy-Duty (Grade 1HD-100 and Grade 1HD-200): Undermount.

- a. Type: Full overtravel extension.
 - b. Material: Aluminum slides.
 - c. Motion Feature: Push to open and Soft close dampener .
- H. Door and Drawer Silencers: ANSI/BHMA A156.16, L03011.
- I. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with ANSI/BHMA A156.18 for ANSI/BHMA finish number indicated.
 - 1. Satin Chromium Plated: ANSI/BHMA 626 for brass or bronze base; ANSI/BHMA 652 for steel base.
- J. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in ANSI/BHMA A156.9.

2.4 MISCELLANEOUS MATERIALS

- A. Adhesive for Bonding Plastic Laminate: Type II water-resistant type as selected by fabricator to comply with requirements.
 - 1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.5 FABRICATION

- A. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- B. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.
- B. Architectural Woodwork Standards Grade: Install cabinets to comply with quality standard grade of item to be installed.
- C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.

- D. Install cabinets level, plumb, and true in line to a tolerance of **1/8 inch in 96 inches** using concealed shims.
1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
 2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
 3. Fasten wall cabinets through back, near top and bottom, and at ends not more than **16 inches** o.c. with No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish .

END OF SECTION 06 4116

SECTION 07 2100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Mineral-wool blanket insulation.

B. Related Requirements:

1. Section 092900 "Gypsum Board" for sound attenuation blanket used as acoustic insulation.

1.2 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Thermal-Resistance Value (R-Value): R-value as indicated on Drawings in accordance with ASTM C518.

2.2 MINERAL-WOOL BLANKET INSULATION

- A. Mineral-Wool Blanket Insulation, Unfaced: ASTM C665, Type I (blankets without membrane facing); consisting of fibers; complying with ASTM E136 for combustion characteristics.

2.3 INSULATION FASTENERS

- A. Insulation Fastener Accessories: Provide double-pointed weld pins, lagging pins, quilting pins, duct liner pins, insulation hangers, specialty washers, special caps, j-hooks, capacitor discharge annular weld pins, capacitor discharge acoustical lagging pins, and other accessory materials that are recommended in writing by insulation fastener manufacturer to produce complete insulation supports.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or those that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products, applications and applicable codes.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Install insulation with manufacturer's R-value label exposed after insulation is installed.
- D. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- E. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Install in cavities formed by framing members in accordance with the following requirements:
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - 3. Maintain **3-inch** clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
 - 4. For metal-framed wall cavities where cavity heights exceed **96 inches**, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
 - 5. For wood-framed construction, install blankets in accordance with ASTM C1320 and as follows:
 - a. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.

3.4 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.
- B. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 07 2100

SECTION 07 4116 - INSULATED METAL ROOF PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Standing-seam-profile, foamed-insulation-core metal roof panels.

1.2 COORDINATION

- A. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.
- B. Coordinate metal roof panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.3 ACTION SUBMITTALS

A. Product Data:

1. For insulated metal roof panels.
 - a. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For insulated metal roof panels.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, insulated metal roof panels, and other manufactured items so as not to be damaged or deformed. Package insulated metal roof panels for protection during transportation and handling.
- B. Unload, store, and erect insulated metal roof panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack insulated metal roof panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store insulated metal roof panels to

ensure dryness, with positive slope for drainage of water. Do not store insulated metal roof panels in contact with other materials that might cause staining, denting, or other surface damage.

- D. Retain strippable protective covering on insulated metal roof panels during installation.

1.6 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of insulated metal roof panels to be performed in accordance with manufacturers' written installation instructions and warranty requirements.

1.7 WARRANTY

- A. Panel Finish Warranty: Submit Manufacturer's limited warranty on the exterior paint finish for adhesion to the metal substrate and limited warranty on the exterior paint finish for chalk and fade.
- B. Finish Warranty: Standard form in which manufacturer agrees to repair or replace metal panels that evidence deterioration of fluoropolymer finish, including flaking or peeling from approved primed metal substrate, chalk in excess, and/or color fading.
 - 1. Warranty Period: Thirty (30) years from date of Substantial Completion, or 30 years and 3 months from the date of shipment from manufacturer's plant, whichever occurs first.

PART 2 - PRODUCTS

2.1 INSULATED METAL ROOF PANELS, GENERAL

- A. Provide factory-formed metal roof panels fabricated from two sheets of metal with insulation core foamed in place during fabrication with joints between panels designed to form weathertight seals. Include all accessories required for weathertight installation.
 - 1. Insulation Core Foam: Foam using a non-CFC blowing agent, with maximum flame-spread and smoke-developed indexes of 25 and 450, respectively.
 - a. Closed-Cell Content: 90 percent when tested in accordance with ASTM D6226.
 - b. Density: **2.0 to 2.5 lb/cu. ft.** when tested in accordance with ASTM D1622.
 - c. Compressive Strength: Minimum **14 psi** when tested in accordance with ASTM D1621.
 - d. Shear Strength: **14 psi** when tested in accordance with ASTM C273/273M.

2.2 STANDING-SEAM-PROFILE, FOAMED-INSULATION-CORE METAL ROOF PANELS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Kingspan KingSeam roof panels or comparable product by one of the following:
1. Kingspan Insulated Panels
- B. Insulated Metal Roof Panels: Vertical ribs along one side of exterior face sheets are mechanically seamed on-site with vertical ribs of adjacent exterior face sheets. Concealed clips in the seams are anchored to supports by screws through the interior face sheet. Interior face sheets provide a tongue-and-groove interlock at joints.
1. Panel Coverage: 40 inches.
 2. Panel Thickness: 5.0 inches.
 3. Exterior Face Sheet:
 - a. Material: AZ50/Galvalume/Zincalume per ASTM A792. Minimum Grade 33.
 - b. Texture: Smooth.
 - c. Finish: PVDF finish, dry film thickness of 1.0 mil including primer.
 - d. Color: As selected by Architect from manufacturer's full range.
 4. Interior Face Sheet:
 - a. Material: A750/Galvalume/Zincalume per ASTM A792. Minimum Grade 33.
 - b. Texture: Smooth.
 - c. Finish: PVDF finish, dry film thickness of 1.0 mil including primer.
 - d. Color: As selected by Architect from manufacturer's full range.
 5. Insulation Core: polyurethane foam.

2.3 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C645, cold-formed, metallic-coated steel sheet, minimum ASTM A653/A653M, **G90** coating designation or ASTM A792/A792M, **Class AZ50** coating designation. Provide manufacturer's standard sections as required for support and alignment of insulated metal roof panel system.
- B. Roof Panel Accessories: Provide components required for a complete, weathertight metal roof panel system, including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of insulated metal roof panels unless otherwise indicated.
1. Closures: Provide closures at eaves and ridges, fabricated of same metal as insulated metal roof panels.
 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum **1-inch** thick, flexible closure strips; cut or premolded to match insulated metal roof panel profile. Provide closure strips where indicated or necessary to ensure weathertight

construction.

- C. Flashing and Trim: Provide flashing and trim formed from same material as exterior facings of insulated metal roof panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent insulated metal roof panels.
- D. Gutters: Formed from same material, finish, and color as exterior facings of insulated metal roof panels, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum **96-inch**- long sections, of size and metal thickness in accordance with manufacturer's recommendations. Furnish gutter supports spaced a maximum of **36 inches** o.c., fabricated from same metal as gutters. Provide wire ball strainers of compatible metal at outlets. Finish gutters to match metal roof panels.
- E. Downspouts: Formed from same material, finish, and color as exterior facings of insulated metal roof panels. Fabricate in **10 ft.-** long sections, complete with formed elbows and offsets, of size and metal thickness in accordance with manufacturer's recommendations. Finish downspouts to match gutters.
- F. Roof Curbs: Fabricated from same material, finish, and color as exterior facings of insulated metal roof panels, **0.048-inch** nominal thickness; with bottom of skirt profiled to match roof panel profiles and with welded top box and integral full-length cricket. Fabricate curb subframing of **0.060-inch**- nominal thickness, angle-, C-, or Z-shaped steel sheet. Fabricate curb and subframing to withstand indicated loads of size and height indicated. Finish roof curbs to match metal roof panels.
 - 1. Insulate roof curb with **1-inch**- thick, rigid insulation.
- G. Roof Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide EPDM or PVC sealing washers for exposed fasteners.
 - 1. Galvanized-Steel Fasteners: Provide exposed fasteners with heads matching color of insulated metal roof panels by means of plastic caps or factory-applied coating.
- H. Roof Panel Sealants: Provide sealant types recommended by manufacturer that are compatible with metal roof panel materials, are nonstaining, and do not damage panel finish.
 - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape **1/2 inch** wide and **1/8 inch** thick.
 - 2. Joint Sealant: ASTM C920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in insulated metal roof panels and remain weathertight; and as recommended in writing by insulated metal roof panel manufacturer.
 - 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

2.4 FABRICATION

- A. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations.
 - 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
 - 2. Seams: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
 - 3. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with manufacturer's recommendations.
 - 4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
 - 5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by insulated metal roof panel manufacturer.
 - a. Size: As recommended by insulated metal roof panel manufacturer for application but not less than thickness of metal being secured.

2.5 FINISHES

- A. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, insulated metal roof panel supports, and other conditions affecting performance of the Work.
 - 1. Examine primary and secondary roof framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer.
- B. Examine roughing-in for components and systems penetrating insulated metal roof panels to verify actual locations of penetrations relative to seam locations of insulated metal roof panels before installation.

- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages in accordance with ASTM C754 and insulated metal roof panel manufacturer's written recommendations.

3.3 INSTALLATION OF INSULATED METAL ROOF PANELS

- A. General: Install insulated metal roof panels in accordance with manufacturer's written instructions and approved Shop Drawings in orientation, sizes, and locations indicated on Drawings. Anchor insulated metal roof panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Apply continuous ribbon of sealant to panel joint on concealed side of insulated metal roof panels as vapor seal; apply sealant to panel joint on exposed side of panels for weather seal.
 - 2. Shim or otherwise plumb substrates receiving insulated metal roof panels.
 - 3. Flash and seal insulated metal roof panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by insulated metal roof panels are installed.
 - 4. Install screw fasteners in predrilled holes.
 - 5. Locate and space fastenings in uniform vertical and horizontal alignment.
 - 6. Install flashing and trim as insulated metal roof panel work proceeds.
 - 7. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
 - 8. Align bottoms of insulated metal roof panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
 - 9. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fasteners: Use stainless steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.
- C. Anchor Clips: Anchor insulated metal roof panels and other components of the Work securely in place, using manufacturer's approved fasteners in accordance with manufacturers' written instructions.
- D. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by insulated metal roof panel manufacturer.
- E. Standing-Seam, Foamed-Insulation-Core Metal Roof Panels: Fasten insulated metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.
 - 1. Install clips to supports with self-tapping fasteners.

2. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so cleat, insulated metal roof panel, and factory-applied side-lap sealant are completely engaged.
- F. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete insulated metal roof panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by insulated metal panel manufacturers; or, if not indicated, provide types recommended in writing by metal roof panel manufacturer.
- G. Flashing and Trim: Comply with performance requirements and manufacturer's written installation instructions. Provide concealed fasteners where possible and set units true to line and level. Install work with laps, joints, and seams that are permanently watertight and weather resistant.
1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof performance.
 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of **10 ft.** with no joints allowed within **24 inches** of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than **1 inch** deep, filled with mastic sealant (concealed within joints).
- H. Gutters: Join sections with riveted and soldered or lapped and sealed joints. Attach gutters to eave with gutter hangers spaced not more than **36 inches** o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.
- I. Downspouts: Join sections with telescoping joints. Provide fasteners designed to hold downspouts securely **1 inch** away from walls; locate fasteners at top and bottom and at approximately **60 inches** o.c. in between.
1. Provide elbows at base of downspouts to direct water away from building.
 2. Connect downspouts to underground drainage system indicated.
- J. Roof Curbs: Install curbs at locations indicated on Drawings. Install flashing around bases where they meet metal roof panels.

3.4 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align insulated metal roof panels within installed tolerance of **1/4 inch in 20 ft.** on slope and location lines as indicated and within **1/8-inch** offset of adjoining faces and of alignment of matching profiles.

3.5 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as insulated metal roof panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of insulated metal roof panel installation, clean finished surfaces as recommended by insulated metal roof panel manufacturer. Maintain in a clean condition during construction.
- B. Replace insulated metal roof panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 4116

SECTION 07 4213.13 - FORMED METAL WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Flush-profile, concealed-fastener metal wall panels.
2. Creased-rib-profile, concealed fastener metal wall panels.

B. Related Requirements:

1. Section 072100 "Thermal Insulation" for insulation.

1.2 DEFINITIONS

- A. Wall Panel Assembly: Assembly consisting of wall panels, support systems, cavities, weather barriers, air barriers, and sheathing substrate that has been shown to comply with assembly testing and performance requirements.

1.3 COORDINATION

- A. Coordinate installation of wall panels and support system with insulation, weather barriers, air barriers, flashings, and other adjoining construction to ensure proper sequencing.

1.4 ACTION SUBMITTALS

- A. Product Data: For each specified system and assembly, including components and accessories.

1. For formed metal wall panels, include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For formed metal wall panels.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Entity that employs installers and supervisors who are trained

and approved by manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, metal wall panels, and other manufactured items so as not to be damaged or deformed. Package panels for protection during transportation and handling.
- B. Unload, store, and erect metal wall panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal wall panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store panels to ensure dryness, with positive slope for drainage of water. Do not store panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Retain strippable protective covering on metal wall panels during installation.
- E. Copper Wall Panels: Wear gloves when handling to prevent fingerprints and soiling of surface.

1.8 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal wall panels to be performed in accordance with manufacturers' written instructions and warranty requirements.

1.9 WARRANTY

- A. Manufacturer's Warranty: Manufacturer's standard 25-year performance warranty, stating the following:
 - 1. Architectural fluorocarbon finish:
 - a. Will be free of fading or color change in excess of 5 Hunter delta-E units as determined by ASTM D2244-02.
 - b. Will not chalk in excess of numerical rating of 8 when measured in accordance with standard procedures specified in ASTM D4214-98 method D659.
 - c. Will not peel, crack, chip, or delaminate.
 - 2. Metal substrate will not rupture, fail structurally, or perforate.
- B. Installer's Warranty: Warrant panels, flashings, sealants, fasteners and accessories against defective materials and/or workmanship, covering repairs required to maintain wall panels watertight and weatherproof with normal usage for two years following Project Substantial Completion date.

1. Furnish written warranty, signed by installer.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal wall panel systems, including associated support system, capable of withstanding the effects of the following loads, based on testing in accordance with ASTM E1592 or ASTM E330/E330M:
- B. Air Infiltration: Not more than **0.06 cfm/sq. ft.** when tested in accordance with ASTM E283/283M at the following test-pressure difference:
- C. Thermal Movement: Allow for thermal movement from ambient and surface temperature changes.
 1. Temperature Change: **120 deg F**, ambient; **180 deg F**, material surfaces.

2.2 METAL WALL PANELS

- A. Provide factory-formed metal panels designed to be field assembled by lapping side edges of adjacent panels and mechanically attaching panels to supports using concealed fastener in side laps. Include accessories required for weathertight installation.
- B. Flush-Profile, Concealed-Fastener Metal Wall Panels:
 1. Basis-of-Design Product: Subject to compliance with requirements, provide Prestige Series Metal Siding or comparable product by one of the following:
 - a. AEP Span a brand of ASC Profiles LLC, a part of BlueScope
 2. Metal Wall Panels: Formed with vertical panel edges and a flat pan between panel edges; with flush joint between panels.
 - a. Material: Metallic-coated steel.
 - b. Panel Coverage: **12 inches**.
 - c. Panel Height: **1.5 inches**.
- C. Creased-Rib-Profile, Concealed-Fastener Metal Wall Panels:
 1. Basis-of-Design Product: Subject to compliance with requirements, provide Flex Series Metal Siding or comparable product by one of the following:
 - a. AEP Span, a Division of ASC Profiles, LLC.
 2. Metal Wall Panels: Formed with raised, center-creased, trapezoidal major ribs; with reveal joint between panels.

- a. Material: Metallic-coated steel.
- b. Panel Coverage: **12 inches**.
- c. Panel Height: 1.25 inches.

2.3 METAL WALL PANEL MATERIALS

- A. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A653/A653M, **G90** coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A792/A792M, **Class AZ50** coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755/A755M.
 - 1. Nominal Thickness: **0.030 inch**.
 - 2. Exterior Finish: Two-coat fluoropolymer.
 - 3. Color: As selected by Architect from manufacturer's full range.

2.4 ACCESSORIES

- A. Wall Panel Assembly Accessories, General: Provide components required for a complete, weathertight wall panel system including trim, copings, fascia, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels unless otherwise indicated on Drawings.
 - 1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal wall panels.
- B. Flashing and Trim: Provide flashing and trim formed from same material as metal wall panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal wall panels.
- C. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.
- D. Panel Sealants: Provide sealant types recommended in writing by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
 - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape **1/2 inch** wide and **1/8 inch** thick.
 - 2. Joint Sealant: ASTM C920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
 - 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

2.5 FABRICATION

- A. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with panel manufacturer's written recommendations that apply to design, dimensions, metal, and other characteristics of item indicated.
1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels specified, with exposed edges folded back to form hems.
 2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
 3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
 4. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with manufacturer's written recommendations.
 5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
 6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
 - a. Size: As recommended in writing by metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.6 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Metallic-Coated Steel Panels and Accessories:
1. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of **0.5 mil**.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal wall panel supports, and other conditions affecting performance of the Work.
 - 1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.
 - 2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.
 - a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Examine roughing-in for components and systems penetrating metal wall panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Miscellaneous Supports: Install steel subframing, furring, and other miscellaneous support system members and anchorages in accordance with metal wall panel manufacturer's written instructions.

3.3 INSTALLATION OF FORMED METAL WALL PANELS, GENERAL

- A. Install in accordance with metal wall panel manufacturer's written instructions in orientation, sizes, and locations indicated. Anchor panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Shim or otherwise plumb substrates receiving metal panels.
 - 2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
 - 3. Install screw fasteners in predrilled holes.
 - 4. Locate and space fastenings in uniform vertical and horizontal alignment.
 - 5. Install flashing and trim as metal panel work proceeds.
 - 6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
 - 7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with

self-tapping screws.

8. Provide watertight escutcheons for pipe- and conduit-penetrating panels.

B. Fasteners:

1. Metallic-Coated Steel Panels: Use stainless steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.

C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

3.4 INSTALLATION OF METAL WALL PANELS

A. Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended in writing by manufacturer.

1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.
2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
5. Flash and seal panels with weather closures at perimeter of all openings.

3.5 INSTALLATION OF ACCESSORIES

A. Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal wall panel manufacturer; or, if not indicated, provide types recommended in writing by metal panel manufacturer.

B. Flashing and Trim: Comply with performance requirements and panel manufacturer's written installation instructions. Provide concealed fasteners where possible and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.

1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems.

Install sheet metal flashing and trim to fit substrates and achieve watertight performance.

2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of **10 ft.** with no joints allowed within **24 inches** of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than **1 inch** deep, filled with mastic sealant concealed within joints.

3.6 INSTALLATION TOLERANCES

- A. Shim and align metal wall panel units within installed tolerance of **1/4 inch in 20 ft.**, non-accumulative, on level, plumb, and location lines as indicated on Drawings, and within **1/8-inch** offset of adjoining faces and of alignment of matching profiles.

3.7 CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as metal wall panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of panel installation, clean finished surfaces as recommended in writing by metal wall panel manufacturer.
- B. After installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

3.8 PROTECTION

- A. Maintain metal wall panels in a clean condition during the remainder of construction.
- B. Replace metal wall panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 4213.13

SECTION 07 6200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sheet metal materials.
2. Underlayment.
3. Miscellaneous materials.
4. Roof-drainage sheet metal fabrications.
5. Sloped roof sheet metal fabrications.
6. Wall sheet metal fabrications.
7. Miscellaneous sheet metal fabrications.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for wood nailers, curbs, and blocking.

1.2 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For sheet metal flashing and trim, and its accessories.

1.3 QUALITY ASSURANCE

- A. Fabricator Qualifications: Entity that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.
1. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
 2. Protect stored sheet metal flashing and trim from contact with water.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.5 COORDINATION

- A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Sheet metal flashing and trim assemblies, including cleats, anchors, and fasteners, are to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim are not to rattle, leak, or loosen, and are to remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual: Architectural Metal Flashing, Condensation and Air Leakage Control, and Reroofing" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 SHEET METAL MATERIALS

- A. Sheet Metal Materials, General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with minimum ASTM A653/A653M, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with minimum ASTM A792/A792M, Class AZ50 coating designation; structural quality.
 - 1. Nominal Thickness: 0.030 inch.
 - 2. Surface: Smooth, flat.
 - 3. Color: As selected by Architect from manufacturer's full range.

2.3 MISCELLANEOUS MATERIALS

- A. Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation

and as recommended by manufacturer of primary sheet metal unless otherwise indicated.

- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.
 - 1. Fasteners for Zinc-Coated (Galvanized) or Aluminum-Zinc Alloy-Coated Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel in accordance with ASTM A153/A153M or ASTM F2329/F2329M.
- C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape **1/2 inch** wide and **1/8 inch** thick.
- D. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

2.4 FABRICATION, GENERAL

- A. Custom fabricate sheet metal flashing and trim to comply with details indicated and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required.
 - 1. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
 - 2. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 - 3. Verify shapes and dimensions of surfaces to be covered and obtain field measurements for accurate fit before shop fabrication.
 - 4. Form sheet metal flashing and trim to fit substrates without excessive oil-canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
 - 5. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Fabrication Tolerances:
 - 1. Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of **1/4 inch in 20 ft.** on slope and location lines indicated on Drawings and within **1/8-inch** offset of adjoining faces and of alignment of matching profiles.
 - 2. Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified.
- C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than **1 inch** deep, filled with butyl sealant concealed within joints.

2. Use lapped expansion joints only where indicated on Drawings.
- D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal in accordance with cited sheet metal standard to provide for proper installation of elastomeric sealant.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.
- G. Seams:
 1. Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use.

2.5 ROOF-DRAINAGE SHEET METAL FABRICATIONS

- A. Built-In Gutters: Fabricate to cross section required, with riveted and soldered joints, complete with end pieces, outlet tubes, and other special accessories as required.
 1. Minimum Fabrication Length: **96-inch**-long sections.
 2. Gutter Components: Fabricate expansion joints and accessories from same metal as gutters unless otherwise indicated.
 3. Expansion Joints: Fabricate gutters with built-in expansion joints.
 4. Fabricate from the following materials:
 - a. Galvanized Steel: G90, 0.030 inch thick.
- B. Downspouts: Fabricate downspouts to dimensions indicated on Drawings.
 1. Type: Rectangular.
 2. Downspout Elbows: Mitered.
 3. Metal Hangers: Provide same material as downspouts and anchors.
 4. Fabricate from the following materials:
 - a. Galvanized Steel: **0.030 inch** thick.

2.6 SLOPED ROOF SHEET METAL FABRICATIONS

- A. Low-Sloped Roof Sheet Metal Fabrications:
 1. Roof Edge Flashing (Gravel Stop) and Fascia Cap:
 - a. Fabricate in minimum **96-inch**- long, but not exceeding **12 ft.** long sections. Furnish with **6-inch**- wide, joint cover plates.
 - b. Joint Style: Butted with expansion space and **6-inch**- wide, concealed

- backup plate.
- c. Fabricate from the following materials:
 - 1) Galvanized Steel: **0.030 inch** thick.
- 2. Copings:
 - a. Fabricate in minimum **96-inch-** long, but not exceeding **12 ft.** long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and interior leg. Miter corners, fasten and seal watertight.
 - b. Joint Style: Butted with expansion space and **6-inch-** wide, concealed backup plate
 - c. Fabricate from the following materials:
 - 1) Galvanized Steel: **0.030 inch** thick.
- 3. Base Flashing:
 - a. General: Fabricate from the following materials:
 - 1) Galvanized Steel: **0.030 inch** thick.
- 4. Counterflashing:
 - a. General: Fabricate from the following materials:
 - 1) Galvanized Steel: **0.030 inch** thick.
- 5. Roof-Penetration Flashing: Fabricate from the following materials:
 - a. Galvanized Steel: **0.030 inch** thick.
- 6. Roof-Drain Flashing: Fabricate from the following materials:
 - a. Stainless Steel: **0.030 inch** thick.
- B. Steep-Slope Roof Sheet Metal Fabrications:
 - 1. Apron, Step, Cricket, and Backer Flashing: Fabricate from the following materials:
 - a. Galvanized Steel: **0.030 inch** thick.
 - 2. Valley Flashing: Fabricate from the following materials:
 - a. Galvanized Steel: **0.030 inch** thick.
 - 3. Drip Edges: Fabricate from the following materials:
 - a. Galvanized Steel: **0.030 inch** thick.

4. Eave, Rake, Ridge, and Hip Flashing: Fabricate from the following materials:
 - a. Galvanized Steel: **0.030 inch** thick.
5. Counterflashing:
 - a. General: Fabricate from the following materials:
 - 1) Galvanized Steel: **0.030 inch** thick.
6. Roof-Penetration Flashing: Fabricate from the following materials:
 - a. Galvanized Steel: **0.030 inch** thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrates, and other conditions affecting performance of the Work.
 1. Verify compliance with requirements for installation tolerances of substrates.
 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
 3. Verify that air- or water-resistant barriers have been installed over substrate to prevent air infiltration or water penetration.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF UNDERLAYMENT

- A. Synthetic Underlayment: Install synthetic underlayment, wrinkle free, in accordance with manufacturers' written instructions, and using adhesive where possible to minimize use of mechanical fasteners under sheet metal.
 1. Lap horizontal joints not less than **4 inches**.
 2. Lap end joints not less than **12 inches**.

3.3 INSTALLATION OF SHEET METAL FLASHING AND TRIM, GENERAL

- A. Install sheet metal flashing and trim to comply with details indicated and recommendations of cited sheet metal standard that apply to installation characteristics required unless otherwise indicated on Drawings.
 1. Install fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim

- system.
2. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of sealant.
 3. Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement.
 4. Install sheet metal flashing and trim to fit substrates and to result in watertight performance.
 5. Install continuous cleats with fasteners spaced not more than **12 inches** o.c.
 6. Space individual cleats not more than **12 inches** apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
 7. Install exposed sheet metal flashing and trim with limited oil-canning, and free of buckling and tool marks.
 8. Do not field cut sheet metal flashing and trim by torch.
- B. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim.
1. Space movement joints at maximum of **10 ft.** with no joints within **24 inches** of corner or intersection.
 2. Form expansion joints of intermeshing hooked flanges, not less than **1 inch** deep, filled with sealant concealed within joints.
 3. Use lapped expansion joints only where indicated on Drawings.
- C. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than **1-1/4 inches** for nails and not less than **3/4 inch** for wood screws.
- D. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- E. Seal joints as required for watertight construction.
1. Use sealant-filled joints unless otherwise indicated.
 - a. Embed hooked flanges of joint members not less than **1 inch** into sealant.
 - b. Form joints to completely conceal sealant.
 - c. When ambient temperature at time of installation is between **40 and 70 deg F**, set joint members for 50 percent movement each way.
 - d. Adjust setting proportionately for installation at higher ambient temperatures.
 - 1) Do not install sealant-type joints at temperatures below **40 deg F**.
 2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."
- 3.4 INSTALLATION OF ROOF-DRAINAGE SHEET METAL FABRICATIONS
- A. Install sheet metal roof-drainage items to produce complete roof-drainage system in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

B. Built-In Gutters:

1. Join sections with joints sealed with sealant.
2. Provide for thermal expansion.
3. Slope to downspouts.
4. Provide end closures and seal watertight with sealant.
5. Install underlayment layer in built-in gutter trough and extend to drip edge at eaves and under underlayment on roof sheathing.
 - a. Lap sides minimum of **2 inches** over underlying course.
 - b. Lap ends minimum of **4 inches**.
 - c. Stagger end laps between succeeding courses at least **72 inches**.
 - d. Fasten with roofing nails.
 - e. Install slip sheet over underlayment.

C. Downspouts:

1. Join sections with **1-1/2-inch** telescoping joints.
2. Provide hangers with fasteners designed to hold downspouts securely to walls.
3. Locate hangers at top and bottom and at approximately **60 inches** o.c.
4. Connect downspouts to underground drainage system.

3.5 INSTALLATION OF SLOPED ROOF SHEET METAL FABRICATIONS

A. Install sheet metal flashing and trim to comply with performance requirements and cited sheet metal standard.

1. Provide concealed fasteners where possible, and set units true to line, levels, and slopes.
2. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Roof Edge Flashing:

1. Install roof edge flashings in accordance with ANSI/SPRI/FM 4435/ES-1.
2. Anchor to resist uplift and outward forces in accordance with recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered **3-inch** centers.
3. Anchor to resist uplift and outward forces in accordance with recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.

C. Copings:

1. Install copings in accordance with ANSI/SPRI/FM 4435/ES-1.
2. Anchor to resist uplift and outward forces in accordance with recommendations in cited sheet metal standard unless otherwise indicated.
 - a. Interlock exterior bottom edge of coping with continuous cleat anchored to

- substrate at **24-inch** centers.
- b. Anchor interior leg of coping with washers and screw fasteners through slotted holes at **24-inch** centers.
- D. Counterflashing: Coordinate installation of counterflashing with installation of base flashing.
 - 1. Extend counterflashing **4 inches** over base flashing.
 - 2. Lap counterflashing joints minimum of **4 inches**.
 - 3. Secure in waterproof manner by means of snap-in installation and sealant or lead wedges and sealant unless otherwise indicated.
- E. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with **butyl** sealant and clamp flashing to pipes that penetrate roof.

3.6 INSTALLATION TOLERANCES

- A. Shim and align sheet metal flashing and trim within installed tolerance of **1/4 inch in 20 ft.** on slope and location lines indicated on Drawings and within **1/8-inch** offset of adjoining faces and of alignment of matching profiles.

3.7 CLEANING

- A. Clean off excess sealants.

3.8 PROTECTION

- A. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended in writing by sheet metal flashing and trim manufacturer.
- C. Maintain sheet metal flashing and trim in clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures, as determined by Architect.

END OF SECTION 07 6200

SECTION 07 9200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Silicone joint sealants.

1.2 CLOSEOUT SUBMITTALS

- A. Manufacturers' special warranties.
- B. Installer's special warranties.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Authorized representative who is trained and approved by manufacturer.

1.4 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
 2. When joint substrates are wet.
 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.5 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: Five years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
 1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 2. Disintegration of joint substrates from causes exceeding design specifications.
 3. Mechanical damage caused by individuals, tools, or other outside agents.
 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain joint sealants from single manufacturer.

2.2 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As indicated by manufacturer's designations.

2.3 SILICONE JOINT SEALANTS

- A. Silicone, S, NS, 50, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 50, Use NT.

2.4 NONSTAINING SILICONE JOINT SEALANTS

- A. Nonstaining Joint Sealants: No staining of substrates when tested in accordance with ASTM C1248.

2.5 JOINT-SEALANT BACKING

- A. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant

manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.6 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.

3. Remove laitance and form-release agents from concrete.
 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
1. Do not leave gaps between ends of sealant backings.
 2. Do not stretch, twist, puncture, or tear sealant backings.
 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
1. Place sealants so they directly contact and fully wet joint substrates.
 2. Completely fill recesses in each joint configuration.
 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants in accordance with requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to

eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.

3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 07 9200

SECTION 08 1113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Interior standard steel doors and frames.
 - 2. Exterior standard steel doors and frames.

1.2 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings in accordance with NAAMM-HMMA 803 or ANSI/SDI A250.8.

1.3 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.4 ACTION SUBMITTALS

- A. Product Data:
 - 1. Interior standard steel doors and frames.
 - 2. Exterior standard steel doors and frames.
- B. Product Data Submittals: For each product.
 - 1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.

1.5 CLOSEOUT SUBMITTALS

- A. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
 - 1. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum **4-inch**- high wood blocking. Provide minimum **1/4-inch** space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 HOLLOW METAL DOORS AND FRAMES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Trudoor, LLC

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated on Drawings, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.

2.3 INTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Standard-Duty Doors and Frames: ANSI/SDI A250.8, Level 1; ANSI/SDI A250.4, Level C. At locations indicated in the Door and Frame Schedule on Drawings.
 - 1. Doors:
 - a. Type: As indicated in the Door and Frame Schedule on Drawings.
 - b. Thickness: **1-3/4 inches**.
 - c. Face: Uncoated steel sheet, minimum thickness of **0.032 inch**.
 - d. Edge Construction: Model 2, Seamless.
 - e. Edge Bevel: Provide manufacturer's standard beveled or square edges.

- f. Core: Manufacturer's standard.
- g. Fire-Rated Core: Manufacturer's standard core for fire-rated doors.

2. Frames:

- a. Materials: Uncoated steel sheet, minimum thickness of **0.042 inch**.
- b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
- c. Construction: Knocked down.

2.4 EXTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B. At locations indicated in the Door and Frame Schedule on Drawings.

1. Doors:

- a. Type: As indicated in the Door and Frame Schedule on Drawings.
- b. Thickness: **1-3/4 inches**.
- c. Face: Metallic-coated steel sheet, minimum thickness of **0.042 inch**, with minimum **A60** coating.
- d. Edge Construction: Model 2, Seamless.
- e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
- f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
- g. Bottom Edges: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
- h. Core: Manufacturer's standard.

2. Frames:

- a. Materials: Metallic-coated steel sheet, minimum thickness of **0.053 inch**, with minimum **A60** coating.
- b. Construction: Face welded.

3. Exposed Finish: Factory.

2.5 FRAME ANCHORS

A. Jamb Anchors:

- 1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.

2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each **24 inches** of frame height above **7 feet**.
 3. Post installed Expansion Anchor: Minimum **3/8-inch**- diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.
- B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.
- C. Material: ASTM A879/A879M, Commercial Steel (CS), **04Z** coating designation; mill phosphatized.
1. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A1008M or ASTM A1011/A1011M; hot-dip galvanized in accordance with ASTM A153/A153M, Class B.

2.6 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Inserts, Bolts, and Fasteners: Hot-dip galvanized in accordance with ASTM A153/A153M.
- C. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

2.7 FABRICATION

- A. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
1. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
- B. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping in accordance with ANSI/SDI A250.6, the Door Hardware Schedule on Drawings, and templates.
1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
 2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.

2.8 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
 - 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

- A. Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.
- B. Hollow-Metal Frames: Comply with ANSI/SDI A250.11.
 - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
 - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
 - b. Install frames with removable stops located on secure side of opening.
 - 2. Fire-Rated Openings: Install frames in accordance with NFPA 80.
 - 3. Floor Anchors: Secure with post installed expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of post installed expansion anchors if so indicated and approved on Shop Drawings.
 - 4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
 - 5. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:

- a. Squareness: Plus or minus **1/16 inch**, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus **1/16 inch**, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus **1/16 inch**, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus **1/16 inch**, measured at jambs at floor.
- C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.
- 1. Non-Fire-Rated Steel Doors: Comply with ANSI/SDI A250.8.
 - 2. Fire-Rated Doors: Install doors with clearances in accordance with NFPA 80.

3.3 REPAIR

- A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint in accordance with manufacturer's written instructions.
- C. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 08 1113

SECTION 08 1116.13 - INTERIOR ALUMINUM FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior aluminum frames.

1.2 ACTION SUBMITTALS

A. Product Data:

1. For each type of product.
 - a. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For interior aluminum doors and frames.

PART 2 - PRODUCTS

2.1 INTERIOR ALUMINUM DOORS AND FRAMES

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
1. Alpha Aluminum Architectural Products
- B. Source Limitations: Obtain interior aluminum doors and frames from single source from single manufacturer.
- C. Aluminum Framing: **ASTM B221**, with alloy and temper required to suit structural and finish requirements, and not less than **0.062 inch** thick.
- D. Door Frames: Extruded aluminum, reinforced for hinges, strikes, and closers.
- E. Glazing Frames: Extruded aluminum, for glass thickness indicated on Drawings.

2.2 ACCESSORIES

- A. Wood Doors: As specified in Section 081416 "Flush Wood Doors."
- B. Fasteners: Aluminum, nonmagnetic, stainless steel, zinc-plated steel or other noncorrosive metal fasteners compatible with frames, stops, panels, reinforcement plates, hardware, anchors, and other items being fastened.
- C. Corner Reinforcements and Alignment Clips: Manufacturer's standard concealed units to provide accurately fitted hairline joints at butted and mitered connections.
- D. Glazing Gaskets: Manufacturer's standard extruded or molded rubber or plastic, to accommodate glazing thickness indicated; in manufacturer's standard color.
- E. Glass: As specified in Section 088000 "Glazing."
- F. Door Hardware: As specified in Section 087100 "Door Hardware."

2.3 FABRICATION

- A. Hardware Preparation: Factory prepare components to receive templated mortised hardware; include cutouts, reinforcements, mortising, drilling, and tapping.
 - 1. Reinforce doors and frames to receive nontemplated mortised and surface-mounted hardware.
 - 2. Locate hardware as indicated on Drawings.
- B. Glazing Stops: Locate removable stops on inside of spaces accessed by locking doors.
- C. Fabricate components to allow secure installation without exposed fasteners and to provide accurately fitted hairline joints at butted and mitered connections.
- D. Fabricate frame components 84 inches long or shorter as one piece. Where splices are required, no individual piece may be less than 48 inches long.

2.4 ALUMINUM FINISHES

- A. Comply with NAAMM/NOMMA AMP 500 for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF ALUMINUM DOORS AND FRAMES

- A. Install aluminum frames plumb, rigid, properly aligned, and securely fastened in place in accordance with manufacturer's written instructions.
 - 1. Use concealed installation clips to produce tightly fitted and aligned splices and connections.
 - 2. Secure clips to extruded main-frame components and not to snap-in or trim members.
 - 3. Do not leave screws or other fasteners exposed to view when installation is complete.
- B. Glass: Install glass in accordance with Section 088000 "Glazing" and aluminum-frame manufacturer's written instructions.
- C. Doors: Install doors aligned with frames and fitted with required hardware.
 - 1. Wood Doors: Install in accordance with Section 081416 "Wood Doors" and aluminum-frame manufacturer's written instructions.
 - 2. Hardware: Install in accordance with Section 087100 "Door Hardware" and aluminum-frame manufacturer's written instructions.

3.3 ADJUSTING AND CLEANING

- A. Inspect installation, correct misalignments, and tighten loose connections.
- B. Doors: Adjust doors to operate smoothly and easily, without binding or warping. Adjust hardware to function smoothly in accordance with manufacturer's written instructions.
- C. Clean exposed frame surfaces promptly after installation, using cleaning methods recommended in writing by frame manufacturer and in accordance with AAMA 609 & 610.
- D. Touch Up: Immediately after installation, repair damaged areas of aluminum finishes and touchup in accordance with manufacturer's written instructions.

END OF SECTION 08 1116.13

INTERIOR ALUMINUM DOORS AND
FRAMES

08 1116.13 - 3

SECTION 08 1416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid-core five-ply flush wood doors

B. Related Requirements:

1. Section 099123 "Interior Painting" for field finishing doors.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Solid-core five-ply flush wood doors

B. Product Data Submittals: For each product, including the following:

1. Door core materials and construction.
2. Door edge construction
3. Door face type and characteristics.
4. Door trim for openings.
5. Door frame construction.
6. Factory-finishing specifications.

1.3 CLOSEOUT SUBMITTALS

A. Special warranties.

B. Quality Standard Compliance Certificates: WI Certified Compliance Program certificates.

1.4 QUALITY ASSURANCE

A. Manufacturer's Certification: Licensed participant in WI's Certified Compliance Program.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written

instructions.

- B. Package doors individually in plastic bags or cardboard cartons.
- C. Mark each door on bottom rail with opening number used on Shop Drawings.

1.6 FIELD CONDITIONS

- A. Environmental Limitations:
 - 1. Do not deliver or install doors until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and HVAC system is operating and maintaining temperature and relative humidity at levels designed for building occupants for the remainder of construction period.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain flush wood doors from single manufacturer.

2.2 FLUSH WOOD DOORS AND FRAMES, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with AWI/AWMAC/WI's "Architectural Woodwork Standards."
 - 1. Provide labels and certificates from WI certification program indicating that doors comply with requirements of grades specified.

2.3 SOLID-CORE FIVE-PLY FLUSH WOOD DOORS AND TRANSOM PANELS FOR OPAQUE FINISH

- A. Interior Doors, Solid-Core Five-Ply for Opaque Finish:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **[Forte Opening Solutions]**
 - b. **[Lambton Doors]**
 - c. **[Lynden Door, Inc.]**
 - d. **[Manhattan Door Corp.]**
 - e. **[Oregon Door]**
 - f. **[Oshkosh Door Company]**
 - g. **[VT Industries, Inc.]**
 - h. **<Insert manufacturer's name>**

2. Performance Grade: ANSI/WDMA I.S. 1A Standard Duty.
3. Architectural Woodwork Standards Quality Grade: Custom.
4. Faces: Hardboard or MDF.
 - a. Hardboard Faces: ANSI A135.4, Class 1 (tempered) or Class 2 (standard).
 - b. MDF Faces: ANSI A208.2, Grade 150 or Grade 160.
5. Core for Non-Fire-Rated Doors:
 - a. ANSI A208.1, Grade LD-1 particleboard.

2.4 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated.
 1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

2.5 FACTORY FINISHING

- A. Comply with referenced quality standard for factory finishing.
 1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 2. Finish faces, all four edges, edges of cutouts, and mortises.
 3. Stains and fillers may be omitted on **top and** bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors.
- C. Factory finish doors where indicated in schedules or on Drawings as factory finished.
- D. Opaque Finish:
 1. Architectural Woodwork Standards Grade: **Custom**.
 - a. System-5, Varnish, Conversion.
 - b. System-9, UV Curable, Acrylated Epoxy, Polyester, or Urethane.
 - c. System-10, UV Curable, Water Based.
 - d. System-11, Polyurethane, Catalyzed.
 2. Color: **As selected by Architect from manufacturer's full range.**

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
 - 1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Section 087100 "Door Hardware."
- B. Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
- C. Install frames level, plumb, true, and straight.
 - 1. Shim as required with concealed shims. Install level and plumb to a tolerance of **1/8 inch in 96 inches**.
 - 2. Anchor frames to anchors or blocking built in or directly attached to substrates.
 - a. Secure with countersunk, concealed fasteners and blind nailing.
 - b. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.

3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 08 1416

SECTION 08 3323 - OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Service doors.
2. Fire-rated service doors.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for miscellaneous steel supports, door-opening framing, and corner guards.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.

1.3 CLOSEOUT SUBMITTALS

A. Special warranty.

B. Maintenance Data: For overhead coiling doors to include in maintenance manuals.

C. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

1.5 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of doors that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain overhead coiling doors from single source from single manufacturer.
 - 1. Obtain operators and controls from overhead coiling-door manufacturer.

2.2 DOOR ASSEMBLY

- A. Service Doors: Overhead coiling doors formed with curtain of interlocking metal slats.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **[ACME Rolling Doors]**
 - b. **[Advanced Door Technologies]**
 - c. **[Alpine Overhead Doors, Inc]**
 - d. **[Alumatec Pacific Products]**
 - e. **[Amarr Company]**
 - f. **[ASTA America; Janus International Group]**
 - g. **[C.H.I. Overhead Doors, Inc.]**
 - h. **[City Gates USA]**
 - i. **[Clopay Building Products]**
 - j. **[Cookson; a CornellCookson company]**
 - k. **[Cornell; a CornellCookson company]**
 - l. **[Dynamic Closures Corporation]**
 - m. **[Hormann High Performance Doors]**
 - n. **[Lawrence Doors; by Amarr]**
 - o. **[McKeon Door Company]**
 - p. **[Metro Door LLC]**
 - q. **[Overhead Door Corporation]**
 - r. **[Raynor Garage Doors]**
 - s. **[Rytec Corporation]**
 - t. **[Southwestern Rolling Steel Door Co]**
 - u. **[Wayne Dalton; a division of Overhead Door Corporation]**
 - v. **[Windsor Door]**
- B. Operation Cycles: Door components and operators capable of operating for not less than 10,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
- C. Insulated Door Curtain R-Value: **4.5 deg F x h x sq. ft./Btu.**
- D. Insulated Door Assembly U-Factor: **0.90 Btu/deg F x h x sq. ft.**
- E. Door Curtain Material: Galvanized steel.

- F. Door Curtain Slats: Flat profile slats of **2-5/8-inch** center-to-center height.
- G. Bottom Bar: Two angles, each not less than **1-1/2 by 1-1/2 by 1/8 inch** thick; fabricated from hot-dip galvanized steel and finished to match door.
- H. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats.
- I. Hood: Match curtain material and finish.
 - 1. Shape: Round.
 - 2. Mounting: Face of wall.
- J. Locking Devices: Equip door with chain lock keeper.
- K. Manual Door Operator: Chain-hoist operator.
- L. Door Finish:
 - 1. Factory Prime Finish: Manufacturer's standard color.
 - 2. Interior Curtain-Slat Facing: Finish as indicated by manufacturer's designations.

2.3 FIRE-RATED DOOR ASSEMBLY

- A. Fire-Rated Service Doors: Overhead fire-rated coiling doors formed with curtain of interlocking metal slats.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **[ACME Rolling Doors]**
 - b. **[Advanced Door Technologies]**
 - c. **[Alpine Overhead Doors, Inc]**
 - d. **[Amarr Company]**
 - e. **[ASTA America; Janus International Group]**
 - f. **[C.H.I. Overhead Doors, Inc.]**
 - g. **[City Gates USA]**
 - h. **[Clopay Building Products]**
 - i. **[Cookson; a CornellCookson company]**
 - j. **[Cornell; a CornellCookson company]**
 - k. **[Lawrence Doors; by Amarr]**
 - l. **[McKeon Door Company]**
 - m. **[Overhead Door Corporation]**
 - n. **[Raynor Garage Doors]**
 - o. **[Southwestern Rolling Steel Door Co]**
 - p. **[Wayne Dalton; a division of Overhead Door Corporation]**
- B. Operation Cycles: Door components and operators capable of operating for not less than 10,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.

- C. Fire Rating: 3 hours.
- D. Insulated Door Curtain R-Value: 4.5 deg F x h x sq. ft./Btu.
- E. Insulated Door Assembly U-Factor: 0.90 Btu/deg F x h x sq. ft..
- F. Door Curtain Material: Galvanized steel.
- G. Door Curtain Slats: Flat profile slats of 2-5/8-inch center-to-center height.
 - 1. Insulated-Slat Interior Facing: Metal.
- H. Bottom Bar: Two angles, each not less than 1-1/2 by 1-1/2 by 1/8 inch thick; fabricated from hot-dip galvanized steel and finished to match door.
- I. Curtain Jamb Guides: steel with exposed finish matching curtain slats.
- J. Hood: Match curtain material and finish.
 - 1. Shape: Round.
 - 2. Mounting: Face of wall.
- K. Locking Devices: Equip door with chain lock keeper.
- L. Manual Door Operator: Chain-hoist operator.
- M. Door Finish:
 - 1. Factory Prime Finish: Manufacturer's standard color.
 - 2. Interior Curtain-Slat Facing: Finish as indicated by manufacturer's designations.

2.4 DOOR CURTAIN MATERIALS AND CONSTRUCTION

- A. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:
 - 1. Steel Door Curtain Slats: Zinc-coated (galvanized), cold-rolled structural-steel sheet; complying with ASTM A653/A653M, with G90 zinc coating; nominal sheet thickness (coated) of 0.028 inch; and as required.
 - 2. Insulation: Fill slats for insulated doors with manufacturer's standard thermal insulation complying with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, in accordance with ASTM E84 or UL 723. Enclose insulation completely within slat faces.
 - 3. Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face, with minimum steel thickness of 0.010 inch.
- B. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same

material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain.

2.5 HOODS

- A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.
 - 1. Galvanized Steel: Nominal **0.028-inch**- thick, hot-dip galvanized-steel sheet with **G90** zinc coating, complying with ASTM A653/A653M.
 - 2. Include automatic drop baffle on fire-rated doors to guard against passage of smoke or flame.

2.6 LOCKING DEVICES

- A. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on both left and right jamb sides, operable from coil side.
- B. Chain Lock Keeper: Suitable for padlock.

2.7 CURTAIN ACCESSORIES

- A. Weatherseals for Exterior Doors: Equip each exterior door with weather-stripping gaskets fitted to entire exterior perimeter of door for a weather-resistant installation unless otherwise indicated.
 - 1. At door head, use **1/8-inch**- thick, replaceable, continuous-sheet baffle secured to inside of hood or field-installed on the header.
 - 2. At door jambs, use replaceable, adjustable, continuous, flexible, **1/8-inch**- thick seals of flexible vinyl, rubber, or neoprene.
- B. Astragal for Interior Doors: Equip each door bottom bar with a replaceable, adjustable, continuous, compressible gasket of flexible vinyl, rubber, or neoprene as a cushion bumper.
- C. Automatic-Closing Device: Equip each fire-rated door with an automatic-closing device or holder-release mechanism and governor unit complying with NFPA 80 and an easily tested and reset release mechanism. Testing for manually operated doors allows resetting by opening the door without retensioning the counterbalance mechanism. Automatic-closing device is to be designed for activation by the following:
 - 1. Manufacturer's standard UL-labeled heat detector and door-holder-release

devices.

2.8 COUNTERBALANCE MECHANISM

- A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.
- B. Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, welded carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than **0.03 in./ft.** of span under full load.
- C. Counterbalance Spring: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.
 - 1. Fire-Rated Doors: Equip with auxiliary counterbalance spring and prevent tension release from main counterbalance spring when automatic-closing device operates.
- D. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.
- E. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.9 MANUAL DOOR OPERATORS

- A. General: Equip door with manual door operator by door manufacturer.
- B. Chain-Hoist Operator: Consisting of endless steel hand chain, chain-pocket wheel and guard, and gear-reduction unit with a maximum **30-lbf** force for door operation. Provide alloy-steel hand chain with chain holder secured to operator guide.

2.10 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.11 STEEL AND GALVANIZED-STEEL FINISHES

- A. Factory Prime Finish: Manufacturer's standard primer, compatible with field-applied finish. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Examine locations of electrical connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF OVERHEAD COILING DOORS, GENERAL

- A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Install overhead coiling doors, hoods, controls, and operators at the mounting locations indicated for each door.
- C. Fire-Rated Service Doors: Install in accordance with NFPA 80.

3.3 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
 - 1. Adjust exterior doors and components to be weather resistant.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.
- C. Adjust seals to provide tight fit around entire perimeter.

END OF SECTION 08 3323

SECTION 08 4113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Aluminum-framed entrance and storefront systems.

B. Related Requirements:

1. Section 081116.13 "Interior Aluminum Frames" for interior aluminum framing.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Operating characteristics, electrical characteristics, and furnished accessories.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For aluminum-framed entrance and storefront systems.

1.4 QUALITY ASSURANCE

A. Installer Qualifications:

1. Fabricator of products.
2. Entity that employs installers and supervisors who are trained and approved by manufacturer.
3. Authorized representative who is trained and approved by manufacturer.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain all components of aluminum-framed entrance and storefront system, including framing and accessories, from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrance and storefront systems representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
1. Aluminum-framed entrance and storefront systems to withstand movements of supporting structure, including, but not limited to, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 2. Failure also includes the following:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.
 - c. Noise or vibration created by wind and thermal and structural movements.
 - d. Loosening or weakening of fasteners, attachments, and other components.
 - e. Failure of operating units.

2.3 ALUMINUM-FRAMED ENTRANCE AND STOREFRONT SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Kawneer Company, LLC
- B. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
1. Exterior Framing Construction: Nonthermal.
 2. Glazing System: Retained mechanically with gaskets on four sides.
 3. Glazing Plane: Front.
 4. Finish: Clear anodic finish.
 5. Fabrication Method: Field-fabricated stick system.
 6. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 7. Steel Reinforcement: As required by manufacturer.
- C. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- E. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing or automatic operation.
1. Door Construction: **1-3/4-inch** overall thickness, with minimum **0.125-inch** thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that

- incorporate concealed tie rods.
- 2. Door Design: Medium stile; 3-1/2-inch nominal width.
- 3. Glazing Stops and Gaskets: Beveled, snap-on, extruded-aluminum stops and preformed gaskets.
- 4. Finish: Match adjacent storefront framing finish.

2.4 ENTRANCE DOOR HARDWARE

- A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 087100 "Door Hardware."
- B. General: Provide entrance door hardware and entrance door hardware sets indicated in door and frame schedule for each entrance door, to comply with requirements in this Section.
 - 1. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products.
 - 2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
 - 3. Opening-Force Requirements:
 - a. Egress Doors: Not more than **15 lbf** to release the latch and not more than **30 lbf** to set the door in motion.
- C. Designations: Requirements for design, grade, function, finish, quantity, size, and other distinctive qualities of each type of entrance door hardware are indicated in "Entrance Door Hardware Sets" Article. Products are identified by using entrance door hardware designations as follows:
 - 1. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.
- D. Pivot Hinges: BHMA A156.4, Grade 1.
 - 1. Offset-Pivot Hinges: Provide top, bottom, and intermediate offset pivots at each door leaf.
- E. Mortise Auxiliary Locks: BHMA A156.5, Grade 1.
- F. Panic Exit Devices: BHMA A156.3, Grade 1, listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing in accordance with UL 305.
- G. Cylinders:
 - 1. As specified in Section 087100 "Door Hardware."
- H. Closers: BHMA A156.4, Grade 1, with accessories required for a complete installation, sized as required by door size, exposure to weather, and anticipated frequency of use; adjustable to comply with field conditions and requirements for opening force.

- I. Weather Stripping: Manufacturer's standard replaceable components.
 - 1. Compression Type: Made of ASTM D2000 molded neoprene or ASTM D2287 molded PVC.
- J. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.

2.5 GLAZING

- A. Glazing: Comply with Section 088000 "Glazing."
- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
- C. Glazing Sealants: As recommended by manufacturer.

2.6 MATERIALS

- A. Sheet and Plate: **ASTM B209**.
- B. Extruded Bars, Rods, Profiles, and Tubes: **ASTM B221**.

2.7 ACCESSORIES

- A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
 - 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 - 2. Reinforce members as required to receive fastener threads.
- B. Anchors: Three-way adjustable anchors with minimum adjustment of **1 inch** that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
- C. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

2.8 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.

3. Provisions for field replacement of glazing from exterior.
 4. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- C. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- D. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
1. At interior and exterior doors, provide compression weather stripping at fixed stops.
- E. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
 2. At exterior doors, provide weather sweeps applied to door bottoms.
- F. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- G. After fabrication, clearly mark components to identify their locations in Project in accordance with Shop Drawings.

2.9 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF ALUMINUM-FRAMED ENTRANCE AND STOREFRONT SYSTEMS

- A. Comply with manufacturer's written instructions.
- B. Do not install damaged components.
- C. Fit joints to produce hairline joints free of burrs and distortion.

- D. Rigidly secure nonmovement joints.
- E. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
- F. Seal perimeter and other joints watertight unless otherwise indicated.
- G. Metal Protection:
 - 1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
 - 2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- H. Set continuous sill members and flashing in full sealant bed, as specified in Section 079200 "Joint Sealants," to produce weathertight installation.
- I. Install joint filler behind sealant as recommended by sealant manufacturer.
- J. Install components plumb and true in alignment with established lines and grades.
- K. Install entrance doors to produce smooth operation and tight fit at contact points.
 - 1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
 - 2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware in accordance with entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.
- L. Install glazing as specified in Section 088000 "Glazing."

3.3 ERECTION TOLERANCES

- A. Install aluminum-framed entrance and storefront systems to comply with the following maximum tolerances:
 - 1. Plumb: **1/8 inch in 10 feet; 1/4 inch in 40 feet.**
 - 2. Level: **1/8 inch in 20 feet; 1/4 inch in 40 feet.**
 - 3. Alignment:
 - a. Where surfaces abut in line or are separated by reveal or protruding element up to **1/2 inch** wide, limit offset from true alignment to **1/16 inch.**
 - b. Where surfaces are separated by reveal or protruding element from **1/2 to 1 inch** wide, limit offset from true alignment to **1/8 inch.**
 - c. Where surfaces are separated by reveal or protruding element of **1 inch** wide or more, limit offset from true alignment to **1/4 inch.**
 - 4. Location: Limit variation from plane to **1/8 inch in 12 feet; 1/2 inch** over total length.

Skarphol/Frank Associates
7005

Household Hazardous Waste
Facility
Bakersfield, California

END OF SECTION 08 4113

SECTION 08 6200 - UNIT SKYLIGHTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Unit skylights.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include product dimensions, construction details, material descriptions, dimensions and profiles of components, and finishes.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For products and accessories to include in maintenance manuals.

1.4 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of products that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
 - a. Failure to meet performance requirements.
 - b. Water leakage not controlled by drainage features.
 - c. Deterioration of materials and finishes beyond normal weathering.
 - d. Yellowing of acrylic glazing.
 - e. Breakage of polycarbonate glazing.
 - f. Deterioration of insulating-glass units including failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating-glass units contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
2. Warranty Period:
 - a. Products and Accessories: Ten years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Performance Standard: Comply with AAMA/WDMA/CSA 101/1.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
- B. Thermal Transmittance: NFRC 100 maximum U-factor of 0.45 Btu/sq. ft. x h x deg F.
- C. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum SHGC of 0.27.

2.2 UNIT SKYLIGHTS

- A. Factory-Assembled Skylight: Unit that includes glazing, extruded-aluminum glazing retainers, gaskets, and inner frame.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Velux America, LLC
- B. Product Type: AAMA/WDMA/CSA 101/1.S.2/A440 SKG, unit skylight - glass glazed.
 - 1. Provide fixed (nonoperable) units.
- C. Unit Shape and Size: As indicated.
- D. Insulating Glass: Sealed units that comply with Section 088000 "Glazing," in manufacturer's standard overall thickness.
 - 1. Exterior Lite: 6-mm, tinted, fully tempered glass.
 - 2. Interior Lite: Laminated glass; two plies of 3-mm clear heat-strengthened glass with 0.030-inch clear polyvinyl butyral interlayer.
 - 3. Interspace Content: Argon.
 - 4. Low-Emissivity Coating: Manufacturer's standard.
- E. Glazing Gaskets: Manufacturer's standard.
- F. Condensation Control: Fabricate unit skylights with integral internal gutters and nonclogging weeps to collect and drain condensation to the exterior.
- G. Thermal Break: Fabricate unit skylights with thermal break separating exterior and interior metal framing.
- H. Aluminum Finishes:
 - 1. Mill Finish: Manufacturer's standard.

2.3 ACCESSORY MATERIALS

- A. Fasteners: Same metal as metal being fastened, nonmagnetic stainless steel, or other noncorrosive metal that is compatible with the materials being fastened and as recommended in writing by manufacturer. Finish exposed fasteners to match material being fastened.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF UNIT SKYLIGHTS

- A. Coordinate installation of products and accessories with installation of substrates, vapor retarders, roof insulation, roofing membrane, and flashing as required to ensure that each element of the Work performs properly and that combined elements are waterproof and weathertight.
- B. Install products and accessories to comply with recommendations in AAMA 1607 and with manufacturer's written installation instructions.
- C. Install products true to line and without distortion.
- D. Anchor products securely to supporting substrates.
- E. Where metal surfaces of products will contact other metal or corrosive substrates, such as preservative-treated wood, apply bituminous coating on concealed metal surfaces or provide other approved permanent separation recommended in writing by manufacturer.

3.3 CLEANING AND ADJUSTING

- A. Clean exposed product surfaces in accordance with manufacturer's written instructions. Touch up damaged metal coatings and finishes.
- B. Remove excess sealants, glazing materials, dirt, and other substances.
- C. Remove and replace glazing that has been broken, chipped, cracked, abraded, or damaged during construction period.
- D. Protect product surfaces from contact with contaminating substances resulting from

construction operations.

END OF SECTION 08 6200

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Hinges.
2. Bored locks.
3. Lock cylinders.
4. Surface closers.
5. Wall- and floor-mounted stops.
6. Thresholds.

B. Related Requirements:

1. Section 081113 "Hollow Metal Doors and Frames" for door silencers provided as part of hollow-metal frames.
2. Section 081216 "Aluminum Frames" for door silencers provided as part of aluminum frames.

1.2 COORDINATION

- A. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- B. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

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

B. Shop Drawings: For electrified door hardware.

1. Include diagrams for power, signal, and control wiring.
2. Include details of interface of electrified door hardware and building safety and security systems.

C. Door Hardware Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant. Coordinate door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of

door hardware.

1. Submittal Sequence: Submit door hardware schedule concurrent with submissions of product data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.
 2. Format: Use same scheduling sequence and format and use same door numbers as in door hardware schedule in the Contract Documents.
 3. Content: Include the following information:
 - a. Identification number, location, hand, fire rating, size, and material of each door and frame.
 - b. Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
 - c. Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
 - d. Description of electrified door hardware sequences of operation and interfaces with other building control systems.
 - e. Fastenings and other installation information.
 - f. Explanation of abbreviations, symbols, and designations contained in door hardware schedule.
 - g. Mounting locations for door hardware.
 - h. List of related door devices specified in other Sections for each door and frame.
- D. Keying Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of door hardware to include in maintenance manuals.
- B. Schedules: Final door hardware and keying schedule.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and of an Architectural Hardware Consultant who is available during the course of the Work to consult Contractor, Architect, and Owner about door hardware and keying.
 1. Scheduling Responsibility: Preparation of door hardware and keying schedule.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lockup for door hardware delivered to Project site.
- B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.
- C. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain each type of door hardware from single manufacturer.
 - 1. Provide electrified door hardware from same manufacturer as mechanical door hardware unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.

2.2 PERFORMANCE REQUIREMENTS

- A. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Means of Egress Doors: Latches do not require more than **15 lbf** to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- C. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the USDOJ's "2010 ADA Standards for Accessible Design".
 - 1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than **5 lbf**.
 - 2. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: **5 lbf** applied perpendicular to door.
 - 3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than **1/2 inch** high.
 - 4. Adjust door closer sweep periods so that, from an open position of 90 degrees, the door will take at least 5 seconds to move to a position of 12 degrees from the latch.
 - 5. Adjust spring hinges so that, from an open position of 70 degrees, the door will take at least 1.5 seconds to move to the closed position.

2.3 HINGES

- A. Hinges: ANSI/BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Allegion plc

2.4 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: As indicated in door hardware schedule.
- B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
 - 1. Bored Locks: Minimum **1/2-inch** latchbolt throw.
- C. Lock Backset: **2-3/4 inches** unless otherwise indicated.
- D. Lock Trim:
 - 1. Description: As indicated on Drawings.
 - 2. Levers: Cast.
- E. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.
 - 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 - 2. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.
- F. Bored Locks: ANSI/BHMA A156.2, Grade 2, Series 4000.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Allegion plc

2.5 LOCK CYLINDERS

- A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver. Provide cylinder from same manufacturer of locking devices.
- B. Standard Lock Cylinders: ANSI/BHMA A156.5, Grade 2 permanent cores; face finished to match lockset.

1. Core Type: Interchangeable.

2.6 SURFACE CLOSERS

- A. Surface Closers: ANSI/BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written instructions for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Allegion plc

2.7 MECHANICAL STOPS AND HOLDERS

- A. Wall- and Floor-Mounted Stops: ANSI/BHMA A156.16.
 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Allegion plc

2.8 THRESHOLDS

- A. Thresholds: ANSI/BHMA A156.21; fabricated to full width of opening indicated.
 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Zero International; Allegion plc

2.9 FABRICATION

- A. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and ANSI/BHMA A156.18.
- B. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended; however, aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware unless otherwise indicated.
 1. Concealed Fasteners: For door hardware units that are exposed when door is

closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.

2. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
3. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.10 FINISHES

- A. Provide finishes complying with ANSI/BHMA A156.18 as indicated in door hardware schedule.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance of the Work.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Steel Doors and Frames: For surface-applied door hardware, drill and tap doors and frames in accordance with ANSI/SDI A250.6.
- B. Wood Doors: Comply with door and hardware manufacturers' written instructions.

3.3 INSTALLATION OF DOOR HARDWARE

- A. Mounting Heights: Mount door hardware units at heights indicated on Drawings unless

otherwise indicated or required to comply with governing regulations.

- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- C. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every **30 inches** of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- D. Lock Cylinders: Install construction cores to secure building and areas during construction period.
 - 1. Replace construction cores with permanent cores as directed by Owner.
 - 2. Furnish permanent cores to Owner for installation.
- E. Key Control System:
 - 1. Key Control Cabinet: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
 - 2. Key Lock Boxes: Install where indicated or approved by Architect to provide controlled access for fire and medical emergency personnel.
 - 3. Key Control System Software: Set up multiple-index system based on final keying schedule.
- F. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings. Verify location with Architect.
 - 1. Configuration: Provide one power supply for each door opening with electrified door hardware.
- G. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."
- H. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.4 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final

operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.

3.5 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.6 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

END OF SECTION 087100

SECTION 08 8000 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Monolithic glass.
 - 2. Glazing sealants.
 - 3. Glazing tapes.
 - 4. Miscellaneous glazing materials.
- B. Related Requirements:
 - 1. Section 088813 "Fire-Rated Glazing."

1.2 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters in accordance with ASTM C1036.
- C. IBC: International Building Code.

1.3 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances to achieve proper safety margins for glazing retention under each design load case, load case combination, and service condition.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials in accordance with manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
 - 1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below **40 deg F**.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Source Limitations for Glass: Obtain glass from single source from single manufacturer.
- B. Source Limitations for Glazing Accessories: For each product and installation method, obtain from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems to withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

2.3 GLASS, GENERAL

- A. Thickness: Where glass thickness is indicated, it is a minimum.

2.4 MONOLITHIC GLASS

- A. Clear Annealed Float Glass: ASTM C1036, Type I, Class 1 (clear), Quality-Q3.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide PPG Solarban 70 XL Clear or comparable product by one of the following:
 - a. Vitro Architectural Glass

2.5 GLAZING SEALANTS

- A. General:

1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
- B. Neutral-Curing Silicone Glazing Sealant, Class 50: Complying with ASTM C920, Type S, Grade NS, Use NT.

2.6 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C1281 and AAMA 800 for products indicated below:
1. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

2.7 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, recommended in writing by manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Spacers:
1. Type recommended in writing by sealant or glass manufacturer.
- D. Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- E. Provide spacers for glass lites where length plus width is larger than **50 inches**.
1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 2. Provide **1/8-inch**- minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- F. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and in accordance with requirements in referenced glazing publications.

- G. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- H. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

3.4 INSTALLATION OF GLAZING TAPES

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.

3.5 INSTALLATION OF GLAZING SEALANT

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.6 CLEANING

- A. Immediately after installation, remove nonpermanent labels and clean surfaces.
- B. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.7 PROTECTION

- A. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other

masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

- B. Remove and replace glass that is damaged during construction period.

3.8 MONOLITHIC GLASS SCHEDULE

- A. Clear Glass Type: Annealed float glass.

~~Samples for verification or mockups should be used for laminated glass that has the coating facing the plastic interlayer due to potential color shift.~~END OF SECTION 08 8000

SECTION 08 8813 - FIRE-RATED GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fire-resistance-rated glazing.

1.2 DEFINITIONS

- A. Fire-Resistance-Rated Glazing: Glazing that prevents spread of fire and smoke and radiant heat and complies with requirements for rated walls and rated openings; capable of blocking radiant heat
- B. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- C. Glass Thicknesses: Indicated by thickness designations in millimeters in accordance with ASTM C1036.

1.3 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the NGA's Certified Glass Installer Program.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials in accordance with manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install fire-resistant glazing until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature conditions at occupancy levels during remainder of construction period.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Glass: For each glass type, obtain from single source from single manufacturer.
- B. Glazing Accessories: For each product and installation method, obtain from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and impact loads (where applicable) without failure, including loss or glass breakage attributable to defective manufacture, fabrication, or installation; deterioration of glazing materials; or other defects in construction.

2.3 GLASS PRODUCTS

- A. Float Glass: ASTM C1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.

2.4 FIRE-RESISTANCE-RATED GLAZING

- A. General: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-resistance ratings indicated, based on testing in accordance with ASTM E119 or UL 263.
- B. Fire-Resistance-Rated Glazing Labeling: Permanently mark fire-resistance-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, that glazing is approved for use in walls, and fire-resistance rating in minutes.

2.5 GLAZING ACCESSORIES

- A. Provide glazing gaskets, glazing sealants, glazing tapes, setting blocks, spacers, edge blocks, and other glazing accessories that are compatible with glazing products and each other and are approved by testing agencies that listed and labeled fire-resistant glazing products with which products are used for applications and fire-protection

ratings indicated.

- B. Glazing Sealants for Fire-Rated Glazing Products: Neutral-curing silicone glazing sealant complying with ASTM C920, Type S, Grade NS, Class 50, Use NT. Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated.
 - 1. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C1281 and AAMA 800 for products indicated below:
 - 1. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

2.6 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, recommended in writing by manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.7 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with manufacturing and installation tolerances, including those for size, squareness, and offsets at corners, and for compliance with minimum required face and edge clearances.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate fire side and protected side. Label or mark units as needed so that fire side and protected side are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

- A. Use methods approved by testing agencies that listed and labeled fire-resistant glazing products.
- B. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials unless more stringent requirements are indicated, including those in referenced glazing publications.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass lites where length plus width is larger than **50 inches**.
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - 2. Provide **1/8-inch-** minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- H. Set glass lites with proper orientation so that coatings face fire side or protected side as specified.

3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.
- F. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

3.5 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.6 CLEANING AND PROTECTION

- A. Immediately after installation, remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
 - 1. If, despite such protection, contaminating substances do contact with glass, remove substances immediately as recommended in writing by glass manufacturer.
- C. Remove and replace glass that is damaged during construction period.

- D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION 08 8813

SECTION 09 2900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Interior gypsum board.
 - 2. Trim accessories.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.4 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C840 requirements or manufacturer's written instructions, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, moisture damaged, or mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain each type of gypsum panel and joint finishing material from single source with resources to provide products of consistent quality in appearance and physical

properties.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings in accordance with ASTM E119; tested by a qualified testing agency.

2.3 GYPSUM BOARD, GENERAL

- A. Size: Provide panel products in maximum lengths and widths available that will minimize joints in each area and that correspond with support system specified or indicated on Drawings.

2.4 INTERIOR GYPSUM BOARD

- A. Gypsum Wallboard: ASTM C1396/C1396M.
 - 1. Thickness: As indicated on Drawings.
 - 2. Long Edges: Tapered.
- B. Gypsum Board, Type X: ASTM C1396/C1396M.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **[American Gypsum]**
 - b. **[CertainTeed; SAINT-GOBAIN]**
 - c. **[Georgia-Pacific Gypsum LLC]**
 - d. **[Gold Bond Building Products, LLC provided by National Gypsum Company]**
 - e. **[PABCO Gypsum]**
 - f. **[Panel Rey]**
 - g. **[USG Corporation]**
 - 2. Thickness: As indicated on Drawings.
 - 3. Long Edges: Tapered.
- C. Gypsum Ceiling Board: ASTM C1396/C1396M.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **[American Gypsum]**
 - b. **[CertainTeed; SAINT-GOBAIN]**
 - c. **[Georgia-Pacific Gypsum LLC]**

- d. [Gold Bond Building Products, LLC provided by National Gypsum Company]
 - e. [PABCO Gypsum]
 - f. [Panel Rey]
 - g. [USG Corporation]
- 2. Thickness: As indicated on Drawings.
 - 3. Long Edges: Tapered.

2.5 TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Board: ASTM C1178/C1178M, with manufacturer's standard edges.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. [CertainTeed; SAINT-GOBAIN]
 - b. [Georgia-Pacific Gypsum LLC]
 - c. [Gold Bond Building Products, LLC provided by National Gypsum Company]
 - d. [USG Corporation]
 - 2. Core: **1/2 inch**, regular type.
 - 3. Mold Resistance: ASTM D3273, score of 10 as rated in accordance with ASTM D3274.

2.6 TRIM ACCESSORIES

- A. Interior Trim: ASTM C1047.
 - 1. Material: Galvanized-steel sheet or aluminum-coated steel sheet or rolled zinc.
 - 2. Shapes:
 - a. Cornerbead.
- B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated on Drawings.
 - 1. Aluminum: Alloy and temper with not less than the strength and durability properties of **ASTM B221**, Alloy 6063-T5.
 - 2. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

2.7 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C475/C475M requirements.

- B. Joint Tape:
 - 1. Interior Gypsum Board: Paper.
- C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
 - 1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
 - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 - 3. Fill Coat: For second coat, use drying-type, all-purpose compound.
 - 4. Finish Coat: For third coat, use drying-type, all-purpose compound.
- D. Joint Compound for Tile Backing Panels:
 - 1. Glass-Mat, Water-Resistant Backing Panel: As recommended in writing by backing panel manufacturer.

2.8 AUXILIARY MATERIALS

- A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Steel Drill Screws: ASTM C1002 unless otherwise specified or indicated on Drawings.
- C. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION AND FINISHING OF PANELS, GENERAL

- A. Comply with ASTM C840 requirements.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than **1/16 inch** of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than **8 sq. ft.** in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow **1/4- to 3/8-inch-** wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide **1/4- to 1/2-inch-** wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.

3.3 INSTALLATION OF INTERIOR GYPSUM BOARD

- A. Single-Layer Application:
 - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated on Drawings.
 - 2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless

otherwise specified or indicated on Drawings or required by fire-resistance-rated assembly, and minimize end joints.

- a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
- b. At stairwells and other high walls, install panels horizontally unless otherwise indicated on Drawings or required by fire-resistance-rated assembly.

3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

3.4 INSTALLATION OF TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install at **showers, tubs, and where indicated on Drawings**. Install with **1/4-inch** gap where panels abut other construction or penetrations.
- B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLATION OF TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim in accordance with manufacturer's written instructions.
- B. Control Joints: Install control joints in accordance with ASTM C840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
 1. Cornerbead: Install at outside corners unless otherwise specified or indicated on Drawings.

3.6 APPLICATION OF JOINT TREATMENT MATERIALS

- A. Finishing Panel Products: Treat joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare panel surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints and damaged surface areas.
- C. Apply joint tape over panel joints
- D. Interior Gypsum Board: Finish panels to levels indicated below and in accordance with ASTM C840:

1. Level 3: At all new partition walls.
 - a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."

3.7 PROTECTION

- A. Protect adjacent surfaces from joint compound and promptly remove from floors and other non-gypsum board surfaces. Repair surfaces stained, marred, or otherwise damaged during gypsum board installation and finishing.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 2900

SECTION 09 5123 - ACOUSTICAL TILE CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Acoustical tiles.
 - 2. Metal suspension system.

1.2 ACTION SUBMITTALS

- A. Product Data:
 - 1. For each type of product.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For finishes to include in maintenance manuals.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same production run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Acoustical Ceiling Units: Full-size tiles equal to 5 percent of quantity installed.
 - 2. Suspension-System Components: Quantity of each concealed grid and exposed component equal to 2 percent of quantity installed.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical tiles, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical tiles, permit them to reach room temperature and a stabilized moisture content.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical tile ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Source Limitations for Suspended Acoustical Tile Ceiling System: Obtain each type of acoustical ceiling tile and its suspension system from single source from single manufacturer.

2.2 ACOUSTICAL TILES

- A. Acoustical Tiles:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Armstrong World Industries
2. Acoustical Tile Standard: Provide manufacturer's standard tiles of configuration indicated that comply with ASTM E1264 classifications as designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.
3. Classification: Provide tiles as follows:
 - a. Type and Form: Type A, Wet-formed mineral fiber with factory-applied latex paint, Form A1.2.
 - b. Pattern: E (lightly textured).
4. Color: White.
5. Light Reflectance (LR): Not less than 0.80.
6. Ceiling Attenuation Class (CAC): Not less than 35.
7. Noise Reduction Coefficient (NRC): Not less than 0.50.
8. Edge/Joint Detail: As indicated by manufacturer's designation.
9. Thickness: **3/4 inch**.
10. Modular Size: As indicated on Drawings.
11. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested in accordance with ASTM D3273, ASTM D3274, or ASTM G21 and evaluated in accordance with ASTM D3274 or ASTM G21.

2.3 METAL SUSPENSION SYSTEM

A. Concealed or Semi-Exposed Metal Suspension System:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Armstrong Ceiling & Wall Solutions
2. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, fully concealed, metal suspension system and accessories of type, structural classification, and finish indicated that complies with applicable requirements in ASTM C635/C635M.
 - a. High-Humidity Finish: Where indicated, provide coating tested and classified for "severe environment performance" in accordance with ASTM C635/C635M.

2.4 ACCESSORIES

A. Wire Hangers, Braces, and Ties: Provide wires as follows:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.
2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C635/C635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.008-inch- diameter wire.

B. Seismic Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to accommodate seismic forces.

C. Seismic Struts: Manufacturer's standard compression struts designed to accommodate lateral forces.

D. Seismic Clips: Manufacturer's standard seismic clips designed to secure acoustical tiles in-place during a seismic event.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing and substrates to which acoustical tile ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine acoustical tiles before installation. Reject acoustical tiles that are wet,

moisture damaged, or mold damaged.

- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical tiles to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width tiles at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.
- B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION OF SUSPENDED ACOUSTICAL TILE CEILINGS

- A. Install suspended acoustical tile ceilings in accordance with ASTM C636/C636M and manufacturer's written instructions.
- B. Suspend ceiling hangers from building's structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 - 4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 - 5. Space hangers not more than **48 inches** o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than **8 inches** from ends of each member.
 - 6. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- C. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

3.4 ERECTION TOLERANCES

- A. Suspended Ceilings: Install main and cross runners level to a tolerance of **1/8 inch in 12 feet**, non-cumulative.

3.5 ADJUSTING

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

END OF SECTION 09 5123

SECTION 09 6513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Vinyl base.
2. Vinyl molding accessories.

B. Related Requirements:

1. Section 096516 "Resilient Sheet Flooring" for resilient rolled flooring.
2. Section 096519 "Resilient Tile and Plank Flooring" for modular resilient flooring.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of specified product.

1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
2. Include manufacturer's written installation instructions for each type of substrate.

B. Samples: For each exposed product and for each color and texture specified, not less than **12 inches** long.

1.3 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Material: Furnish extra materials, from the same production run, to Owner that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than **10 linear ft.** for every **500 linear ft.** or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than **50 deg F** or more than **85 deg F**.

1.5 FIELD CONDITIONS

- A. Installation Temperature Requirements: Maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F or more than 85 deg F, in spaces to receive resilient products during the following periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. Post-Installation Temperature Requirements: After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F or more than 85 deg F.
- C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 RESILIENT BASE

- A. Vinyl Base:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Vinyl Wall Base, 4 Inch Cove or comparable product by one of the following:
 - a. Flexco Corporation
 - 2. Classification: ASTM F1861, Type TV (vinyl, thermoplastic), Group II (layered).
 - 3. Style and Location:
 - a. Style B, Cove: Provide in all areas.
 - 4. Minimum Thickness: 0.125 inch.
 - 5. Height: 4 inches.
 - 6. Lengths: Coils in manufacturer's standard length.
 - 7. Outside Corners: Preformed.
 - 8. Inside Corners: Preformed.

2.2 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended in writing by resilient-product manufacturer for resilient products and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Prepare substrates in accordance with manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until materials are the same temperature as space where they are to be installed.
 - 1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 INSTALLATION OF RESILIENT BASE

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.

- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Preformed Corners: Install preformed corners before installing straight pieces.

3.4 CLEANING

- A. Comply with manufacturer's written instructions for cleaning resilient products.
- B. Perform the following operations immediately after completing resilient-product installation:
 - 1. Remove adhesive and other blemishes from surfaces.

3.5 PROTECTION

- A. Comply with manufacturer's written instructions for protecting resilient products.
- B. After post-installation cleaning, immediately protect resilient products from marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- C. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 09 6513

SECTION 09 6516 - RESILIENT SHEET FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Vinyl sheet flooring with backing.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of resilient sheet flooring to include in maintenance manuals.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Resilient Sheet Flooring: Furnish not less than **10 linear feet** for every **500 linear feet** or fraction thereof, in roll form and in full roll width for each type, color, and pattern of flooring installed.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for resilient sheet flooring installation and seaming method indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store resilient sheet flooring and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than **50 deg F** or more than **85 deg F**. Store rolls upright.

1.7 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F or more than 85 deg F, in spaces to receive resilient sheet flooring during the following periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F or more than 85 deg F.
- C. Close spaces to traffic during resilient sheet flooring installation.
- D. Close spaces to traffic for 48 hours after resilient sheet flooring installation.
- E. Install resilient sheet flooring after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 VINYL SHEET FLOORING WITH BACKING

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Beauflor USA
- B. Wearing Surface: Smooth.
- C. Sheet Width: As standard with manufacturer.
- D. Seamless-Installation Method: Heat welded.

2.2 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient sheet flooring manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by flooring and adhesive manufacturers to suit resilient sheet flooring and substrate conditions indicated.
- C. Seamless-Installation Accessories:
 - 1. Heat-Welding Bead: Manufacturer's solid-strand product for heat welding seams.

- a. Colors: Match flooring.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient sheet flooring.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to resilient sheet flooring manufacturer's written instructions to ensure adhesion of resilient sheet flooring.
- B. Concrete Substrates: Prepare according to ASTM F710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by resilient sheet flooring manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by resilient sheet flooring manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install resilient sheet flooring until materials are the same temperature as space where they are to be installed.
 - 1. At least 48 hours in advance of installation, move flooring and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient sheet flooring.

3.3 RESILIENT SHEET FLOORING INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient sheet flooring.
- B. Unroll resilient sheet flooring and allow it to stabilize before cutting and fitting.
- C. Lay out resilient sheet flooring as follows:
 - 1. Maintain uniformity of flooring direction.
 - 2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least **6 inches** away from parallel joints in flooring substrates.
 - 3. Match edges of flooring for color shading at seams.
 - 4. Avoid cross seams.
- D. Scribe and cut resilient sheet flooring to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend resilient sheet flooring into toe spaces, door reveals, closets, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on resilient sheet flooring as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Adhere resilient sheet flooring to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- H. Seamless Installation:
 - 1. Heat-Welded Seams: Comply with ASTM F1516. Rout joints and heat weld with welding bead to fuse sections permanently into a seamless flooring installation. Prepare, weld, and finish seams to produce surfaces flush with adjoining flooring surfaces.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient sheet flooring.
- B. Perform the following operations immediately after completing resilient sheet flooring installation:
 - 1. Remove adhesive and other blemishes from surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect resilient sheet flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of

construction period.

- D. Cover resilient sheet flooring until Substantial Completion.

END OF SECTION 09 6516

SECTION 09 6519 - RESILIENT TILE AND PLANK FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Commercial luxury vinyl floor planks.

B. Related Requirements:

1. Section 096513 "Resilient Base and Accessories" for wall base and accessories installed with resilient tile and plank flooring.
2. Section 096516 "Resilient Sheet Flooring" for resilient rolled flooring.

1.2 DEFINITIONS

- A. LVP: Luxury vinyl planks. A marketing term that is applied to modular resilient floor plank products.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of specified product.

1. Include manufacturers' written data on physical characteristics, durability, and fade resistance.
2. Include manufacturers' written installation instructions for each type of substrate.

- B. Samples: Full-size units of each color, texture, and pattern of resilient flooring type required.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of resilient flooring product type to include the following:

1. Methods for maintaining resilient flooring, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to resilient flooring.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Extra Stock Material: Furnish extra materials, from the same production run, to Owner that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Resilient Tile and Plank Flooring: Furnish no fewer than 1 box for each 50 boxes or fraction thereof, of each type, color, pattern, and size of resilient flooring product installed.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for resilient flooring installation and seaming method indicated.
 - 1. Engage an installer who employs workers for this Project who are trained or certified by resilient flooring manufacturer for installation techniques required.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturers' labels indicating brand name and directions for storing.
- B. Store resilient flooring and accessory materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than **50 deg F** or more than **80 deg F**. Store resilient flooring on flat surfaces.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install resilient flooring until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.
- B. Do not install resilient flooring over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended in writing by resilient flooring manufacturer.
- C. Adhesively Applied Products:
 - 1. Maintain temperatures during installation within range recommended in writing by manufacturer, but not less than 60 deg F or more than 80 deg F, in spaces to receive flooring 48 hours before installation, during installation, and 48 hours after installation unless longer period is recommended in writing by manufacturer.
 - 2. After postinstallation period, maintain temperatures within range recommended in writing by manufacturer, but not less than 50 deg F or more than **95 deg F**.

3. Close spaces to traffic during flooring installation.
4. Close spaces to traffic for 48 hours after flooring installation unless manufacturer recommends longer period in writing.

1.9 WARRANTY

- A. Special Warranty for Resilient Flooring Products: Manufacturer agrees to repair or replace components of flooring installation that fail in materials or workmanship within specified warranty period.
 1. Warranty does not include deterioration or failure of flooring due to unusual traffic, failure of substrate, vandalism, or abuse.
 2. Warranty Period: 22 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 RESILIENT TILE AND PLANK FLOORING

- A. Commercial Luxury Vinyl Floor Planks: Solid, resilient plank flooring product composed of binder, fillers, and pigments compounded with suitable stabilizers and processing aids; marketed as luxury vinyl planks (LVP).
 1. Basis-of-Design Product: Subject to compliance with requirements, provide Merge Forward Rigidform Free or comparable product by one of the following:
 - a. Milliken & Company
 2. Classification: ASTM F1700, Class III, Printed Film Vinyl Tile.
 - a. Type: B, Embossed Surface.
 3. Nominal Size: 7 by 48 inches.

2.2 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by flooring manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended in writing by floor tile and adhesive manufacturers for substrate and conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance of the Work.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Installation of resilient flooring products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Prepare substrates in accordance with manufacturer's written installation instructions to ensure adhesion of flooring.
- B. Concrete Substrates: Prepare in accordance with ASTM F710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by resilient flooring manufacturer. Do not use solvents.
 - 3. Alkalinity Testing: Perform pH testing in accordance with ASTM F710. Proceed with installation only if pH readings are not less than 7.0 and not greater than 8.5.
 - 4. Moisture Testing: Perform tests so that each test area does not exceed **1000 sq. ft.** and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Move flooring and installation materials into spaces where they will be installed at least 48 hours in advance of installation unless manufacturer recommends a longer period in writing.
 - 1. Do not install flooring until it is the same temperature as space where it is to be installed.

- E. Sweep and vacuum clean substrates to be covered by flooring immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION OF RESILIENT TILE AND PLANK FLOORING

- A. Comply with manufacturer's written installation instructions.
- B. Discard broken, cracked, chipped, or deformed tiles.
- C. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
 - 1. Lay tiles square with room axis.
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Adhered Floor Tile: Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to comply with adhesive and flooring manufacturers' written installation instructions, including those for trowel notching, adhesive mixing, and adhesive open and working times, to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING

- A. Comply with manufacturer's written instructions for cleaning flooring.
- B. Perform the following operations immediately after completing flooring installation:
 - 1. Remove adhesive and other blemishes from surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.

3.5 PROTECTION

- A. Comply with manufacturer's written instructions for protecting flooring.

- B. After post-installation cleaning, immediately protect flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- C. Cover resilient flooring until Substantial Completion.

END OF SECTION 09 6519

SECTION 09 7200 - WALL COVERINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fiberglass Reinforced Plastic Wall Panels

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include data on physical characteristics, durability, fade resistance, and fire-test-response characteristics.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For wall coverings to include in maintenance manuals.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same production run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Wall-Covering Materials: For each type, color, texture, and finish, full width by length to equal to 2 percent of amount installed.

1.5 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install wall coverings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and HVAC system is operating and maintaining ambient temperature and humidity conditions at levels intended for occupants after Project completion during the remainder of the construction period.
- B. Lighting: Do not install wall covering until lighting that matches conditions intended for occupants after Project completion is provided on the surfaces to receive wall covering.
- C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall-covering manufacturer for full drying or curing.

PART 2 - PRODUCTS

2.1 FIBERGLASS REINFORCED PLASTIC PANELS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. VALTO Engineered Materials
- B. Description: Provide fiberglass reinforced plastic composite panel from same production run.
- C. Width: 96 inches.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation surfaces being true in plane and vertical and horizontal alignment, maximum moisture content, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, and mildew.
- C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.
 - 1. Gypsum Board: Apply primer/sealer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 - 2. Painted Surfaces:
 - a. Check for pigment bleeding. Apply primer/sealer to areas susceptible to pigment bleeding as recommended in writing by primer/sealer manufacturer.
 - b. Sand gloss, semigloss, and eggshell finishes with fine sandpaper.
- D. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

- E. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

3.3 INSTALLATION OF WALL COVERING

- A. Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated.
- B. Cut wall-covering strips in roll number sequence. Change the roll numbers at partition breaks and corners.
- C. Install strips in same order as cut from roll.
 - 1. For solid-color, even-texture, or random-match wall coverings, reverse every other strip.
- D. Install wall covering without lifted or curling edges and without visible shrinkage.
- E. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without overlaps or gaps between strips.
- F. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.

3.4 CLEANING

- A. Remove excess adhesive at seams, perimeter edges, and adjacent surfaces.
- B. Use cleaning methods recommended in writing by wall-covering manufacturer.
- C. Replace strips that cannot be cleaned.
- D. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION 09 7200

SECTION 09 9123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Primers.
2. Water-based finish coatings.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for shop priming metal fabrications.
2. Section 055213 "Pipe and Tube Railings" for shop priming pipe and tube railings.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include preparation requirements and application instructions.
2. Indicate VOC content.

1.3 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint Products: 2 percent, but not less than **1 gal.** of each material and color applied.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than **45 deg F.**

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.5 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between **50 and 90 deg F.**

- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures of less than **5 deg F** above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 PAINT PRODUCTS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Sherwin-Williams Company (The)
- B. Source Limitations: Obtain each paint product from single source from single manufacturer.
- C. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- D. Colors: As selected by Architect from manufacturer's full range.

2.2 PRIMERS

- A. Interior Latex Primer Sealer: Water-based latex sealer used on new interior plaster, concrete, and gypsum wallboard surfaces.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Sherwin-Williams Company (The)

2.3 WATER-BASED FINISH COATS

- A. Interior, Latex, Eggshell: Pigmented, water-based paint for use on primed/sealed interior plaster and gypsum board, and on primed wood and metals.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Sherwin-Williams Company (The)
 - 2. Gloss and Sheen Level: Manufacturer's standard eggshell finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Wood: 15 percent.
 - 2. Gypsum Board: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- E. Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.3 INSTALLATION

- A. Apply paints according to manufacturer's written instructions.
 1. Use applicators and techniques suited for paint and substrate indicated.
 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
 1. Do not clean equipment with free-draining water and prevent solvents, thinners, cleaners, and other contaminants from entering into waterways, sanitary and storm drain systems, and ground.
 2. Dispose of contaminants in accordance with requirements of authorities having jurisdiction.
 3. Allow empty paint cans to dry before disposal.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged

or defaced painted surfaces.

3.5 INTERIOR PAINTING SCHEDULE

~~If necessary, insert drawing designations. Use these designations on Drawings to identify locations of each coating.~~ Retain "Intermediate Coat" subparagraphs throughout the Interior Painting Schedule for high-quality systems; delete if not required. Steel Substrates:

1. Latex over Shop-Applied Quick-Drying Shop Primer System:
 - a. Prime Coat: Quick-dry primer for shop application.
- B. Exposed Wood Framing:
 1. Latex over Latex Primer System:
 - a. Prime Coat: Interior latex primer for wood.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Interior, latex, eggshell.
- C. Finish Carpentry: Doors.
 1. Latex over Latex Primer System:
 - a. Prime Coat: Interior latex primer for wood.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Interior, latex, eggshell.
- D. Gypsum Board Substrates:
 1. Latex over Latex Sealer System:
 - a. Prime Coat: Interior latex primer sealer.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Interior, latex, eggshell.

END OF SECTION 09 9123

SECTION 09 9726 - CEMENTITIOUS COATINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and application of cementitious coating systems on the following substrates:

1. Interior concrete.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in manufacturer's original, new, unopened packages and containers bearing manufacturer's name and label, and the following information:

1. Product name or title of material.
2. Manufacturer's stock number and date of manufacture.
3. Contents by volume, for pigment and vehicle constituents.
4. Application instructions.
5. Color name and number.
6. Handling instructions and precautions.

- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of **45 deg F**. Maintain containers used in storage of coatings in a clean condition, free of foreign materials and residue.

1. Protect cementitious coating materials from freezing. Keep materials dry and storage area neat and orderly. Remove waste daily. Take necessary measures to ensure that workers and work areas are protected from health hazards resulting from handling, mixing, and applying the coating.

1.4 FIELD CONDITIONS

- A. Apply coatings only when temperature of surfaces to be painted and ambient air temperatures are between **50 and 95 deg F**.
- B. Do not apply coatings when relative humidity exceeds 85 percent; at temperatures less than **5 deg F** above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 CEMENTITIOUS COATINGS

- A. Source Limitations: Obtain cementitious coating materials from single source and from single manufacturer.
- B. Colors: As selected by Architect from manufacturer's full range.
- C. Other Materials: Provide crack fillers, block fillers, and related materials that are compatible with cementitious finish-coat materials and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Verify suitability of substrates, including surface conditions and compatibility.
- C. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions for mixing and preparing materials and as applicable to substrates indicated.
- B. Remove plates, machined surfaces, and similar items already in place that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.
 - 1. After completing coating operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of coatings, including dirt, oil, grease, incompatible coatings, and loose substrate materials.
- D. Cementitious and Masonry Surfaces: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

- E. Crack Repair: Fill cracks according to manufacturer's written instructions before coating surfaces.
 - 1. Cracks Larger Than **1/32 inch**: Cut out static cracks, voids, or honeycombing larger than **1/32 inch** and patch with materials recommended in writing by coating manufacturer. Identify dynamic cracks and treat according to manufacturer's written instructions before beginning application.

3.3 APPLICATION

- A. Apply coatings according to manufacturer's written instructions. Use applicators and techniques suited for coating and substrate indicated.
 - 1. Dampen substrate of surfaces to receive cementitious coatings one hour before beginning application to prevent surface drag. Immediately before applying coatings, redampen substrate. Substrates shall be saturated and surface dry at time of application.
 - 2. Brushes: Use Tampico or masonry brushes best suited for material being applied.
 - 3. Spray Equipment: Use spray equipment recommended in writing by manufacturer for material and texture required.
- B. Apply coating to achieve material thickness as recommended in writing by manufacturer, but not less than the following:
 - 1. First Coat: Apply polymer-modified cementitious coating material at the rate of **2 lb/sq. yd.** to achieve a total cured thickness of **25 mils.**
 - 2. Second Coat: Apply polymer-modified cementitious coating material at the rate of **1 lb/sq. yd.** to achieve a total cured thickness of **15 mils.**
 - 3. Apply additional coats when undercoats or other conditions show through final coat until cured film is of uniform coating finish, color, and appearance.
- C. On previously coated surfaces, apply coating to achieve material thickness as recommended in writing by manufacturer, but not less than the following:
 - 1. Apply polymer-modified cementitious coating material at the rate of **1 lb/sq. yd.** to achieve a total cured thickness of **15 mils.**
 - 2. Apply additional coats when undercoats or other conditions show through final coat until cured film is of uniform coating finish, color, and appearance.
- D. Brush Application: Brush out and work brush coats into surfaces in an even film, filling all pores and voids at rate recommended in writing by manufacturer to achieve cured material thickness indicated. Finish coat with smooth, horizontal strokes.
- E. Spray Application: Apply each coat according to manufacturer's written instructions to provide the equivalent hiding of brush-applied coats. Follow spray application with a general light brooming of coated surface to impart a slight texture.

3.4 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from coating application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

END OF SECTION 09 9726

SECTION 10 2113.13 - METAL TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal toilet compartments.

B. Related Requirements:

1. Section 102800 "Toilet, Bath, and Laundry Accessories" for accessories mounted on toilet compartments.

1.2 COORDINATION

- A. Coordinate requirements for overhead supports, blocking, reinforcing, and other supports concealed within wall to ensure that toilet compartments can be supported and installed as indicated.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Metal toilet compartments.
 - a. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for toilet compartments.

B. Shop Drawings:

1. Include plans, elevations, sections, and attachment details.
2. Show locations of cutouts for compartment-mounted toilet accessories.
3. Show locations of reinforcements for compartment-mounted grab bars and locations of blocking for surface-mounted toilet accessories.
4. Show locations of centerlines of toilet fixtures.
5. Show locations of floor drains.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For toilet compartments.

1.5 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements, and coordinate before fabrication.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain metal toilet compartments from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" for toilet compartments designated as accessible.

2.3 METAL TOILET COMPARTMENTS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Powder-Coated Steel Partitions or comparable product by one of the following:
 - 1. ASI Global Partitions
- B. Toilet-Enclosure Style: Overhead braced.
- C. Entrance-Screen Style: Overhead braced.
- D. Urinal-Screen Style: Wall hung, flat panel.
- E. Door, Panel, and Pilaster Construction: Seamless, metal facing sheets pressure laminated to core material; with continuous, interlocking molding strip or lapped-and-formed edge closures; corners secured by welding or clips and exposed welds ground smooth. Exposed surfaces shall be free of pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections.
 - 1. Core Material: Manufacturer's standard sound-deadening honeycomb of resin-impregnated kraft paper in thickness required to provide finished thickness of **1 inch** for doors and panels and **1-1/4 inches** for pilasters.
 - 2. Grab-Bar Reinforcement: Provide concealed internal reinforcement for grab bars mounted on units of size and material adequate for panel to withstand specified structural performance requirements.
- F. Urinal-Screen Construction:
 - 1. Flat-Panel Urinal Screen: Matching panel construction.

- G. Facing Sheets and Closures: Electrolytically coated steel sheet with nominal base-metal (uncoated) thicknesses as follows:
 - 1. Pilasters, Unbraced at One End: Manufacturer's standard thickness, but not less than **0.048 inch**.
 - 2. Panels: Manufacturer's standard thickness, but not less than **0.030 inch**.
 - 3. Doors: Manufacturer's standard thickness, but not less than **0.030 inch**.
 - 4. Flat-Panel Urinal Screens: Thickness matching panels.
- H. Pilaster Shoes: Formed from stainless steel sheet, not less than **0.031-inch** nominal thickness and **3 inches** high, finished to match hardware.
- I. Brackets (Fittings):
 - 1. Stirrup Type: Ear or U-brackets; stainless steel.
- J. Steel Sheet Finish: Immediately after cleaning and pretreating, apply manufacturer's standard baked-on finish, including thermosetting, electrostatically applied, and powder coatings. Apply one color in each room.
 - 1. Color: As selected by Architect from manufacturer's full range.

2.4 HARDWARE AND ACCESSORIES

- A. Door Hardware and Accessories: Manufacturer's operating hardware and accessories.
 - 1. Hinges:
 - a. Manufacturer's standard hinge.
 - 2. Latch and Keeper: Manufacturer's surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at toilet enclosures designated as accessible.
 - a. Material: Manufacturer's standard.
 - 3. Coat Hook: Manufacturer's combination hook and rubber-tipped bumper, sized to prevent inswinging door from hitting compartment-mounted accessories.
 - a. Material: Manufacturer's standard.
 - 4. Door Bumper: Manufacturer's rubber-tipped bumper at outswinging doors.
 - a. Material: Manufacturer's standard.
 - 5. Door Pull: Manufacturer's unit at outswinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at toilet enclosures designated as accessible.

- a. Material: Manufacturer's standard.
- B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.
- C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized steel, or other rust-resistant, protective-coated steel compatible with related materials.

2.5 MATERIALS

- A. Steel Sheet: Commercial steel sheet for exposed applications; mill phosphatized and selected for smoothness.
 - 1. Electrolytically Zinc Coated: ASTM A879/A879M, **01Z**.
- B. Stainless Steel Castings: ASTM A743/A743M.
- C. Zamac: ASTM B86, commercial zinc-alloy die castings, chrome plated.

2.6 FABRICATION

- A. Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories, and solid blocking within panel where required for attachment of toilet accessories.
- B. Overhead-Braced Units: Manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters and walls to suit floor and wall conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.
- C. Door Size and Swings: Unless otherwise indicated, provide **24-inch-** wide, inswinging doors for standard toilet enclosures and **36-inch-** wide, outswinging doors with a minimum **32-inch-** wide, clear opening for toilet enclosures designated as accessible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.
 - 1. Confirm location and adequacy of blocking and supports required for installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position indicated with manufacturer's recommended anchoring devices.
1. Maximum Clearances:
 - a. Pilasters and Panels or Screens: **1/2 inch**.
 - b. Panels or Screens and Walls: **1 inch**.
 2. Stirrup Brackets: Secure panels or screens to walls and to pilasters with no fewer than two brackets attached near top and bottom of panel.
 - a. Locate wall brackets so holes for wall anchors occur in masonry or tile joints.
 - b. Align brackets at pilasters with brackets at walls.
- B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than **1-3/4 inches** into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than two fasteners. Hang doors to align tops of doors with tops of panels, and adjust so tops of doors are parallel with overhead brace when doors are in closed position.
- C. Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

3.3 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware in accordance with hardware manufacturer's written instructions for proper operation. Set hinges on inswinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on outswinging doors to return doors to fully closed position.

END OF SECTION 10 2113.13

SECTION 10 2800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Public-use washroom accessories.
 - 2. Public-use shower room accessories.

1.2 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.3 ACTION SUBMITTALS

- A. Product Data: For each product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 - 2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For accessories to include in maintenance manuals.

1.5 WARRANTY

- A. Manufacturer's Special Warranty for Hand Dryers: Manufacturer agrees to repair or replace hand dryers that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PUBLIC-USE WASHROOM ACCESSORIES

- A. Source Limitations: Obtain public-use washroom accessories from single source from single manufacturer.
- B. Toilet Tissue (Roll) Dispenser:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Bobrick Washroom Equipment, Inc
 - 2. Description: Double-roll dispenser.
 - 3. Mounting: Surface mounted.
 - 4. Operation: Noncontrol delivery with standard spindle.
 - 5. Capacity: Designed for 5-1/4-inch diameter tissue rolls.
 - 6. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).
- C. Paper Towel (Folded) Dispenser:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Bobrick Washroom Equipment, Inc
 - 2. Mounting: Surface mounted.
 - 3. Minimum Capacity: 400 C-fold or 525 multifold towels.
 - 4. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).
 - 5. Lockset: Tumbler type.
 - 6. Refill Indicator: Pierced slots at sides or front.
- D. Soap Dispenser:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Bobrick Washroom Equipment, Inc
 - 2. Description: Designed for manual operation and dispensing soap in liquid or lotion form.
 - 3. Mounting: Horizontally oriented, surface mounted.
 - 4. Capacity: 40-fl oz.
 - 5. Lockset: Tumbler type.
 - 6. Refill Indicator: Window type.
- E. Grab Bar:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the

following:

- a. Bobrick Washroom Equipment, Inc.
2. Mounting: Flanges with concealed fasteners.
3. Material: Stainless steel, **0.05 inch** thick.
 - a. Finish: Smooth, ASTM A480/A480M No. 4 finish (satin) .
4. OD: **1-1/2 inches**.
5. Configuration and Length: As indicated on Drawings.

F. Seat-Cover Dispenser:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Bobrick Washroom Equipment, Inc
2. Mounting: Surface mounted.
3. Minimum Capacity: 250 seat covers.
4. Exposed Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).
5. Lockset: Tumbler type.

G. Mirror Unit:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Bobrick Washroom Equipment, Inc
2. Frame: Stainless steel channel.
 - a. Corners: Manufacturer's standard.
3. Size: As indicated on Drawings.
4. Hangers: Manufacturer's standard rigid, tamper and theft resistant.

H. Hook:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Bobrick Washroom Equipment, Inc
2. Description: Single-prong unit.
3. Mounting: Concealed.
4. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

2.2 PUBLIC-USE SHOWER ROOM ACCESSORIES

- A. Source Limitations: Obtain public-use shower room accessories from single source from single manufacturer.
- B. Shower Curtain Rod:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Bobrick Washroom Equipment, Inc
 - 2. Description: **1-inch**- OD, straight rod.
 - 3. Configuration: As indicated on Drawings.
 - 4. Mounting Flanges: Concealed fasteners; in manufacturer's standard material and finish.
 - 5. Rod Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).
- C. Folding Shower Seat:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Bobrick Washroom Equipment, Inc
 - 2. Configuration: L-shaped seat, designed for wheelchair access.
 - 3. Seat: Phenolic or polymeric composite of slat-type or one-piece construction in color as selected by Architect.
 - 4. Mounting Mechanism: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

2.3 MATERIALS

- A. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, **0.031-inch**- minimum nominal thickness unless otherwise indicated.
- B. Fasteners: Screws, bolts, and other devices of same material as accessory unit, unless otherwise recommended by manufacturer or specified in this Section, and tamper and theft resistant where exposed, and of stainless or galvanized steel where concealed.
- C. Mirrors: ASTM C1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.4 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and

resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION OF TOILET, BATH, AND LAUNDRY ACCESSORIES

- A. Install accessories in accordance with manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
 - 1. Remove temporary labels and protective coatings.
- B. Grab Bars: Install to comply with specified structural-performance requirements.
- C. Shower Seats: Install to comply with specified structural-performance requirements.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Clean and polish exposed surfaces in accordance with manufacturer's written instructions.

END OF SECTION 10 2800

SECTION 10 5113 - METAL LOCKERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Knocked-down corridor lockers.
2. Locker benches.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal locker .

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver metal lockers until spaces to receive them are clean, dry, and ready for their installation.

1.5 FIELD CONDITIONS

A. Field Measurements: Verify actual dimensions of recessed openings by field measurements before fabrication.

1.6 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of work specified in other Sections to ensure that metal lockers can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain metal lockers , locker benches, and accessories from single source from single locker manufacturer.
 - 1. Obtain locks from single lock manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: For lockers indicated to be accessible, comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and the 2022 California Building Code, Volume 1.

2.3 KNOCKED-DOWN CORRIDOR LOCKERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. **[Art Metal Products]**
 - 2. **[ASI Storage Solutions]**
 - 3. **[GSS Lockers]**
 - 4. **[Hadrian Inc.; Zurn Industries, LLC]**
 - 5. **[List Industries Inc.]**
 - 6. **[LockersMFG]**
 - 7. **[Lyon LLC]**
 - 8. **[Olympus Lockers & Storage Products, Inc.]**
 - 9. **[Penco Products, Inc.]**
 - 10. **[Republic Storage Systems, LLC]**
 - 11. **[Top Tier Storage Products]**
 - 12. **[WEC Manufacturing LLC]**
- B. Doors: One piece; fabricated from **0.060-inch** nominal-thickness steel sheet; formed into channel shape with double bend at vertical edges and with right-angle single bend at horizontal edges.
 - 1. Doors less than **12 inches** wide may be fabricated from **0.048-inch** nominal-thickness steel sheet.
 - 2. Doors for box lockers less than **15 inches** wide may be fabricated from **0.048-inch** nominal-thickness steel sheet.
 - 3. Reinforcement: Manufacturer's standard reinforcing angles, channels, or stiffeners for doors more than **15 inches** wide; welded to inner face of doors.
 - 4. Stiffeners: Manufacturer's standard full-height stiffener fabricated from **0.048-inch** nominal-thickness steel sheet; welded to inner face of doors.
 - 5. Door Style: Vented panel as follows:

- a. Louvered Vents: No fewer than three louver openings at top and bottom for double-tier lockers.
- C. Body: Assembled by riveting or bolting body components together. Fabricate from unperforated steel sheet with thicknesses as follows:
 - 1. Tops, Bottoms, and Intermediate Dividers: **0.024-inch** nominal thickness, with single bend at sides.
 - 2. Backs and Sides: **0.024-inch** nominal thickness, with full-height, double-flanged connections.
 - 3. Shelves: **0.024-inch** nominal thickness, with double bend at front and single bend at sides and back.
- D. Frames: Channel formed; fabricated from **0.060-inch** nominal-thickness steel sheet; lapped and factory welded at corners; with top and bottom main frames factory welded into vertical main frames. Form continuous, integral, full-height door strikes on vertical main frames.
 - 1. Cross Frames between Tiers: Channel formed and fabricated from same material as main frames; welded to vertical main frames.
- E. Hinges: Welded to door and attached to door frame with no fewer than two factory-installed rivets per hinge that are completely concealed and tamper resistant when door is closed; fabricated to swing 180 degrees .
 - 1. Hinges: Manufacturer's standard, steel, continuous or knuckle type.
- F. Recessed Door Handle and Latch: Stainless steel cup with integral door pull, recessed so locking device does not protrude beyond door face; pry and vandal resistant.
 - 1. Single-Point Latching: Nonmoving latch hook with steel padlock loop that projects through recessed cup and is finished to match metal locker body.
 - a. Latch Hook: Equip each door with one latch hook, fabricated from **0.105-inch** nominal-thickness steel sheet; welded midway up full-height door strike; with resilient silencer.
- G. Locks: Combination padlocks.
- H. Hooks: Manufacturer's standard ball-pointed hooks, aluminum or steel; zinc plated.
- I. Coat Rods: Manufacturer's standard.
- J. Legs: **6 inches** high; formed by extending vertical frame members, or fabricated from **0.075-inch** nominal-thickness steel sheet; welded to bottom of locker.
 - 1. Closed Front and End Bases: Fabricated from **0.036-inch** nominal-thickness steel sheet.
- K. Continuous Sloping Tops: Fabricated from manufacturer's standard thickness, but not less than **0.036-inch** nominal-thickness steel sheet.

1. Closures: Vertical -end type.

L. Materials:

1. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B, suitable for exposed applications.

M. Finish: Baked enamel or powder coat.

1. Color: As selected by Architect from manufacturer's full range.

2.4 LOCKS

- A. Combination Padlock: Provided by Owner.

2.5 LOCKER BENCHES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. **[Art Metal Products]**
2. **[ASI Storage Solutions]**
3. **[Hadrian Inc.; Zurn Industries, LLC]**
4. **[List Industries Inc.]**
5. **[Lyon LLC]**
6. **[Penco Products, Inc.]**
7. **[Top Tier Storage Products]**

- B. Provide bench units with overall assembly height of 18 inches.

- C. Bench Tops: Manufacturer's standard one-piece units, with rounded corners and edges.

1. Size: Minimum **9-1/2 inches wide by 1-1/4 inches thick** except provide **20- to 24-inch-** wide tops where accessible benches are indicated.
2. Laminated clear hardwood with one coat of clear sealer on all surfaces and one coat of clear lacquer on top and sides.

- D. Fixed-Bench Pedestals: Manufacturer's standard supports, with predrilled fastener holes for attaching bench top and anchoring to floor, complete with fasteners and anchors, and as follows:

1. Tubular Steel:
 - a. **1-1/2-inch-** diameter steel tubing threaded on both ends, with standard pipe flange at top and bell-shaped cast-iron base; with baked-enamel or powder-coat finish; anchored with exposed fasteners.
 - b. **1-1/4-inch-** diameter steel tubing, with **0.1265-inch-** thick steel flanges

welded at top and base; with zinc-plated finish; anchored with exposed fasteners.

- c. Color: As selected by Architect from manufacturer's full range.

E. Materials:

1. Stainless Steel Plate, Sheet, and Strip: ASTM A240/A240M or ASTM A666, Type 304.
2. Steel Tube: ASTM A500/A500M, cold rolled.
3. Particleboard: ANSI A208.1, Grade M-2.

2.6 FABRICATION

- A. Fabricate metal lockers square, rigid, without warp, and with metal faces flat and free of dents or distortion. Make exposed metal edges safe to touch and free of sharp edges and burrs.

1. Form body panels, doors, shelves, and accessories from one-piece steel sheet unless otherwise indicated.
2. Provide fasteners, filler plates, supports, clips, and closures as required for complete installation.

- B. Fabricate each metal locker with an individual door and frame; individual top, bottom, and back; and common intermediate uprights separating compartments.

- C. Equipment: Provide each locker with an identification plate and the following equipment:

1. Double-Tier Units: One double-prong ceiling hook and two single-prong wall hooks.
2. Coat Rods: For each compartment of each locker.

- D. Knocked-Down Construction: Fabricate metal lockers by assembling at Project site, using manufacturer's nuts, bolts, screws, or rivets.

- E. Accessible Lockers: Fabricate as follows:

1. Locate bottom shelf no lower than **15 inches** above the floor.
2. Where hooks, coat rods, or additional shelves are provided, locate no higher than **48 inches** above the floor.

- F. Continuous Zee Base: Fabricated in lengths as long as practical to enclose base and base ends; finished to match lockers.

- G. Continuous Sloping Tops: Fabricated in lengths as long as practical, without visible fasteners at splice locations; finished to match lockers.

2.7 ACCESSORIES

- A. Fasteners: Zinc- or nickel-plated steel, slotless-type, exposed bolt heads; with self-locking nuts or lock washers for nuts on moving parts.
- B. Anchors: Material, type, and size required for secure anchorage to each substrate.
 - 1. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls for corrosion resistance.
 - 2. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls and floors or support bases, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install lockers level, plumb, and true; shim as required, using concealed shims.
 - 1. Anchor locker runs at ends and at intervals recommended by manufacturer, but not more than **36 inches** o.c. Using concealed fasteners, install anchors through backup reinforcing plates, channels, or blocking as required to prevent metal distortion.
 - 2. Anchor single rows of metal lockers to walls near top and bottom of lockers.
- B. Knocked-Down Lockers: Assemble with manufacturer's standard fasteners, with no exposed fasteners on door faces or face frames.
- C. Equipment:
 - 1. Attach hooks with at least two fasteners.
 - 2. Attach door locks on doors using security-type fasteners.
 - 3. Identification Plates: Identify metal lockers with identification indicated on Drawings.
 - a. Attach plates to each locker door, near top, centered, with at least two aluminum rivets.
 - b. Attach plates to upper shelf of each open-front metal locker, centered, with a least two aluminum rivets.

- D. Fixed Benches: Provide no fewer than two pedestals for each bench, uniformly spaced not more than **72 inches** apart. Securely fasten tops of pedestals to undersides of bench tops, and anchor bases to floor.

3.3 ADJUSTING

- A. Clean, lubricate, and adjust hardware. Adjust doors and latches to operate easily without binding.

3.4 PROTECTION

- A. Protect metal lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit use during construction.
- B. Touch up marred finishes, or replace metal lockers that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION 10 5113

SECTION 11 1136 - VEHICLE CHARGING EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Onboard electric vehicle supply equipment.

1.2 DEFINITIONS

- A. EV: Electric vehicle.
- B. EVSE: Electric vehicle supply equipment. This term refers to AC Level 2 charging equipment that depends on the built-in charger located onboard the vehicle.
- C. Fastened in Place: Does not require tools to be removed and replaced.
- D. Fixed in Place: Requires tools to be removed and replaced.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Product Listing: Include copy of unexpired approval letter, on letterhead of qualified electrical testing agency, certifying product's compliance with specified listing criteria.
 - a. If listed manufacturer differs from selling manufacturer, indicate relationship between entities on submittal. Clearly indicate which entity warrants product performance and fitness for purpose.
 - b. Listing criteria identified in approval letter must match specified listing criteria. UL label indicating approval of equipment's enclosure is not considered approval of equipment for intended application.
 - c. Product identification in approval letter must match product branding and model numbers in submittal. Approval letters for discontinued or superseded products are not acceptable for submitted product.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Spare parts.
- B. Special tools.

1.5 WARRANTY

- A. Special Manufacturer Extended Warranty: Manufacturer warrants that vehicle charging equipment performs in accordance with specified requirements and agrees to provide repair or replacement of components or products that fail to perform as specified within extended-warranty period.

1.6 PAYMENT PROCEDURES

- A. The payment quantity of EV dual chargers shown in the Bid Item List will be paid for at the contract unit price per charger installed for Item No. 26 – EV Dual Chargers.
- B. The payment quantity of EV pedestal mounted receptacles shown in the Bid Item List will be paid for at the contract unit price per receptacle installed for Item No. 27 – EV Pedestal with Receptacles.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Products or components listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

2.2 ONBOARD ELECTRIC VEHICLE SUPPLY EQUIPMENT

- A. Description: EVSE with input rated up to 600 V(ac) for AC Level 2 charging of vehicle batteries using the EV's onboard charger.
- B. UL FFWA - AC Level 2 EV Supply Equipment (EVSE):
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. ChargePoint, Inc.; subsidiary of ChargePoint Holdings, Inc.
 - 2. Source Limitations: Obtain products from single manufacturer.
 - 3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:
 - a. EV Supply Equipment: UL CCN FFWA; including UL 2594.
 - 4. Standard Features:
 - a. Complies with Article 625 of NFPA 70.

5. Other Available Features Required by the Project:

- a. Location Rating: Indoor/outdoor.
- b. Input Feeder Rating:
 - 1) 208 to 240 V(ac), single phase, 60 Hz, 40 A.
- c. Input Feeder Type: Hard wired.
- d. Output Quantity: 2.
- e. Output Wiring: Flexible cord.
 - 1) Output Cable Nominal Length (Usable Length May Be Less): 18 ft.
 - 2) Output Attachment Plug: Type 1 (SAE J1772).
- f. Mounting: Concrete base mount.
- g. Metering: Revenue grade meter.
- h. Authorization or Payment System:
 - 1) Proximity card reader
 - 2) PCI compliant.
 - 3) Capable of remote control and authorization.

6. Accessories:

- a. Multifunctional Display: Provide electronic signage integral with charger pedestal that is capable of displaying operating instructions, video advertising, and other messages while charger is in operation.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls, floors, and bollards or posts for suitable conditions where vehicle charging equipment will be installed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF VEHICLE CHARGING EQUIPMENT

- A. Comply with manufacturer's published instructions.
- B. Reference Standards for Installation: Unless more stringent installation requirements are specified in the Contract Documents or manufacturer's published instructions, comply with the following:
 - 1. Electrical Construction: ICC IBC, ICC IFB, NFPA 1, NFPA 70, and NECA NEIS 1.
 - 2. Electrical Safety: NFPA 70E.

3. Grounding and Bonding: NECA NEIS 331 and Article 250 of NFPA 70.
4. Communications Work: BICSI N1.
5. Work in Basements and Other Developed Subterranean Spaces: NFPA 520.
6. Electric Vehicle Power Transfer System: Article 625 of NFPA 70 and NECA NEIS 413.
7. Consult Architect for resolution of conflicting requirements.

C. Special Installation Techniques:

1. Hard-Wired Connection: Provide safety switch, that is lockable in "Off" position, in readily accessible location for termination of input cable.
2. Base Mounting: When indicated on Drawings or in manufacturer's published instructions, provide concrete bases for installing vehicle charging equipment.
3. Identification: Provide labels for vehicle charging equipment and associated electrical equipment.
 - a. Identify field-installed conductors, interconnecting wiring, and components.
 - b. Provide warning signs.
 - c. Label each enclosure with engraved metal or laminated-plastic nameplate.

D. Cybersecurity:

1. Software:
 - a. Coordinate security requirements with IT department.
 - b. Ensure that latest stable software release is installed and properly operating.
 - c. Disable or change default passwords to password of at least eight characters in length, using a combination of uppercase and lower letters, numbers, and symbols. Record passwords and turn over to party responsible for system operation and administration.
2. Hardware:
 - a. Coordinate location and access requirements with IT department.
 - b. Enable highest level of wireless encryption that is compatible with Owner's information and communications technology network.
 - c. Disable dual network connections.

E. Interfaces with Other Work:

1. Work must be rated to handle available fault current on input feeder.
2. Provide appropriate warning labels for arc-flash hazard on input feeder.

3.3 PROTECTION

- A. After installation, protect vehicle charging equipment from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

Skarphol/Frank Associates
7005

Household Hazardous Waste
Facility
Bakersfield, California

END OF SECTION 11 1136

SECTION 11 1200 - PARKING CONTROL EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Automatic barrier gates.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for parking control equipment.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties.

1.3 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For parking control equipment to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain parking control equipment from single source from single manufacturer.

2.2 AUTOMATIC BARRIER GATES

- A. Automatic Barrier Gates: Provide parking control device consisting of operator and controller housed in a weathertight, tamper-resistant cabinet enclosure with gate arm. Device shall be activated by a signal from access or revenue control device. Fabricate unit with gate-arm height in down position of not more than **35 inches** above pavement.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **[Amano Cincinnati, Inc]**
 - b. **[ASPS Access Security & Parking Systems Inc.]**
 - c. **[Automatic Systems]**
 - d. **[CAME Americas Automation LLC]**
 - e. **[Canadian Parking Equipment Ltd./American Parking Equipment Inc.]**
 - f. **[Delta Scientific Corporation]**
 - g. **[DoorKing, Inc]**
 - h. **[Engineered Parking Systems, Inc]**
 - i. **[Falcon Eye Global Security, LLC]**
 - j. **[HySecurity Gate, Inc.]**
 - k. **[Magnetic AutoControl USA]**
 - l. **[Parking Systems, Inc.]**
 2. Standards: Barrier gate operators that are listed and labeled according to UL 325 by a qualified testing agency.
- B. Controller: Factory-sealed, solid-state, plug-in type, with galvanized-steel box for wiring connections. Noncommunicating type.
- C. Straight Gate Arm: Aluminum.
1. Traffic-Side Face: Manufacturer's standard finish and striping.
 2. Length: **12 feet.**
- D. Operator: UL labeled and listed, Class II. 1/3 hp; 120 -V, 60-Hz, single-phase, instant-reversing, continuous-duty motor for operating gate arm. Transmit power to gate-arm drive shaft through the speed reducer to harmonic-acting crank and connecting rod. Fabricate crank, rod, and drive shaft of galvanized solid bar steel. Provide an operable cam for adjusting arm travel.

2.3 ANCHORAGES

- A. Anchor Bolts: Galvanized.
1. Hot-dip galvanized according to ASTM A153/A153M and ASTM F2329/F2329M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, including equipment bases; accurate placement, pattern, and orientation of anchor bolts; critical dimensions; and other conditions affecting performance of the Work.

- B. Examine roughing-in for electrical and communication systems to verify actual locations of connections before parking control equipment installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Install parking control equipment as required for complete and integrated installation.
 - 1. Rough-in electrical connections.

3.3 INSTALLATION OF AUTOMATIC BARRIER GATES

- A. Anchor cabinets to concrete bases with anchor bolts or expansion anchors, and mount barrier gate arms.
 - 1. Install barrier gates according to UL 325.

3.4 ADJUSTING

- A. Adjust parking control equipment to function smoothly, and lubricate as recommended by manufacturer.
- B. Confirm that locks engage accurately and securely without forcing or binding.
- C. After completing installation of exposed, factory-finished parking control equipment, inspect exposed finishes and repair damaged finishes.

3.5 PROTECTION

- A. Remove barrier gate arms during the construction period to prevent damage, and install them immediately before Substantial Completion.

END OF SECTION 11 1200

SECTION 12 3661 - SIMULATED STONE COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid surface material countertops.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for cantilever supports.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of countertop material.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include product data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver countertops only after casework and supports on which they will be installed have been completed in installation areas.
- B. Store countertops in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.
- C. Keep surfaces of countertops covered with protective covering during handling and installation.

1.6 FIELD CONDITIONS

- A. Field Measurements: Where countertops are indicated to fit to other construction, verify dimensions of countertops by field measurements before countertop fabrication is complete and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 SOLID SURFACE MATERIAL COUNTERTOPS

- A. Solid Surface Countertop Type:
 - 1. Grade: Premium.
- B. Solid Surface Material: Homogeneous fabrication of mineral fillers and pigments bound together with a matrix of polymers and resins, complying with ISFA 2-01.
 - 1. Colors and Patterns: As selected by Architect from manufacturer's full range.
 - 2. Countertop:
 - a. Type: Standard.
 - b. Thickness:
 - 1) ~~1/2-inch~~- thick, solid surface material with front edge built up with same material.
 - c. Exposed Edge Treatment: Eased.
 - d. Backsplash: Detached straight.
 - 1) Height: ~~4 inches~~.
 - 2) Thickness: Matching countertop.
 - e. End Splash: Matching backsplash.
 - 3. Sink Bowls:
 - a. Separate unit for under-counter mounting.
 - b. Material: Stainless steel.
 - c. Shape: Rectangle.

2.2 FABRICATION

- A. Fabricate countertops in sizes and shapes required to comply with requirements indicated.
- B. Fabricate tops with shop-applied edges unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication,

and finishing.

C. Joints:

1. Fabricate countertops without joints.

D. Cutouts and Holes:

1. Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
 - a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting **3/16 inch** into fixture opening.
2. Fittings: Drill countertops in shop for grommets, plumbing fittings, undercounter soap dispensers, and similar items.

2.3 INSTALLATION MATERIALS

- A. Adhesive: Product recommended by manufacturer.
- B. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to receive countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Before installation, condition countertops to average prevailing humidity conditions in installation areas.
- B. Examine shop-fabricated work for completion and complete work as required, including removal of packing.

3.3 INSTALLATION OF SIMULATED STONE COUNTERTOPS

- A. Grade: Install countertops to comply with specified grade.
- B. Assemble countertops and complete fabrication at Project site to the extent that it was not completed in the shop.
 - 1. Provide cutouts not finished in the shop. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
- C. Countertop Installation:
 - 1. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
 - 2. Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
 - 3. Anchor wall cleating necessary for proper setting for countertops not supported by casework.
 - 4. Install countertops level to a tolerance of **1/8 inch in 8 ft., 1/4 inch** maximum. Do not exceed **1/64-inch** difference between planes of adjacent units.
 - 5. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Predrill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with quartz agglomerate manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
 - 6. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.
 - 7. Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Predrill holes for screws as recommended by manufacturer.
 - 8. Seal joints between countertop and backsplash, if any, and joints where countertop and backsplash abut walls. Comply with Section 079200 "Joint Sealants."

3.4 ADJUSTING AND CLEANING

- A. Repair damaged and defective countertops, where possible, to eliminate functional and visual defects. Where not possible to repair, replace countertops. Adjust joinery for uniform appearance.
- B. Clean countertops on exposed and semi-exposed surfaces.
- C. Protection: Provide Kraft paper or other suitable covering over countertop surfaces, taped to underside of countertop at a minimum of **48 inches** o.c. Remove protection at Substantial Completion.

Skarphol/Frank Associates
7005

Household Hazardous Waste
Facility
Bakersfield, California

END OF SECTION 12 3661

SECTION 210000 – FIRE SPRINKLERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Provide a complete hydraulically calculated automatic fire sprinkler system for the new building extending from the point of connection as indicated on the drawings to all areas of the building, including all necessary piping, devices, controls, labor, etc.

1.2 DEFINITIONS

- A. Provide. The term "provide" as used in these specifications or on the Drawing shall mean furnish and install.
- B. Piping. The term "piping" as used in these Specifications or on the Drawings shall mean all pipe, fittings, nipples, valves, unions, hangers, and thermal insulation, etc., as may be required for a complete and functional system.
- C. Wiring. The term "wiring" shall include the provision of all necessary products which are required for a complete installation and shall include products such as conduit, electrical boxes, connections, transformers, relays and switches

1.3 ACTION SUBMITTALS

A. Calculations

1. If other than a pipe schedule is to be provided, submit three (3) copies of supporting hydraulic calculations following procedures outlined in Specification section 15100, Submittals. The hydraulic calculation shall use no more than 90% of the available pressure at the connection to the sprinkler riser.

B. Shop Drawings

1. Complete working shop drawings of the sprinkler system shall be submitted to the engineer prior to installation for preliminary review and comment. Subsequent to the engineer's initial review and before commencing with any work, forward six (6) sets of Sprinkler Drawings to the City of Bakersfield Building & Safety Department and obtain approval of the Shop Drawings from these agencies.
2. One (1) copy of the approved Sprinkler Plan shall be filed with the City of Bakerfield Building & Safety Department and two (2) copies returned to the engineer.

3. Shop Drawings shall indicate the location of the existing street main water supply (including pressure and flow rate), system riser with the number of sprinkler heads served, distribution mains, effect of existing sprinkler system, etc.

1.4 TESTS

- A. All testing shall be done in accordance with NFPA Standard 13 and under the observation of an inspector from the authority having jurisdiction. Work to be concealed shall not be enclosed until prescribed tests are satisfactorily completed and accepted.

1.5 COORDINATION OF WORK

- A. Before starting any work, thoroughly examine all existing and newly completed underlying and adjoining work and conditions upon which the installation of this work is in any way dependent for the workmanship required by the Contract Documents. Report to the Architect and Engineer in writing any and all conditions which might adversely affect this work and limit ability to perform the required workmanship.
- B. Layout of materials, equipment and systems is generally diagrammatic unless specifically dimensioned. The actual locations of all materials, piping, ductwork, fixtures, equipment, supports, etc., shall be carefully planned, prior to installation of any work, to avoid all interference's with each other, or with structural, electrical or architectural elements. Verify the proper voltage and phase of all equipment with the electrical plans. All conflicts shall be called to the attention of the Engineer prior to the installation of any work or the ordering of any equipment.
- C. Because of the small scale of the drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. Carefully investigate the mechanical, electrical, structural, architectural drawings and field conditions that could affect the work to be performed and arrange such work accordingly. Provide the required piping and ductwork offsets, fittings, and accessories to meet such conditions.
- D. Spaces provided in the design of the building shall be utilized and the work shall be kept within walls or furring lines established on the drawings. Any discrepancy between Architectural or Mechanical drawings with respect to wall or furring locations and dimensions shall be brought to the Architect's attention for resolution before proceeding with installation.
- E. Any work which is done as an addition, expansion, or remodel of an existing system shall be compatible with that system

1.6 DAMAGE BY LEAKS

- A. The Contractor shall be responsible for damages caused by leaks in the temporary or permanent piping or mechanical systems prior to completion of work and during the period of the guarantee.

1.7 OPENINGS, CUTTING, AND PATCHING

- A. The locations and dimensions for openings through walls, floors, ceilings, foundations, footings, etc. required to accomplish the work under this Specification Division shall be provided under this Division. Except as noted below, the actual openings and the required cutting and patching shall be provided by other Divisions. Coring through existing concrete or masonry walls, floors or asphaltic concrete required to accomplish the work under this Specification Division shall be provided under this Division. Restoration of all surfaces shall be provided by other Divisions. Cutting or coring shall not impair the strength of the structure. Any damage resulting from this work shall be repaired at the Contractor's expense to the satisfaction of the Architect and Engineer.

1.8 EXCAVATION AND BACKFILLING

- A. Excavation and backfilling for work to be done under this Specification Section shall be done under this Section. All underground lines outside buildings shall be 2'-0" minimum backfill cover unless a greater depth of cover is recommended by the pipe manufacturer for the particular application. Width at top of pipe shall be 16" plus the outside width of pipe. Provide all shoring where required by site conditions.
- B. Backfill
 - 1. 6" Below, Around, and to 12" Above Pipe. Material shall be sand. Place Carefully around and on top of pipe, taking care not to disturb piping, consolidate with vibrator.
 - 2. One Foot Above Pipe to Grade. Material shall be sandy or silty loam, free of lumps, laid in 6" layers, uniformly mixed to proper moisture and compacted to required density. If backfill is determined to be suitable and required compaction is demonstrated by laboratory test, water compaction in 6" layers may be used, subject to review by Engineer.
- C. Compaction. Compact to density of 95% within building and under walkways, driveways, traffic areas, paved areas, etc. and to 90% elsewhere. Demonstrate proper compaction by testing at 8" above top of pipe. Perform test at every 100' of trench. If a test fails, the compaction shall be re-worked in both directions back to test points that passed, before re-testing.
- D. Electrical conduit shall not be run in excavations provided for mechanical systems.
- E. Excavation and backfilling in a public right-of-way shall be done in strict accordance with the agency having jurisdiction.

1.9 HANGERS AND SUPPORTS

- A. Provide all hangers, bracing, and supports for the proper installation of equipment and materials under this Section of the Specification.
- B. Any structural element required to properly hang or support piping, ducts, or equipment, etc., provided under this Specification Section and not shown on the

Architectural or Structural Drawings shall be provided under this Specification Section.

1.10 ELECTRICAL CONNECTIONS

- A. Provide under Section 230000 "Heating, Ventilating, & Air Conditioning" all required control conduit, wiring, controls and control panels as indicated on the drawings or as may be required for system operation.
- B. No control device shall be mounted with rigid connections on vibration isolated mechanical equipment. No field furnished control device shall be mounted on any piece of equipment so that it interferes with physical access of air or water flow, or covers any portions of nameplates or access doors.

1.11 FLASHING

- A. Whenever any part of the Mechanical System(s) must penetrate the roof or outside wall, the openings shall be flashed and counter-flashed absolutely water tight with minimum 22 gauge galvanized sheet metal, prime coated. Flashing aprons shall extend not less than eight inches (8") from the duct, pipe, or supporting member in all directions unless detailed otherwise. All penetrations shall be flashed following the procedures of the National Roofing Contractor's Association

1.12 PAINTING

- A. Paint all black iron supports, hangers, anchors, etc., and all uninsulated black iron pipe work installed in weather exposed locations with one coat of rust resisting primer.

1.13 ACCESS DOORS AND PANELS

- A. Provide access doors as required where equipment, piping, valves, ductwork, etc. are not otherwise accessible. Access doors shall match the wall or ceiling finish and fire rating as indicated on the Architectural drawings or as required to match wall construction. 16-gauge steel frame and 14-gauge steel panel with paintable finish, except in ceramic tile, where panel shall be 16-gauge stainless steel with satin finish. Continuous hinge. Screwdriver latch. Deliver panels to the General Contractor for installation. Provide Zurn Z-1460-4 for square doors and Z-1460-5 for rectangular doors, Karp, or equivalent. Unless otherwise noted, the minimum sizes shall be as follows:

- | | | |
|----|----------------------------|---------|
| 1. | 1 valve up to 1-1/2" | 12"x12" |
| 2. | 1 valve up to 3" | 16"x16" |
| 3. | Fire damper, VAV box, coil | 16"x16" |

1.14 SYSTEM IDENTIFICATION

- A. Below Grade Piping. Bury a continuous, pre-printed, bright colored plastic ribbon

marker with each underground pipe. Locate directly over buried pipe, 6" to 8" below grade

1.15 PROTECTIVE COATING FOR UNDERGROUND PIPING

- A. All ferrous pipe below grade (except cast iron) shall have a factory applied protective coating of extruded high density polyethylene, 35 to 70 mils total thickness, such as X-Tru-Coat or Scotchkote. All fittings and areas of damaged coating shall be covered with two layers of double wrap 10 mil polyvinyl tape to total thickness of 40 mils. Johns-Manville. Protective coating shall be extended 6" above surrounding grade.

1.16 CONCRETE ANCHORS

- A. Steel bolt with expansion anchor requiring a drilled hole - powder driven anchors are not acceptable. Minimum concrete embedment shall be 4½ diameters. Minimum spacing shall be 10 diameters center to center and 5 diameters center to edge of concrete. Maximum capacity shall be determined in compliance with ACI 318-19, Chapter 17 and the anchor's engineering evaluation report. Hilti, Phillips. Wej-it. Exterior locations shall utilize stainless steel hardware.

1.17 EQUIPMENT

- A. General Requirements
 - 1. Capacity. Capacities and efficiencies shall be in accordance with schedules shown on drawings. Scheduled numbers are to be considered minimum.
 - 2. Dimensions. Equipment must conform to space requirements and limitations indicated on drawings and as required for operation and maintenance. Equipment that does not readily conform to space conditions is unacceptable. Prepare and submit layout drawings for all proposed equipment substitutes showing actual job conditions, required clearances for proper operation, maintenance, etc.

1.18 CLOSEOUT SUBMITTALS

- A. Record Drawings
 - 1. Provide in accordance with general conditions of the specifications.
- B. Operation and Maintenance Manual for Mechanical Systems
 - 1. Provide three (3) copies of Operation and Maintenance Manuals to the Engineer for review and acceptance. Provide the Owner's designated representative with one copy of the approved O & M manual.
 - 2. Bind Operation and Maintenance Manuals for each Mechanical System (Plumbing, Air Conditioning, etc.) in a hard-backed binder. Cover of each binder shall have the following lettering:

OPERATION
AND
MAINTENANCE
MANUAL
KERN SPECIAL WASTE FACILITY
SW CORNER DOWNING AVENUE & WEAR STREET
BAKERSFIELD, CALIFORNIA

3. Provide a master index at the beginning of Manual showing items included. Use plastic tab indexes for the sections of the Manual. Provide a sub-section with manufacturer's descriptive literature for each item of installed equipment with model, capacities, and all other pertinent information highlighted.

C. Maintenance Instructions. Provide:

1. Summary list of equipment used indicating name, model and nameplate date of each item together with number and name associated with each system item.
2. Manufacturer's maintenance instructions for each piece of equipment installed in project. Instructions shall include name of vendor, installation instructions, parts numbers and lists, operation instructions of equipment and maintenance and lubrication instructions.

D. Section 5, Warranties. Provide:

1. A copy of each manufacturer's warranty statement, completely filled out and indicating date forwarded to the respective manufacturer.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

A. Outside Building to 5'-0" from Building Wall (under ground).

1. Class 150 polyvinyl chloride (PVC) pressure pipe with integral bell and spigot joints with an elastomeric ring, meeting the requirements of AWWA C900, DR18, and shall be listed and approved by Underwriters Laboratories and Factory Mutual, respectively. Sealing ring shall comply with the requirements of ASTM D-1896 and E-477.

B. From 5'-0" Outside Building (underground) to Inside Building +6" Above Floor at Riser.

1. Ductile iron, AWWA C151, 150 PSIG, bituminous coated exterior. Provided flanged anchors connected to interior piping.

C. Inside Building From 6" Above Floor

FIRE SPRINKLERS

210000 - 6

1. 2" & smaller Pipe Size: Schedule 40 black steel ASTM A53 or A120. Joints shall be threaded malleable iron, ANSI B16.3, Class 125.
2. 2-1/2" & Larger Pipe Size: Schedule 10 black steel pipe, ASTM A135. Joints shall be UL and FM approved mechanical couplings and shall not be welded. Couplings may be of the bolted rolled groove type or the mechanical locking push-on type. Grooves for the rolled grooves type shall be rolled only. Pipe end preparations for the mechanical coupling shall be as follows.
 - a. Group components shall be of one manufacturer.
 - b. Utilized grooving tools shall be acceptable to fitting manufacturer and shall be limited to Victaulic, Ridge Tool Company, or Pace without substitution.

2.2 PIPING PROTECTIVE WRAP

- A. All steel piping buried below shall be factory coated with "Scotchkote" 101 epoxy resin as manufactured by 3-M Company, or "X-Tru-Coat" as Manufactured by Pipe-Line service Corp. Field joints shall be wrapped with "Scotchwrap" #50 or coated with "Scotchkote" 302.
- B. Provide a continuous test of all pipe covering, including field joints, prior to backfilling. This test shall be made using a "Holiday Detector" as manufactured by Tinker and Rascor Co., or approved equal. Test at an electrical voltage of 10,000 volts D.C.. Any wrap holiday found shall be patched and retested. This test shall be done in the presence of the owner's inspector.

2.3 VALVES

- A. Control valves for sprinkler systems.
 1. Solid wedge gate, rising stem, O.S.&Y., 175 psi w.p., U.L. Listed, provided with tamper switches.
- B. Globe valves.
 1. Bronze union bonnet, renewable composition disc, 175 psi w.p., U.L. Listed, provided with tamper switches.
- C. Check valves.
 1. 2" and Smaller: All bronze swing check. 175 psig WOG. U.L. Listed
 2. 2-1/2" and Larger: Iron body, bronze mounted swing check. 175 psig WOG. U.L. Listed
- D. Gate valves.
 1. 2" and Smaller: All bronze, rising stem. 200 psi WOG. U.L. Listed, provided with tamper switches.

2. 2-1/2" and Larger: Iron Body, bronze mounted, outside screw and yoke. 175 psi WOG. U.L. Listed. (U.L. Listed butterfly valves may be substituted for 4" and larger gate valves). Provide with tamper switch.

2.4 SPRINKLER HEADS

- A. Automatic spray sprinkler heads of suitable operating temperature shall be provided.
- B. Up-right, pendant, or flush type shall be provided, as required.
- C. In all areas with ceilings such as offices, work rooms, and corridors, etc., provide flush type heads. Heads installed in areas with finished ceilings shall have metal escutcheons with same finish as heads (Chrome Plated).
- D. Provide side wall heads where indicated on the drawing or required by job condition. Escutcheons for side wall heads shall have finish to match color of wall.
- E. Temperature ratings shall be in accordance with NFPA Pamphlet 13. Heads shall have chrome finish in areas with finished ceilings, standard finish in areas with exposed piping, lead coating on outdoor areas.
- F. Heads installed lower than eight feet above the floor shall have wire guards.
- G. Provide extra heads (of each type installed) in accordance with code requirements.

2.5 TEST AND DRAIN CONNECTION

- A. Install horizontal piping graded to low points and in a manner to make it possible to test and empty the entire system. Provide valves and piping of size as approved on accordance with NFPA Pamphlet 13.

PART 3 - EXECUTION

3.1 GENERAL

- A. The Sprinkler Drawings are schematic and indicate generally the system and equipment to be used. Architectural and structural conditions or drawings and existing conditions shall govern the exact location for all piping and sprinkler heads. Lay out and coordinate the sprinkler work with the work of other trades and confirm the locations of and install sleeves and hangers so that work of other trades is not impeded. Care shall be taken to secure best possible head room in location of sprinkler heads. Coordinate installation of sprinkler piping to avoid interference with adjacent air conditioning, plumbing, etc. Sprinkler piping must clear all overhead equipment.
- B. All sprinkler heads shall be located on center-line of, corridor, light fixtures, air

conditioning outlets ceiling panels as generally indicated and whenever possible to present a neat organized appearance.

- C. Fire caulk all piping penetrations per a U.L. approved caulking assembly, at all piping penetrations of walls and floors.

3.2 PIPING

- A. All piping shall be seismically braced and shall be done on compliance with NFPA 13, latest edition.
- B. Run in line with the building walls. Turns and bends shall be made with standard fittings.
- C. On branch line piping, provide at least one hanger between every two sprinkler heads and a maximum of 12' apart. End Sprinklers more than thirty inches (30") from any hanger shall be supported by a hanger not less than 12" from the sprinkler head.

3.3 SLEEVES

- A. Non-rated assemblies.
 - 1. Sleeves for pipe passing through concrete floors or walls shall be schedule 40 galvanized steel pipe of size sufficient to permit the pipes to pass through with a minimum clearance of 1" between sleeves and pipe for pipe up to 3-1/2" and 2" clearance for pipe larger than 4". Sleeves shall have square ends cut flush with surface and shall be caulked tight. Sleeves through floors shall extend 1" above finished floor surface.
- B. Rated assemblies
 - 1. Same as for non-rated assemblies except that sleeves shall be packed for its entire length with UL listed system three hour classification such as a 3M FireDam 160 caulk at ends and mineral wool batt material stuffer in middle of penetration.

3.4 ESCUTCHEONS

- A. Chrome plated, brass. Crane, with set screw.

3.5 DRAINAGE OF SYSTEM

- A. All sprinkler pipe and fittings shall be installed so that the sprinkler system can be completed drained. Piped shall be pitched at 1/4" per foot.

3.6 FLUSHING CONNECTION

- A. Shall be installed on the sprinkler system where necessary.

3.7 VALVE SUPPORTS

- A. All piping carrying fire valves shall be securely fastened to the building structure and each valve to prevent movement of valves because of manual pressure to the valves.

3.8 CLEANING

- A. All cement, plaster, etc., shall be removed with an approved solvent. All foreign mater shall be thoroughly flushed from inside if pipes before fabrication.

3.9 TESTS

- A. General: At various stages and upon completion the system shall be tested in the presence of a representative of the enforcing authority.
- B. Tests Shall Include
 1. Flushing Test in accordance with NFPA 13, Paragraph 8-2.1.
 2. Hydrostatic Test in accordance with NFPA 13. Paragraph 8-2.2.
 3. System Operational Tests in accordance with NFPA 13, Paragraph 8-2.4.

3.10 CERTIFICATION

- A. At the completion of the installation a certificate of inspection from the authority having jurisdiction indicating that the installation and testing is in accordance with reference standards, shall be delivered to the owner.
- B. Along with the certificate of inspection furnish the owner with a copy of NFPA Pamphlet 13A, Care and Maintenance of Sprinkler Systems. Also provide a copy of Title 19, California Code of Regulations, Article 4, Maintenance and Service, Paragraphs 904.1 and 904.2.

END OF SECTION 220000

SECTION 220000 - PLUMBING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. General Provisions of the contract including General and Supplementary Conditions apply to the work specified in this Section.
2. Work Included. Provide all labor, materials and services necessary for complete, lawful and operating systems as shown or noted on the drawings or as specified here. The work includes, but is not necessarily limited to, the following:
 - a. A complete system of sanitary soil, waste and vent piping including connection to existing waste and drain connections to all fixtures and equipment.
 - b. A complete system of hot and cold water piping including connection to existing and connections to fixtures and equipment.
 - c. Condensate drains from air conditioning and refrigeration units.
 - d. Furnishing, mounting and final connections to fixtures and equipment as shown or scheduled on the plumbing and architectural drawings that is part of any system listed above.
 - e. Final connections to equipment provided in other sections of these specifications or indicated as furnished by owner and installed by the contractor.
 - f. Demolition of all plumbing fixtures, equipment and piping systems indicated or required to be removed or modified.
 - g. Acceptance testing as required under California Building Energy Efficiency Standards, Title 24.

1.2 DEFINITIONS

- A. Provide: Furnish and install.
- B. Piping. All pipe, fittings, nipples, valves, unions, hangers, and thermal insulation, etc., as may be required for a complete and functional system.
- C. Wiring. All necessary products which are required for a complete installation and shall include products such as conduit, electrical boxes, connections, transformers, relays and switches.

1.3 COORDINATION OF WORK

- A. Before starting any work, thoroughly examine all existing and newly completed underlying and adjoining work and conditions upon which the installation of this work is

in any way dependent for the workmanship required by the Contract Documents. Report to the Architect and Engineer in writing any and all conditions which might adversely affect this work and limit ability to perform the required workmanship.

- B. Layout of materials, equipment and systems is generally diagrammatic unless specifically dimensioned. The actual locations of all materials, piping, ductwork, fixtures, equipment, supports, etc., shall be carefully planned, prior to installation of any work, to avoid all interference's with each other, or with structural, electrical or architectural elements. Verify the proper voltage and phase of all equipment with the electrical plans. All conflicts shall be called to the attention of the Engineer prior to the installation of any work or the ordering of any equipment.
- C. Because of the small scale of the drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. Carefully investigate the mechanical, electrical, structural, architectural drawings and field conditions that could affect the work to be performed and arrange such work accordingly. Provide the required piping and ductwork offsets, fittings, and accessories to meet such conditions.
- D. Spaces provided in the design of the building shall be utilized and the work shall be kept within walls or furring lines established on the drawings. Any discrepancy between Architectural or Mechanical drawings with respect to wall or furring locations and dimensions shall be brought to the Architect's attention for resolution before proceeding with installation.
- E. Any work which is done as an addition, expansion, or remodel of an existing system shall be compatible with that system

1.4 MANUFACTURER'S RECOMMENDATIONS

- A. All material, equipment, and devices, etc., shall be installed in a manner meeting approval of the manufacturer of the particular item. The Contractor shall make himself available of all installation manuals, brochures, and procedures that the manufacturer issues for the equipment and material. Contractor shall be held responsible for all installations contrary to the manufacturer's recommendations. Contractor shall make all necessary changes and revisions to achieve such compliance.

1.5 GUARANTEE

- A. Guarantee shall be in accordance with the General Conditions. These Specifications may extend the period of the guarantee for certain items. Where such extensions are called for, or where items are normally provided with guarantee periods in excess of that called for in the General Conditions, the certificate of guarantee shall be furnished to the Owner.

1.6 QUIETNESS

- A. Piping of all types, ductwork, and equipment shall be arranged and supported so that the vibration is at a minimum and is not transmitted to the building structure.

1.7 DAMAGE BY LEAKS

- A. The Contractor shall be responsible for damages caused by leaks in the temporary or permanent piping or mechanical systems prior to completion of work and during the period of the guarantee.

1.8 OPENINGS, CUTTING, AND PATCHING

- A. The locations and dimensions for openings through walls, floors, ceilings, foundations, footings, etc. required to accomplish the work under this Specification Division shall be provided under this Division. Except as noted below, the actual openings and the required cutting and patching shall be provided by other Divisions. Coring through existing concrete or masonry walls, floors or asphaltic concrete required to accomplish the work under this Specification Division shall be provided under this Division. Restoration of all surfaces shall be provided by other Divisions. Cutting or coring shall not impair the strength of the structure. Any damage resulting from this work shall be repaired at the Contractor's expense to the satisfaction of the Architect and Engineer.

1.9 DEMOLITION

- A. Existing equipment, ducts, piping, valves, fittings, devices, etc., requiring removal shall be removed and delivered to the Owner at a location on the job site to be determined by the Owner. Those items determined by the Owner to be of no value shall become the property of the Contractor and shall be removed from the job site by the Contractor at the Contractor's expense.
- B. Existing piping, ducts, and services, etc., requiring capping or plugging shall be capped or plugged below floors, behind walls, above ceilings or above roof unless otherwise noted.

1.10 EXCAVATION AND BACKFILLING

- A. Excavation and backfilling for work to be done under this Specification Section shall be done under this Section. All underground lines outside buildings shall be 2'-0" minimum backfill cover unless a greater depth of cover is recommended by the pipe manufacturer for the particular application. Width at top of pipe shall be 16" plus the outside width of pipe. Provide all shoring where required by site conditions.
- B. Backfill
 1. 6" Below, Around, and to 12" Above Pipe. Material shall be sand. Place Carefully around and on top of pipe, taking care not to disturb piping, consolidate with vibrator.
 2. One Foot Above Pipe to Grade. Material shall be sandy or silty loam, free of lumps, laid in 6" layers, uniformly mixed to proper moisture and compacted to required density. If backfill is determined to be suitable and required compaction is demonstrated by laboratory test, water compaction in 6" layers may be used, subject to review by Engineer.

- C. Compaction. Compact to density of 95% within building and under walkways, driveways, traffic areas, paved areas, etc. and to 90% elsewhere. Demonstrate proper compaction by testing at 8" above top of pipe. Perform test at every 100' of trench. If a test fails, the compaction shall be re-worked in both directions back to test points that passed, before re-testing.
- D. Electrical conduit shall not be run in excavations provided for mechanical systems.
- E. Excavation and backfilling in a public right-of-way shall be done in strict accordance with the agency having jurisdiction.

1.11 HANGERS AND SUPPORTS

- A. Provide all hangers, bracing, and supports for the proper installation of equipment and materials under this Section of the Specification.
- B. Any structural element required to properly hang or support piping, ducts, or equipment, etc., provided under this Specification Section and not shown on the Architectural or Structural Drawings shall be provided under this Specification Section.
- C. All plumbing piping shall be supported and seismically to prevent contact with other building components and / or construction.

1.12 FLASHING

- A. Whenever any part of the Mechanical System(s) must penetrate the roof or outside wall, the openings shall be flashed and counter-flashed absolutely water tight with minimum 22 gauge galvanized sheet metal, prime coated. Flashing aprons shall extend not less than eight inches (8") from the duct, pipe, or supporting member in all directions unless detailed otherwise. All penetrations shall be flashed following the procedures of the National Roofing Contractor's Association

1.13 PAINTING

- A. Paint all black iron supports, hangers, anchors, etc., and all uninsulated black iron pipe work installed in weather exposed locations with one coat of rust resisting primer.

1.14 CONTINUITY OF SERVICES

- A. All existing services and systems shall be maintained except for short intervals when connections are to be made. The contractor shall be responsible for any interruptions of services and shall repair damage done to any existing service caused by the work.
- B. If utilities not indicated on the drawings are uncovered during excavation, the Contractor shall notify the architect immediately for further instructions.

1.15 ELECTRICAL CONNECTIONS

- A. Provide under Section 230000 "Heating, Ventilating, & Air Conditioning" all required control conduit, wiring, controls and control panels as indicated on the drawings or as may be required for system operation.
- B. No control device shall be mounted with rigid connections on vibration isolated mechanical equipment. No field furnished control device shall be mounted on any piece of equipment so that it interferes with physical access of air or water flow, or covers any portions of nameplates or access doors.

1.16 ELECTRICAL COORDINATION

- A. Prior to commencing construction arrange a conference with the electrical and mechanical trades as well as equipment suppliers and verify types, sizes, locations, voltage requirements, controls and diagrams of all equipment furnished by them. In writing, inform the Architect that all phases of coordination of this equipment have been covered and if there are any unusual conditions or problems they shall be enumerated at this time.

1.17 PAINTING

- A. Paint all black iron supports, hangers, anchors, etc., and all uninsulated black iron pipe work installed in weather exposed locations with one coat of rust resisting primer.

1.18 ACCESS DOORS AND PANELS

- A. Provide access doors as required where equipment, piping, valves, ductwork, etc. are not otherwise accessible. Access doors shall match the wall or ceiling finish and fire rating as indicated on the Architectural drawings or as required to match wall construction. 16-gauge steel frame and 14-gauge steel panel with paintable finish, except in ceramic tile, where panel shall be 16-gauge stainless steel with satin finish. Continuous hinge. Screwdriver latch. Deliver panels to the General Contractor for installation. Provide Zurn Z-1460-4 for square doors and Z-1460-5 for rectangular doors, Karp, or equivalent. Unless otherwise noted, the minimum sizes shall be as follows:

- | | | |
|----|----------------------------|---------|
| 1. | 1 valve up to 1-1/2" | 12"x12" |
| 2. | 1 valve up to 3" | 16"x16" |
| 3. | Fire damper, VAV box, coil | 16"x16" |

1.19 SYSTEM IDENTIFICATION

- A. Above Grade Piping. Provide markers on piping which is either exposed or concealed in accessible spaces. For piping systems, other than drain and vent lines, indicate the fluid conveyed or its abbreviation, by stenciled marking or decals, and include arrows to indicated direction of flow. Locate markers at end of lines, near major branches and

other interruptions including equipment in the line, where lines pass through floors, walls or ceilings or otherwise pass into inaccessible spaces, and at 50' maximum intervals along exposed portions of lines. Marking of short branches and repetitive branches of equipment connections are not required. Decals pasted, glued, or adhered to piping or insulation shall be Seton "Setmark", or equivalent. Decals or stencils shall be applied after the painting of all piping systems is complete and after preliminary acceptance of piping system. Decals and stencils shall comply with ANSI and OSHA specifications with respect to marker size, color, and legend.

- B. Below Grade Piping. Bury a continuous, pre-printed, bright colored plastic ribbon marker with each underground pipe. Locate directly over buried pipe, 6" to 8" below grade
- C. Equipment. All equipment shall be identified with a plastic laminated engraved nameplate which bears the unit number marked as indicated on the drawings (e.g. AC-4, WH-1) Provide 1/2" high lettering - white on black background. Nameplates shall be permanently secured to the unit. Air conditioning equipment shall be identified as to area served.

1.20 PROTECTIVE COATING FOR UNDERGROUND PIPING

- A. All ferrous pipe below grade (except cast iron) shall have a factory applied protective coating of extruded high density polyethylene, 35 to 70 mils total thickness, such as X-Tru-Coat or Scotchkote. All fittings and areas of damaged coating shall be covered with two layers of double wrap 10 mil polyvinyl tape to total thickness of 40 mils. Johns-Manville. Protective coating shall be extended 6" above surrounding grade.

1.21 CONCRETE ANCHORS

- A. Steel bolt with expansion anchor requiring a drilled hole - powder driven anchors are not acceptable. Minimum concrete embedment shall be 4½ diameters. Minimum spacing shall be 10 diameters center to center and 5 diameters center to edge of concrete. Maximum capacity shall be determined in compliance with ACI 318-19, Chapter 17 and the anchor's engineering evaluation report. Hilti, Phillips. Wej-it. Exterior locations shall utilize stainless steel hardware.

1.22 EQUIPMENT

- A. General Requirements
 - 1. Capacity. Capacities and efficiencies shall be in accordance with schedules shown on drawings. Scheduled numbers are to be considered minimum.
 - 2. Dimensions. Equipment must conform to space requirements and limitations indicated on drawings and as required for operation and maintenance. Equipment that does not readily conform to space conditions is unacceptable. Prepare and submit layout drawings for all proposed equipment substitutes showing actual job conditions, required clearances for proper operation, maintenance, etc.

1.23 CLOSEOUT SUBMITTALS

A. Record Drawings

1. Provide in accordance with general conditions of the specifications.

B. Operation and Maintenance Manual for Mechanical Systems

1. Provide three (3) copies of Operation and Maintenance Manuals to the Engineer for review and acceptance. Provide the Owner's designated representative with one copy of the approved O & M manual. Bind Operation and Maintenance Manuals for each Mechanical System (Plumbing, Air Conditioning, etc.) in a hard-backed binder. Cover of each binder shall have the following lettering:

OPERATION
AND
MAINTENANCE
MANUAL
KERN SPECIAL WASTE FACILITY
SW CORNER DOWNING AVENUE & WEAR STREET
BAKERSFIELD, CALIFORNIA

Provide a transmittal letter at the beginning of the manual on the Contractor's letterhead. Letter shall be signed by a contractor principal (Owner or Corporate Officer) and shall be countersigned by the Owner's designated representative and shall indicate the date when the mechanical systems were shown and explained in detail to the Owner's designated representative. (The Engineers office shall be notified 48 hours minimum prior to the owner-contractor meeting.)

Provide a master index at the beginning of Manual showing items included. Use plastic tab indexes for the sections of the Manual.

Section 1, General. Provide:

Name of Architect, Mechanical Engineer, Contractor and Mechanical Sub-Contractor.

A complete list of installed equipment with project mark number, indicating name of vendor, address and phone number.

A sub-section with manufacturer's descriptive literature for each item of installed equipment with model, capacities, and all other pertinent information highlighted.

Section 2, Operating instructions. Provide:

General description of each separate system and sub-system.

Step by step procedure to follow in putting each piece of mechanical equipment into operation. Start-up sheets must be signed by the owner of the installing contractor certifying that the start-up has been completed per manufacturer's

written instruction.

Schematic as-built control diagrams for each separate system. Diagrams shall bear the date of the acceptance of the project. Include all temperature control panels and their respective functions.

Section 3, Maintenance Instructions. Provide:

Summary list of mechanical equipment used indicating name, model, serial number, and nameplate date of each item together with number and name associated with each system item.

Manufacturer's maintenance instructions for each piece of mechanical equipment installed in project. Instructions shall include name of vendor, installation instructions, parts numbers and lists, operation instructions of equipment and maintenance and lubrication instructions.

Section 4, Warranties. Provide:

A copy of each manufacturer's warranty statement, completely filled out and indicating date forwarded to the respective manufacturer.

1.24 PAYMENT PROCEDURES

- A. The payment quantity of the water supply system shown in the Bid Item List will be paid for at the contract price as a lump sum for Item No. 12 - Water Supply System.

PART 2 - PRODUCTS

2.1 PIPING

A. General

- 1. All material shall be in conformance with current specifications of American Society of Testing Materials (ASTM) and CPC 301.2.

B. Domestic Cold Water

- 1. Inside Building, Above Grade or Slab
 - a. Type "L" hard drawn copper tubing with wrought copper solder joint fittings, NIBCO, ANACONDA, or acceptable equivalent. Joints shall be made with 95.5 solder, such as Silavoy Streamline 122, Silvabrite 100 or acceptable "lead free" equivalent. Pipe to be reamed to full bore, de-burred, and joint area cleaned with a Trisodiumphosphate solution prior to joining.
 - b. Where allowed under local and state building codes: Pro-Press pipe joining system for copper piping.

2. Outside Building, Below Grade, Slab, and Paved Areas.

- a. Schedule 40 galvanized steel with galvanized malleable iron banded 150 lb. fittings. Pipe shall be protected as specified elsewhere in this section.
- b. Polyvinylchloride (PVC) pressure rated Schedule 40, ASTM D 2241, with rubber rings, ASTM D 1869. Piping shall be equivalent to Johns-Manville "Ring-Tite" and shall be installed in strict compliance with Manufacturer's Installation Guide. Where sizes shown are smaller than those available with "Ring-Tite" pipe, use schedule 80 PVC glued pipe and fittings. Piping option only where local codes allow its use.
- c. Type "K" hard drawn. All else per copper specification above.

C. Domestic Hot Water

1. Inside Building, Above grade or slab

- a. Same as Cold Water Piping - Inside Building.

D. Soil Waste and Vent Piping

1. Inside Building and Within 5 Feet of Building Wall

- a. Coated standard weight cast iron pipe and fittings, CISPI Standard 301 and ASTM A-888. Joints shall be ABI "No-Hub" stainless steel band, mechanically assembled (no welds), conforming to ASTM C564.
- b. Vent piping and waste piping above floor 2-1/2" diameter maximum may be standard weight galvanized steel pipe.

2. Outside Building

- a. Johns-Manville ring-tite, or equivalent, polyvinylchloride (PVC) gravity pipe, where permitted by local codes, complying with ASTM 03034-SDR 35 with joints using flexible elastomeric seals meeting requirements of ASTM D-3212.

E. Condensate Drains

- 1. Type "L" hard drawn copper tubing with wrought copper solder joint fittings. All changes in direction of condensate drain shall be accomplished with plugged tees. Drains shall be extended as indicated on drawings or to nearest acceptable fixture or vent if not indicated.

F. Exposed Pipe at Fixtures

- 1. Chrome plated red brass pipe, iron pipe size, with threaded cast bronze chromium plated couplings and fittings. Any pipe required to extend from finish wall into exposed view within toilet rooms shall be chrome plated.

G. Piping Protective Wrap

- 1. All galvanized or black steel piping buried below grade shall be factory coated

with Scotchkote 101 Epoxy Resin as manufactured by 3M Company, or "X-tru-Coat" as manufactured by Pipe Line Service Corp. Field joints shall be wrapped by Scotchrap #50 or coated with Scotchkote 302 as recommended by manufacturer. In lieu of above, pipe may be machine-wrapped with Scotchrap #51. 50% lapped with joints per above.

2. Provide a continuous test of all pipe covering, including field joints, prior to backfilling. This test shall be made using a "Holiday Detector" as manufactured by Tinker and Rascor Co., or approved equal. Test at an electrical voltage of 10,000 volts D.C.. Any wrap holiday found shall be patched and retested. This test shall be done in the presence of the owner's inspector

H. Concrete Thrust Blocks

1. Shall be constructed at all valves, tees, elbows, bands, crosses, reducers and dead ends in loose-joint pipe. Blocks shall cure a minimum of 7 days before pressure is applied. Concrete shall be 2000 psi min.

2.2 INSULATION

A. General

1. All insulation shall comply with the requirements per the 2022 California Building energy Efficiency standards, Title 24. Refer to Table 120.3-A, Pipe Insulation Thickness
2. All insulation shall be provided in accordance with the "National Insulation Contractors Association" manuals. Insulation shall be applied by a contractor holding a valid California C-2 License.
3. All insulation jackets and lap seal adhesives shall be tested as a composite product in accordance with ASTM E 84, Class A and shall have a flame spread of not more than 25 and a smoke developed rating of not more than 50.
4. All domestic hot water piping, fittings and accessories shall be insulated. All circulating piping shall be insulated. Cold water piping in ventilated attic shall be insulated.

B. Interior Piping, Fittings, and Valves

1. Shall be insulated with 1" thick Fiberglass ASJ/SSL U.L. rated pipe insulation through 1" diameter pipe, 1-1/2" thick for 1-1/4" diameter pipe and above. Fittings shall be hard molded plastic flush. Do not insulate flanges or valves unless water temperature exceeds 140°F or the piping is exposed to weather.

C. Piping Exposed to Weather or View

1. All piping and fittings exposed to weather shall have, in addition to the above-described insulation, aluminum jacketing. 0.016" thickness for straight pipe. 0.024" thickness for fittings. Integral moisture barrier. Provide pre-fabricated aluminum strapping and seals by same manufacturer, "Childers" or equal. Secure in place with factory supplied straps. Install all joints to prevent water entry. All joints shall be sealed with outdoor mastic. Benjamin Foster 65-07 or equal.

2. For Miscellaneous fittings for which aluminum jackets are not available or where proximity of fittings precludes a neat-appearing installation, the Contractor may cover the insulation with stretchable glass fabric and at least two coats of outdoor mastic.
 3. Additional Finish for Exposed Piping and Equipment: All piping and equipment exposed to view but protected from the weather such as in equipment rooms shall be given an additional finish of PVC jackets.
- D. Hot Water Supply/Drain Piping and Handicap Fixtures "Handi Lav-Guard" insulating kits by Truebro, Inc.. or "Trap Wrap" as manufactured by Brocar Industries. Pre-formed insulation and materials to cover hot water, cold water, and drain piping. Must conform to ADA and California codes. Pressure sensitive expanded poly foam tape will not be accepted.

2.3 CLEANOUTS

- A. Style shall be ZURN as follows (equivalent models of Smith are acceptable):
1. For vinyl tile use #ZN-1400-6
 2. For carpeted areas use #ZN-1400-14
 3. For terrazzo areas use #ZN-1400-10
 4. For ceramic tile or finished concrete use #ZN-1420-2
 5. Grade cleanouts (Non-Traffic areas) use #ZN-1400-25
 6. Grade cleanouts (Traffic areas) use #ZN-146-15W/Z-1450-8
 7. For wall cleanouts use #ZN-1460-8
- B. Cleanout Box.
1. Precast reinforced concrete. Cast iron lid marked for service.

2.4 FIXTURES AND TRIM

- A. General
1. Provide Rough-in for and install all plumbing fixtures shown on drawings. All trim not concealed shall be brass with polished chrome plate finish unless noted otherwise. Waste shall be chrome plated 17 gauge P-trap shall have clean-out and escutcheon at tailpiece. All enameled fixtures to be acid resisting. Standard color is white unless otherwise noted.
 2. All drinking water faucet products shall be certified to NSF Standard 61 section 9 Drinking Water Components. The brass casting shall contain no more than two tenths of one percent lead by dry weight.
 3. Other brass components which contact water within the faucet shall be from brass which contains no more than three percent lead by dry weight. All faucets exempt from NSF Standard 61 Section 9 shall meet the same lead content criteria.
- B. Supplies

1. Standard compression stop, straight pattern, loose key, chromium plated with stuffing box.
2. All exposed fixture supplies to lavatories, sink-sand water closets shall be Brass-Craft "Speedway" flexible supplies with metal compression ring connection at all stops or fittings as designated by part number, and shall have a rigid metal to metal connection to fixture valves. For lavatories & sinks use STR 1715A and for tank-type water closets use STR 1712DL.

C. Air Chambers

1. Zurn Z-1700 "Shoktrol" complete with shut-off valve on branch to air chamber and screwdriver stop stainless steel access panel. Provide where noted on drawings and upstream at every quick-closing manual, solenoid or flush valve. Install per manufacturers instructions locating chamber between the last two fixtures on a 20' or shorter header, or use (2) chambers (calculated for the total fixture unit count)for headers over 20' in length with locations in the middle and between the last two fixtures on the header.

2.5 BACKFLOW PREVENTERS

A. General

1. Backflow preventers shall be provided on building domestic water service as may be required by the local utility and shall also be provided in all branch lines serving any new or existing boiler, cooling tower, evap. condenser or other device requiring chemical water treatment.

B. Reduced Pressure Type: Two spring loaded "Y" pattern check valves, differential relief valve mechanism, inlet and outlet shut-off valves, and four test clocks. Approved by AWWA. Febco, Beeco, or equivalent.

C. Double Check Type: Two spring loaded "Y" pattern check valves, inlet and outlet shut-off valves, and four test clocks. Approved by AWWA. Febco, Beeco, or equivalent.

D. Pressure Type Vacuum Breaker: Spring loaded check valve assembly, air inlet port and poppet, inlet and outlet shut-off valves, and two test cocks. Febco, Beeco or equivalent.

E. Domestic Water Heater Expansion Tank: Provide expansion tank on cold water supply to any water heater if backflow prevention is required at site water connection. "Amtrol" ST series sized per manufacturer's recommendations.

2.6 STRAINERS

A. Threaded strainers are to be of the gasketed capped cover extra heavy iron body type - Similar to Mueller Fig. #11. Provide gate valve and pipe nipple with 3/4" hose connection on each strainer for blow-off.

2.7 FLOOR, CEILING, AND WALL PLATES

- A. Beaton and Cadwell No. 10, steel flange with locking device and polished chromium plated finish. Provide plates on any finished surface through which pipe passes.

2.8 INSULATING FITTING

- A. Epco dielectric unions with Epconite insulating gasket selected for applicable duty. Provide wherever pipes of different metals are joined.

2.9 PIPE MARKERS

- A. One inch (1") high minimum, stenciled letters, located every 6'-0". Markers shall indicate piping service such as domestic cold water supply, etc., and shall have directional flow arrow at each location of stenciled letters. Decals pasted, glued, or adhered to piping or insulation are not acceptable unless decal wraps entirely around pipe or insulation such as Seton "Set mark", or equivalent. Decals shall be applied after painting of all piping systems is complete and after preliminary acceptance of piping system. Decals shall comply with ANSI and OSHA specifications with respect to marker size, color, and legend

2.10 TEMPERATURE AND PRESSURE RELIEF VALVE

- A. ASME rated fully automatic, reseating combination temperature and pressure relief valve sized in accordance with energy input. Sensing element immersed within upper 6" of tank. "Watts" series 40 or 140 sized per BTU input

2.11 UNION

- A. 2" and smaller - AAR malleable iron, bronze to iron ground seat. 30 psi. Size 2-1/2" and larger - Grooved pipe, synthetic gasket, malleable iron housing. Victaulic Style 77, Type "E" gasket, Grinnell.

2.12 PIPE HANGERS AND SUPPORTS

- A. Steel pipe and Cast Iron Soil Pipe
 - 1. 1/2" through 4" pipe. Provide B-line B3690 J-style hanger, with standard electro-plated finish.
 - 2. 5" and larger pipe. B-line B3100 Clevis-Style pipe hanger with standard electro-plated finish.
- B. Copper Tubing
 - 1. Provide B-line B3690F felt-lined hanger for copper tubing with standard electro-plated finish.

C. Insulated Pipe & Tubing

1. Provide B-line B3380 through B3384 360° calcium silicate shield. The hanger and shield shall be fitted to the outside of the pipe insulation.

D. Cast Iron Pressure Piping

1. Provide B-line B3102 Clevis-Type hangers sized for water works piping.

E. Hanger Rod Sizing

1. Hanger rods shall be roll threaded mild steel with electro-galvanized finish and shall meet or exceed the following table:

Piping or Tubing Size	Hanger Rod Size
½" through 2"	3/8"
2-1/2" through 5"	½"
6" through 10"	5/8"

F. Hanger Spacing

1. Provide at least one hanger per branch and independently support all line-mounted equipment. Provide a hanger within 12" of elbow at riser or drop. Spacing of hangers along the run of the pipe shall not exceed the following table:

Pipe or Tubing Size	Steel Pipe	Copper Tube	CI Pipe
½" through ¾"	7'-0"	5'-0"	5'-0"
1" through 1-1/4"	7'-0"	6'-0"	5'-0"
1-1/2" through larger	10'-0"	10'-0"	5'-0"

G. Structure Attachments

1. General
 - a. Shall be engineered to support the intended design load and shall be sized for the hanger rod specified.
 - b. For poured-in-place construction, install B-line B2500 Spot insert. After removing the concrete forms, install hanger rod in insert hanger rod in insert using channel nuts.
 - c. For steel and concrete decking, install B-line B3019 insert through steel form prior to the pour. The anchor plate shall be fastened to the steel deck with machine screw.
 - d. For attaching to steel channels, use B-line beam clamp threaded anchor hook.

H. Trapeze Hangers

1. Trapeze hangers shall be fabricated from galvanized channel. Stress on the installed channel shall not exceed 25,000 psi. Deflection on the installed channel shall not be greater than 1/240th of the span length. For load calculations, all piping to be assumed to be water-filled unless handling a heavier liquid. Hanger rods for trapeze hangers shall be limited to 9,000 psi stress based on the area at the root of the threads. Minimum hanger rod size shall be 3/8"

I. Riser Clamps

1. B-Line B3373 plain finish for interiors, galvanized for exterior. Provide on vertical piping at each floor.

2.13 SLEEVES

- A. Non-Rated Assemblies: Sleeves for pipe passing through concrete floors or walls shall be Schedule 40 galvanized steel pipe of size sufficient to permit the pipes to pass through with a minimum clearance of 1/2" between sleeve and pipe. Sleeves shall have square ends cut flush with surface and shall be caulked tight whether pipe is bare or insulated. Sleeves through floors shall extend 1" above finished floor surface.
- B. Rated Assemblies
1. Bare Pipe. Same as for non-rated assemblies except that sleeves shall provide a clearance of 1" between sleeve and pipe. Clearance shall be packed for its entire length with a UL system 161 three hour classification such as a 3M FireDam 160 caulk at ends and mineral wool batt material stuffer in middle of penetration.
 2. Insulated Pipe. Insulation for pipe in sleeve shall consist of a 360 degree water-proofed calcium silicate insert sized to extend a minimum of 1" beyond each end of sleeve. Calcium silicate insert shall be of the same thickness of adjoining insulation. Clearance shall be packed for its entire length with a UL system 161 three hour classification such as a 3M FireDam 160 caulk at ends and mineral wool batt stuffer in middle of penetration.

2.14 FLASHINGS

- A. Vent flashing shall be 4 lb. seamless lead, 16" sq. flange, length sufficient to be turned down 2" into vent. Oatey. Provide 24"x24" 4 lb. lead flashing at each roof drain. Flashing for other piping through roof shall be prefabricated galvanized steel roof-jacks with 16" sq. flange. Provide storm collar and seal water tight with mastic

2.15 YARD BOXES AND COVERS

- A. One piece precast concrete with cast iron cover labeled "Sewer", "Gas", "Water", etc., as required. Provide traffic weight cover in traffic areas. Provide 6" minimum length "Thinwall" series 2000 6" diameter pipe extension to valves installed deeper than boxes. Install in workman like manner. Multiple boxes located on same centerline

parallel to building exterior wall. Provide 6" concrete apron in non-paved areas.

PART 3 - EXECUTION

3.1 EQUIPMENT CONNECTIONS

- A. Water and drain connections shall be provided for each piece of equipment as required. Provide shut- off valve or fixture stop for each water supply to each piece of equipment whether or not equipment is furnished in this Specification Section.
- B. Provide a backflow preventer at each connection to equipment as required by code whether or not equipment is provided in this specification section.
- C. Provide a regulating valve at drinking fountain supplies. Valve, supply piping, and electrical connector shall be installed so as not to be visible.
- D. Ratings
 - 1. Electrical. Equipment shall be in accordance with NEMA standards and U.L. listed where applicable standards have been established.
- E. Piping
 - 1. Each item or assembly of items shall be furnished completely piped for connection to services. Control valves and devices shall be furnished, installed, and wired except where noted by others on drawings

3.2 WATER HEATERS

- A. See plumbing fixture schedule on drawings.

3.3 CIRCULATING PUMP

- A. See plumbing fixture schedule on drawings.

3.4 FIXTURES

- A. Piping beyond finished wall at each fixture shall be chrome plated.
- B. All piping supporting flush valves, hose bibbs, etc., shall be securely fastened to the building structure at each device to prevent movement of piping. All supplies to individual and/or adjacent fixtures shall be at same height and on center line of waste insofar as possible. Fixture height shall be as indicated on architectural drawings
- C. Wall hung fixtures shall have space between fixture and wall surface caulked with white silicone caulk.

- D. Rough-in and connection for trim and other fixtures supplied by others shall be included in this specification section.
- E. Where aerators are scheduled for the various fixtures, provide Chicago "Lam-A-Flo" Laminar flow controls.
- F. Floor Drains or Floor Sinks shall be placed parallel to room surfaces, set level, flush with floor and adjusted to proper height to drain. Cover openings during construction to keep all foreign matter out of drain line.

3.5 PIPING

- A. Constantly coordinate work with that of other trades so as to prevent any interference with this installation.
- B. Install cleanouts at ends of sewer lines, at changes of direction greater than 45 degrees, and at not greater than 100 foot intervals. Locate interior cleanouts in accessible locations and bring flush to finished surface.
- C. Vents shall terminate not less than 6" above the roof nor less than 12" from any vertical surface nor within 10' of any outside air intake. Install horizontal vent lines at 1/4" per foot pitch. Offset vents 2' minimum from gutters, parapets, ridges and roof flashing.
- D. Condensate Drain Piping shall be installed with constant pitch of 1/8" per foot minimum. Provide tee with clean-out plug at all changes of direction. Provide a trap at each air handling unit to prevent air leakage. Connections to equipment mounted on vibration isolators shall be made with flexible connections.

E. FREEZE PROTECTION

- 1. All piping two inch and smaller located outside building and above ground and where exposed to freezing conditions shall be neatly wrapped with refrigerant insulated tape for freeze protection.

F. STERILIZATION OF PIPING

- 1. Disinfect all domestic hot and cold water piping systems in accordance with 2022 CPC 609.10, "Disinfecting of Potable Water System". Disinfecting process shall be performed by contractor and witnessed by a representative of the Engineer. During procedure signs shall be posted at each water outlet stating, "Chlorinating - Do not drink". After disinfecting, water samples shall be collected and sent to an independent lab for bacteriological analysis. Certificate of Bacteriological Purity shall be obtained from lab and delivered to the Owner through the Engineer.

G. TESTS AND ADJUSTMENTS

- 1. Sanitary Sewer. All ends of the sanitary sewer system shall be capped and lines filled with water to the top of the highest vent, 10' above grade minimum. This test shall be made before any fixtures are installed. Test shall be maintained until all joints have been inspected, but no less than 2 hours. Grade tests will be

- allowed on "ring-tite" PVC pipe.
2. Condensate Drain. Similar to Sanitary Sewer.
 3. Domestic Hot and Cold Water Piping: Maintain 100 psig water pressure for 4 hours.
 4. Gas: Maintain 60 psi for 1 hour.

END OF SECTION 220000

SECTION 230000 – HEATING, VENTILATING, & AIR CONDITIONING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. General Provisions of the contract including General and Supplementary Conditions apply to the work specified in this Section.
2. Work Included. Provide all labor, materials and services necessary for complete, lawful and operating systems as shown or noted on the drawings or as specified here. The work includes, but is not necessarily limited to, the following:
 - a. Air distribution systems.
 - b. All equipment as shown or noted on the drawings or as specified.
 - c. System energy balance.
 - d. Demolition as indicated on drawings.
 - e. HVAC controls. Basis of design is Pelican wi-fi thermostats with gateway.
 - f. Acceptance testing as required under California Building Energy Efficiency Standards, Title 24.

1.2 DEFINITIONS

- A. Provide: Furnish and install.
- B. Piping: All pipe, fittings, nipples, valves, unions, hangers, and thermal insulation, etc., as may be required for a complete and functional system.
- C. Ductwork: All ducts, fittings, joints, dampers, hangers, and thermal insulation, etc., and other devices as may be required to make a complete and functional system.
- D. Wiring: All necessary products which are required for a complete installation and shall include products such as conduit, electrical boxes, connections, transformers, relays and switches.

1.3 COORDINATION OF WORK

- A. Before starting any work, thoroughly examine all existing and newly completed underlying and adjoining work and conditions upon which the installation of this work is in any way dependent for the workmanship required by the Contract Documents. Report to the Architect and Engineer in writing any and all conditions which might adversely affect this work and limit ability to perform the required workmanship.
- B. Layout of materials, equipment and systems is generally diagrammatic unless specifically dimensioned. The actual locations of all materials, piping, ductwork,

fixtures, equipment, supports, etc., shall be carefully planned, prior to installation of any work, to avoid all interference's with each other, or with structural, electrical or architectural elements. Verify the proper voltage and phase of all equipment with the electrical plans. All conflicts shall be called to the attention of the Engineer prior to the installation of any work or the ordering of any equipment.

- C. Because of the small scale of the drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. Carefully investigate the mechanical, electrical, structural, architectural drawings and field conditions that could affect the work to be performed and arrange such work accordingly. Provide the required piping and ductwork offsets, fittings, and accessories to meet such conditions.
- D. Spaces provided in the design of the building shall be utilized and the work shall be kept within walls or furring lines established on the drawings. Any discrepancy between Architectural or Mechanical drawings with respect to wall or furring locations and dimensions shall be brought to the Architect's attention for resolution before proceeding with installation.
- E. Any work which is done as an addition, expansion, or remodel of an existing system shall be compatible with that system

1.4 MANUFACTURER'S RECOMMENDATIONS

- A. All material, equipment, and devices, etc., shall be installed in a manner meeting approval of the manufacturer of the particular item. The Contractor shall make himself available of all installation manuals, brochures, and procedures that the manufacturer issues for the equipment and material. Contractor shall be held responsible for all installations contrary to the manufacturer's recommendations. Contractor shall make all necessary changes and revisions to achieve such compliance.

1.5 GUARANTEE

- A. Guarantee shall be in accordance with the General Conditions. These Specifications may extend the period of the guarantee for certain items. Where such extensions are called for, or where items are normally provided with guarantee periods in excess of that called for in the General Conditions, the certificate of guarantee shall be furnished to the Owner.

1.6 QUIETNESS

- A. Piping of all types, ductwork, and equipment shall be arranged and supported so that the vibration is at a minimum and is not transmitted to the building structure.

1.7 DAMAGE BY LEAKS

- A. The Contractor shall be responsible for damages caused by leaks in the temporary or permanent piping or mechanical systems prior to completion of work and during the

period of the guarantee.

1.8 OPENINGS, CUTTING, AND PATCHING

- A. The locations and dimensions for openings through walls, floors, ceilings, foundations, footings, etc. required to accomplish the work under this Specification Division shall be provided under this Division. Except as noted below, the actual openings and the required cutting and patching shall be provided by other Divisions. Coring through existing concrete or masonry walls, floors or asphaltic concrete required to accomplish the work under this Specification Division shall be provided under this Division. Restoration of all surfaces shall be provided by other Divisions. Cutting or coring shall not impair the strength of the structure. Any damage resulting from this work shall be repaired at the Contractor's expense to the satisfaction of the Architect and Engineer.

1.9 DEMOLITION

- A. Existing equipment, ducts, piping, valves, fittings, devices, etc., requiring removal shall be removed and delivered to the Owner at a location on the job site to be determined by the Owner. Those items determined by the Owner to be of no value shall become the property of the Contractor and shall be removed from the job site by the Contractor at the Contractor's expense.
- B. Existing piping, ducts, and services, etc., requiring capping or plugging shall be capped or plugged below floors, behind walls, above ceilings or above roof unless otherwise noted.

1.10 EXCAVATION AND BACKFILLING

- A. Excavation and backfilling for work to be done under this Specification Section shall be done under this Section. All underground lines outside buildings shall be 2'-0" minimum backfill cover unless a greater depth of cover is recommended by the pipe manufacturer for the particular application. Width at top of pipe shall be 16" plus the outside width of pipe. Provide all shoring where required by site conditions.
- B. Backfill
 - 1. 6" Below, Around, and to 12" Above Pipe. Material shall be sand. Place Carefully around and on top of pipe, taking care not to disturb piping, consolidate with vibrator.
 - 2. One Foot Above Pipe to Grade. Material shall be sandy or silty loam, free of lumps, laid in 6" layers, uniformly mixed to proper moisture and compacted to required density. If backfill is determined to be suitable and required compaction is demonstrated by laboratory test, water compaction in 6" layers may be used, subject to review by Engineer.
- C. Compaction. Compact to density of 95% within building and under walkways, driveways, traffic areas, paved areas, etc. and to 90% elsewhere. Demonstrate proper compaction by testing at 8" above top of pipe. Perform test at every 100' of trench. If a

test fails, the compaction shall be re-worked in both directions back to test points that passed, before re-testing.

- D. Electrical conduit shall not be run in excavations provided for mechanical systems.
- E. Excavation and backfilling in a public right-of-way shall be done in strict accordance with the agency having jurisdiction.

1.11 HANGERS AND SUPPORTS

- A. Provide all hangers, bracing, and supports for the proper installation of equipment and materials under this Section of the Specification.
- B. Any structural element required to properly hang or support piping, ducts, or equipment, etc., provided under this Specification Section and not shown on the Architectural or Structural Drawings shall be provided under this Specification Section.
- C. All plumbing piping shall be supported and seismically to prevent contact with other building components and / or construction.

1.12 CONTINUITY OF SERVICES

- A. All existing services and systems shall be maintained except for short intervals when connections are to be made. The contractor shall be responsible for any interruptions of services and shall repair damage done to any existing service caused by the work.
- B. If utilities not indicated on the drawings are uncovered during excavation, the Contractor shall notify the architect immediately for further instructions.

1.13 ELECTRICAL CONNECTIONS

- A. Provide under Section 260000 "Electrical" all required control conduit, wiring, controls and control panels as indicated on the drawings or as may be required for system operation.
- B. No control device shall be mounted with rigid connections on vibration isolated mechanical equipment. No field furnished control device shall be mounted on any piece of equipment so that it interferes with physical access of air or water flow, or covers any portions of nameplates or access doors.
- C. Electrical Coordination
 - 1. Prior to commencing construction arrange a conference with the electrical and mechanical trades as well as equipment suppliers and verify types, sizes, locations, voltage requirements, controls and diagrams of all equipment furnished by them. In writing, inform the Architect that all phases of coordination of this equipment have been covered and if there are any unusual conditions or problems they shall be enumerated at this time.

D. FLASHING

1. Whenever any part of the Mechanical System(s) must penetrate the roof or outside wall, the openings shall be flashed and counter-flashed absolutely water tight with minimum 22 gauge galvanized sheet metal, prime coated. Flashing aprons shall extend not less than eight inches (8") from the duct, pipe, or supporting member in all directions unless detailed otherwise. All penetrations shall be flashed following the procedures of the National Roofing Contractor's Association

1.14 PAINTING

- A. Paint all black iron supports, hangers, anchors, etc., and all uninsulated black iron pipe work installed in weather exposed locations with one coat of rust resisting primer.

1.15 SYSTEM IDENTIFICATION

- A. Equipment. All equipment shall be identified with a plastic laminated engraved nameplate which bears the unit number marked as indicated on the drawings (e.g. AC-4, WH-1) Provide 1/2" high lettering - white on black background. Nameplates shall be permanently secured to the unit. Air conditioning equipment shall be identified as to area served.

1.16 EQUIPMENT

A. General Requirements

1. Start-up. All equipment shall be started and tested in strict accordance with the manufacturer's written instructions. Provide the inspector of record factory start-up literature for each mechanical item. Demonstrate to inspector that strict compliance to the start-up procedure has been completed for each item. Start-up sheets must be completed and turned in with the O&M manuals. Start-up sheets must be signed by the owner of the installing contractor certifying that the start-up has been completed per manufacturer's written instruction.
2. Acceptance Testing. Complete acceptance testing of all systems and equipment as required under the Building Energy Efficiency Standards, 2013 Edition, Title 24. Submit all completed and signed forms to the building department or the Division of the State Architect, where applicable.
3. Capacity. Capacities shall be in accordance with schedules shown on drawings. Capacities are to be considered minimum.
4. Dimensions. Equipment must conform to space requirements and limitations as indicated on drawings and as required for operation and maintenance. Where architectural screening is indicated, equipment shall not extend above or beyond screening. Equipment is not acceptable that does not readily conform with the space conditions. Prepare and submit layout drawings for all proposed equipment (different than scheduled units) showing actual job conditions, required clearances for proper operation, maintenance, etc.
5. Ratings.

- a. Electrical. Electrical equipment shall be in accordance with NEMA Standards and UL listed where applicable standards have been established.
- 6. Piping. Each item or assembly of items shall be furnished completely piped for connection to services. Control valves and devices shall be provided. Equipment requiring domestic water for none-potable use shall be provided with backflow preventer acceptable for intended use by local governing authorities.
- 7. Electrical
 - a. General. Each item or assembly of items shall be furnished completely wired to individual terminal blocks for connection to single branch electrical circuit. All electrical accessories and controls required by equipment shall be provided. Provide terminal blocks for controls and interlocks not included in equipment package.
 - b. Wiring. Conductors, conduit, and wiring shall be in accordance with Electrical Specifications. Individual items within assembly shall be separately protected with dead front, fused disconnect, fuse block, or circuit breaker for each underground conductor. Switches, contacts and other devices shall be in undergrounded conductors.
 - c. Motors. Shall be rated, constructed and applied in accordance with NEMA and ANSI Standards without using service factor. Single-phase motor shall be of type to suit application. Three-phase motors shall be of type to suit application. Three-phase motors shall be open drip proof, NEMA B design on pumps and fans, NEMA C on reciprocating equipment, sealed ball bearing, three-phase indication. Insulation shall be double dip and bake with Class F thermal polyester non-hygroscopic epoxy base insulating materials. Design shall limit starting inrush current and running current to values shown on drawings. Motors exposed to weather shall be open drip-proof approved by manufacturer for this type of service. All motors 1 horsepower and larger shall be the high efficiency type with efficiency and power factor equal or exceeding Century E-Plus.

1.17 CLOSEOUT SUBMITTALS

A. Record Drawings

- 1. Provide in accordance with general conditions of the specifications.

B. Operation and Maintenance Manual for Mechanical Systems

- 1. Provide three (3) copies of Operation and Maintenance Manuals to the Engineer for review and acceptance. Provide the Owner's designated representative with one copy of the approved O & M manual. Bind Operation and Maintenance Manuals for each Mechanical System (Plumbing, Air Conditioning, etc.) in a hard-backed binder. Cover of each binder shall have the following lettering:

OPERATION
AND

HEATING, VENTILATING, & AIR
CONDITIONING

230000 - 6

MAINTENANCE
MANUAL
KERN SPECIAL WASTE FACILITY
SW CORNER DOWNING AVENUE & WEAR STREET
BAKERSFIELD, CALIFORNIA

Provide a transmittal letter at the beginning of the manual on the Contractor's letterhead. Letter shall be signed by a contractor principal (Owner or Corporate Officer) and shall be countersigned by the Owner's designated representative and shall indicate the date when the mechanical systems were shown and explained in detail to the Owner's designated representative. (The Engineers office shall be notified 48 hours minimum prior to the owner-contractor meeting.)

Provide a master index at the beginning of Manual showing items included. Use plastic tab indexes for the sections of the Manual.

Section 1, General. Provide:

Name of Architect, Mechanical Engineer, Contractor and Mechanical Sub-Contractor.

A complete list of installed equipment with project mark number, indicating name of vendor, address and phone number.

A sub-section with manufacturer's descriptive literature for each item of installed equipment with model, capacities, and all other pertinent information highlighted.

Section 2, Operating instructions. Provide:

General description of each separate system and sub-system.

Step by step procedure to follow in putting each piece of mechanical equipment into operation. Start-up sheets must be signed by the owner of the installing contractor certifying that the start-up has been completed per manufacturer's written instruction.

Schematic as-built control diagrams for each separate system. Diagrams shall bear the date of the acceptance of the project. Include all temperature control panels and their respective functions.

Section 3, Maintenance Instructions. Provide:

Summary list of mechanical equipment used indicating name, model, serial number, and nameplate date of each item together with number and name associated with each system item.

Manufacturer's maintenance instructions for each piece of mechanical equipment installed in project. Instructions shall include name of vendor, installation instructions, parts numbers and lists, operation instructions of equipment and maintenance and lubrication instructions.

Section 4, Warranties. Provide:

A copy of each manufacturer's warranty statement, completely filled out and indicating date forwarded to the respective manufacturer.

PART 2 - PRODUCTS

2.1 DUCTWORK

A. General

1. Construct ductwork to meet all functional criteria defined in section VII, of the SMACNA "HVAC Duct Construction Standards Metal and Flexible". This shall subsequently be referred to as the SMACNA manual.
2. Interior ducts shall be constructed with G-60 or better galvanized steel (ASTM 527) LFQ, chem treat. Exterior ductwork or any duct exposed to high humidity conditions (i.e. dishwasher exhaust) shall be G-90 or better.
3. Support, access doors not part of ducts, bar or angle reinforcing damper rods and items made of uncoated mild steel shall be painted with two coats of two coats primer or provide galvanized equivalent.

B. Rectangular Ducts

1. Construct ductwork and supports to meet all functional criteria defined in section VII, of the SMACNA "HVAC Duct Construction Standards Metal and Flexible" 2005 Edition. Hanger spacing shall not exceed 8'.

C. Ells. Rectangular ells of ninety degrees shall be mitered and fitted with AERO/DYNE, "HEP" or equivalent, adjustable turning vane of airfoil contour design. Side rails shall be installed so that vane at heel of elbow shall fit snugly without air passing on the back side. Spacing of vanes according to manufacturers recommendations.

D. Round Ducts

1. Galvanized.
 - a. Spiral lockseam with standing rib duct. For round ducts, 8" diameter or less, provide Noll or Young and company snap-lock galvanized steel.
 - b. Round elbows shall be pleated or welded gore (5 piece ells). Non-welded gore elbows for use with snap lock ducts shall be taped at gore intersections. Condensate Drains

E. Duct Joints

1. Rectangular. All ducts shall utilize "Ductmate 25/35" factory fabricated duct joint connectors with #440 gasket tape. Flanged interior gaskets shall be Ductmate #440 or Butyl Rubber Gasket which meets Mil-C 18969B, Type II Class B, and TTS-S-001657 must also pass UL-723. The material must not contain any

vehicle that will support fungal or bacterial growth. Formed on flanges shall not be accepted for any duct exceeding 42" in width or any duct subjected to greater than 2" W.G..

2. Round. All round ducts shall utilize male-female slip joints with minimum three (3) sheet metal screws. 0-20" ducts shall utilize sealing compound applied continuously around joint before assembling and after fastening. Wrap joints with 3" wide duct tape. 21" – 72" ducts, use 3-piece, gasketed, flanged joints consisting of two internal flanges (with integral mastic sealant), and one external closure band. Ductmate Spiralmate or equal.

F. Sealing

1. Interior to Building - Hardcast fiber tape and liquid adhesive. DT-5300 or DT-540 tape. FTA-20 adhesive. Ductmate PROseal.
2. Exterior to Building - For joints exposed to weather, sealant shall be G.E. silicone. For joints not exposed to weather, sealant shall be Eco-Duct Seal 44-60, or United Sheet Metal.
3. Exposed Ducts. All joints shall use Hardcast Galva-Grip or equivalent. Joint shall be finished clean from outward appearance.

G. Flexible Insulated Ducts

1. Shall be J.P. Lamborn Company Type AMF or Thermoflex M-KE acoustical low pressure duct. Duct shall be listed and labeled UL-181 Air Duct; meet NFPA-HUD minimum standards and comply with UMC 6. Duct factory R-value 4.2 minimum. In un-conditioned spaces, R-8 minimum.
2. Hangers shall consist of minimum 3" wide 28 gauge galvanized steel and shall be spaced a maximum of 36" on center. Flexible duct shall be installed in compliance with the manufacturer's latest installation instructions. No kinks or sharp bends allowed. Turning radius shall be a minimum of 1.5 times diameter of duct. A copy of which shall be at the site during and after installation. Provide a minimum of at least one hanger per duct section.
3. Connections to round ducts or collars shall be made with galvanized or stainless steel worm clamps or "Panduit" adjustable clamps listed by UL-181.
4. Unless indicated otherwise on the drawings, flexible duct shall be limited to the final 5 foot portion of the duct system connecting to the supply diffuser or return grille. Flex duct shall be limited to factory cut pieces with factory applied end connections.

H. Fire Dampers

1. Fire damper assembly shall bear the U.L. 555 Label and the California State Fire Marshall listing number. Provide duct access door to fire damper as required by job conditions in compliance with Title 24, California Mechanical Code. Fire dampers shall be installed in all rated walls and ceilings penetrated by ducts, grilles and diffusers. Fire damper shall have rating equivalent to construction. Dampers shall be installed in strict compliance with manufacturer's installation instructions.

I. Fire/Smoke Dampers

1. Damper Assembly shall bear the U.L. 555S Label and State Fire Marshall listing number. Provide access door to smoke damper as required by job conditions in compliance with Title 24, California Mechanical Code. Means of disconnect shall be provided between detector and damper(s), where detector is included as factory mounted and wired. Dampers shall meet most current standard for UL testing. UL555 and UL555S. Dampers shall be suitable for a dynamic system. See details on plans for leakage and velocity requirements. If not listed on plans, provide leakage class I and velocity level at 3,000 FPM.

J. Volume Dampers

1. Branch Duct Volume Damper - Volume control damper (VCD) in square or rectangular ducts shall be as follows: Opposed blade, 6" maximum blade width, 16- gauge blade, 48" maximum length, nylon or oil impregnated bronze bearings, 1/2" diameter pin shaft, 16-gauge channel frame, actuating rod out of air stream. VCD in round duct shall be as follows: Damper blade full height of branch and 1" less than branch width. All branch dampers shall have regulator with spring loaded shaft nut and serrated self-locking die cast core. Ventlok 640. Provide remote ceiling operator with chrome plated or painted cover where shown on drawings or where damper control is otherwise inaccessible.

K. Back-Draft Dampers

1. Unless otherwise noted on drawings: .025 aluminum counter-balanced blades with felt strip on mating edges, and machined brass mounted in six gauge steel channel frame, Pacific Model PRO 1100AI or equal. Normally closed back-draft dampers are required at all roof exhaust fans and all outside air intakes.

L. Bellows Duct Connections

1. U.L. Listed neoprene coated 30 ounce fiberglass cloth. 3" metal, 3-1/4" fabric, 3" metal. Ventglass, Dura-Dyne. Ductmate PROflex. Connectors with single fold seams will not be accepted.

M. Duct Fire Caulking

1. All ductwork passing through rated assemblies that do not have a fire or fire/smoke damper shall be installed with a U.L. listed fire caulking assembly. Exact details of U.L. listed assembly shall be followed. Provide inspector of record and project engineer submittal showing U.L. listed fire caulking detail that the contractor intends to use for each condition. In lieu of fire caulking, at contractors option, provide fire damper installed in accordance with U.L. listing

N. Filters

1. Pre-Filters
 - a. Minimum of MERV 13 filter, consisting of a nominal 2" thick, pleated type, panel filter, CSFM listed. Initial resistance at 500 feet per minute face velocity shall not exceed 0.30" w.g. Provide one complete change of all filters after air balance is completed and prior to final acceptance

2.2 PIPING

A. Refrigerant Piping

1. General. Copper Type "L", hard drawn, ASTM B88 with wrought copper fittings, silver alloy brazed 1100°F., joints, Sil-Fos or equal. Size 3/8" O.D. and smaller to be refrigerant tube ASTM B 280. All elbows to have long radius.

2.3 INSULATION

- A. All insulation shall be in strict compliance with California Building Energy Efficiency Standards, 2022 Edition, Title 24.
- B. Refer to table 120.3-A for pipe insulation thickness required. This shall be a minimum. If construction documents call for a higher rating, the higher rating shall apply.
- C. Insulation shall have a flame spread of not more than 25 and a smoke developed rating of not more than 50.
- D. Ducts.
 1. General. All supply, return, exhaust ducts and plenums shall be insulated externally and/or lined internally as specified herein or as indicated on the drawings. Ducts in directly or indirectly conditioned spaces shall be insulated to a minimum level of R4.2 Ductwork in unconditioned spaces such as an attic where the roof insulation is at the ceiling level or where located outdoors shall have an insulation level of R8 minimum.
 2. Ducts in Attics. All supply and return ducts shall be insulated externally with 2" thick fiberglass 3/4# density. Where rectangular ducts are lined internally, they shall be wrapped on the exterior with 1" thick fiberglass, 3/4" minimum density.
 3. Exposed Ducts Within Conditioned Spaces. Shall not require external insulation unless noted on the drawings.
 4. Ducts Exposed to Weather. All supply and return ducts shall be lined internally with 2" thick Manville "Permacote Linacoustic" glass fiber and thermosetting resin duct liner, R-8. Provide with antimicrobial edge coating, Johns Manville Superseal Edge Treatment or Superseal HV. Coating edges with adhesive is not acceptable. All field cut edges must be coated prior to delivering duct to job site. Any lined duct left untreated that has been subjected to dirt and / or dust will be rejected, and will not be accepted for installation. Edges must be treated so that complete coverage is obtained, with no raw edges. Apply as directed by manufacturer's literature.
 5. Interior Duct Surfaces. All supply, return, or exhaust duct connections to air conditioning units or fans shall be internally lined for a minimum distance of ten lineal feet upstream and downstream of fan unless otherwise indicated on the drawings. Interior duct liner where applied for attenuation purposes only shall be 1" thick Manville "Permacote Linacoustic" glass fiber and thermosetting resin duct liner, R-4.2. Provide with antimicrobial edge coating. See paragraph above.
 6. Duct Wrap. Shall be tightly wrapped around ducts to prevent sagging with longitudinal and transverse lap of at least 6". Laps shall be wired or stapled to eliminate gaps. Insulation shall be secured by wrapping with 18 gauge

galvanized wire 12 o.c. adhesive. Insulation shall be applied with density identification exposed.

7. Duct Liner Shall be adhered to clean metal with minimum 100% coverage of adhesive such as 3M Adhesive #38, additionally secured with approved mechanical clips or welded pins per SMACNA standards. Provide with antimicrobial edge coating. Apply per paragraph 2 d) above. Coating edges with adhesive is not acceptable.

E. Piping

1. Exterior Piping Use Arma-Cell closed cell insulation with thickness complying with Title 24 section 120.3. Weatherproof piping insulation with .016 Childers aluminum jacket, or equivalent. Coverings shall be banded at 12" o.c. with 1/2" thick x 0.2 aluminum bands and seals.

- F. Refrigerant. Cover piping with foamed plastic insulation. Longitudinal and end seams shall be thoroughly cemented with adhesive in accordance with manufacturer's recommendations.

PART 3 - EXECUTION

3.1 DUCTWORK

- A. Installation shall conform with NFPA 90A and SMACNA Low Pressure Duct Construction Standards 2005 Edition. Provide mounting and supporting of Ductwork and accessories including, but not limited to, structural supports, hangers, vibration isolators, stands, clamps and brackets, access doors, and dampers. Install ductwork accessories as indicated in accordance with the manufacturer's printed instruction. Allow clearance for inspection, repair, replacement, and service. Ductwork and accessories shall be installed in a manner to prevent vibration and rattling.
- B. Deflectors. Provide in rectangular elbows, duct mounted supply outlets, take-off or extension collars to supply outlets, and tap-in branch take-off connections. 45 degree take-off is an acceptable alternative for low velocity systems (below 1,500 FPM).
- C. Grilles. Each air inlet and outlet shall be flush with finished surface of wall or ceiling and shall be securely attached thereto. Provide plaster grounds at locations of all wall and hard surfaced ceiling grilles.
- D. Branch Take-Offs. All branch ducts from main supply air and to return air trunk duct shall be provided with splitter blade full height of branch take-off and 1" less than branch width. Regulators to be Young or equal. Dampers located in inaccessible areas shall have extended shafts with concealed regulator in adjacent ceiling or wall.
- E. Dampers. Install volume control damper and damper regulator on all branch ducts.
- F. Flexible Glass Fiber Duct. The use of flexible duct is limited to the last 5 feet of each branch duct (i.e. one 5 foot section of flexible duct may be used to connect the grille to the sheet metal branch duct). No joints permitted in 5' length. Joints shall be installed with

metal bands and fiber tape and adhesive. Minimum turn radius shall be in accordance with SMACNA Standards (turn radius of duct centerline not less than 1.5 times the duct diameter).

3.2 PIPING

A. General. Piping Layout:

1. Piping shall be concealed in walls, above the ceilings, or below grade unless otherwise noted. Exposed piping shall run parallel to room surfaces; location to be approved by Engineer. (No structural member shall be weakened by cutting, notching, boring or otherwise, unless specifically allowed by structural drawings and/or specifications. Where such cutting is required, reinforcement shall be provided as specified or detailed.) All piping shall be installed in a manner to ensure unrestricted flow, eliminate air pockets, prevent any unusual noise, and permit complete drainage of the system. All piping shall be installed to permit expansion and contraction without strain on piping or equipment. Vertical lines shall be installed to allow for building settlement without damage to piping. Pipe sizes indicated on the drawings are nominal sizes unless otherwise noted.

B. Hangers. Support at intervals with hangers as specified elsewhere within these Specifications or as indicated on the Drawings. No piping shall be in contact with any part of the building structure including sub-assemblies.

C. Obstructions. Piping shall be installed to clear beams, etc., unless sleeving is particularly indicated. Constantly coordinate work with that of other trades so as to prevent any interference with this installation.

D. Pipe Joints. Pipe Joints shall be smooth inside and cut pipe ends shall be thoroughly reamed to remove all burr. Each length of pipe and each fitting shall be carefully examined and all burrs removed before fabrication.

E. Fittings

1. All joints and changes in direction shall be made with long radius fittings.

F. Refrigerant Piping

1. Pipe shall be cut square. Joint surfaces shall be thoroughly cleaned, fitted and erected before brazing. After installation, evacuate to 29 inches of mercury, ambient temperature during evacuation, fill with dry nitrogen to 250 psi and maintain for two-hour period without additional charge. After nitrogen test, purge with refrigerant charged through dryer and maintain holding charge in system and equipment.

3.3 INSULATION

A. See materials section of this specification for installation requirements.

3.4 EQUIPMENT INSTALLATION

- A. It shall be the responsibility of the equipment installer to ensure that no work done under other specification sections shall in any way block or otherwise hinder the equipment. All equipment shall be securely anchored in place.

3.5 SYSTEM AIR BALANCE

A. General

1. The contractor shall employ the services of an independent system balancing company registered by AABC, NBC, or NEBB. The balancing contractors shall be limited to one of the following:
 - a. Air Control Services 515 E. 19th St., Bakersfield, CA 93305 (661) 327-8755
 - b. Air Control Balancing 1959 N. Gateway #103, Fresno, Ca. 93727 (559) 454-8000
 - c. American Air Balance 4721 E. Hunter, Anaheim, Ca. 92807 (714) 693-3700
 - d. Los Angeles Air Balance Co. 1848 W. 11 St., Upland, Ca. 91786 (909) 931-1114
 - e. RS Analysis 111 Natoma Street, Folsom, Ca. 95630 (916) 351-9842
 - f. National Air Balance 4171 Business Center Drive, Fremont, Ca. 94538 (510) 623-7000
2. Submit within thirty (30) days after receipt of contract, submittal data forms of the selected balance company for the testing and balancing of the air conditioning, heating, and ventilation systems.
3. After development of the balancing procedure to be followed for each respective system, a representative of the system balancing company shall periodically visit the jobsite, particularly before any insulation is applied to ducts or piping, and confirm the suitability of the ducts, piping, accessories, hardware, and access panels installed for balancing. Any noted deficiencies shall be reported to the Contractor in writing with a copy to the Engineer. Noted deficiencies shall be corrected at this time by the Contractor.
4. Final system testing and balance shall not begin until the system has been completed and is in full working order. The Contractor shall put all heating, ventilating, and air conditioning systems and equipment into full operation and shall continue the operation each working day during the balancing procedure. The balancing company shall be responsible for all adjustments to the heating, cooling and ventilating equipment necessary for the system to operate as specified. Upon completion conduct a running test under substantial load conditions demonstrating to the satisfaction of the Owner's representative that all equipment and controls are operating as intended and have been properly adjusted for these conditions.
5. The system balance company shall include an extended warranty of one hundred eighty (180) days after completion and acceptance of test and balance work, during which time the Engineer at his discretion may request a recheck, or resetting of any outlet, fan, etc., as listed in report. The system balance company

shall provide technicians to assist the Engineer in any re-test required during this period. Seasonal re-balance during the first year of operation is part of the scope of this specification.

6. The flow quantities shown on the drawings are not to be considered absolute. If changes in flow quantities are required to attain comfort conditions in any area, the balancing company shall make the required changes at no extra cost.

B. Procedure

1. The testing and balancing of the systems, including all equipment, ducts, piping, and accessories shall be done in strict compliance with the latest edition of the Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems as published by National Environmental Balancing Bureau or equivalent AABC standard.

C. Acceptance of Tests

1. In the event any tests or inspections prove unsatisfactory, such shall be made a matter of record. Acceptance of the system shall be postponed until all defects or improper adjustments have been corrected and the work is again inspected and tests satisfactorily repeated.

D. Data to be Furnished

1. At completion of running tests two (2) complete sets of data listed below for all items of equipment shall be furnished for incorporation in Owner's Equipment Manual for the project:
2. Manufacturer's equipment outline drawings.
3. Manufacturer's performance curves for fans, pumps, and flow control devices and capacity tables for equipment.
4. Pertinent running test data; such as system test points, test point data, horsepower, RPM, FLA, etc., including final instrument set points and adjustments as left.

3.6 TEMPERATURE CONTROLS

A. General

1. A complete system of automatic temperature control shall be provided. Complete system shall consist of the existing plus that which is necessary for proper function and operation
2. All conduit and wiring shall be installed in strict compliance with spec division 26, electrical.
3. Sequence of Operation. Refer to temperature control diagram on the drawings. With initial submittal and on record drawings include narrative of system operation describing start-up, automatic operation, and shut-down.

- B. Electrical Wiring. All electrical wiring and conduit in connection with the drawings shall be provided under Specification Division 23. Any wiring not shown on the drawings but required for proper operation of the automatic temperature control system shall be

performed under this Section.

C. Room Thermostats. Pelican Touch Series thermostats.

END OF SECTION 230000

SECTION 260000 - ELECTRICAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Underground Service - 277/480 volt, three phase, four wire.
2. Grounding of equipment, service, etc.
3. Complete lighting and power system as shown on Drawings and specified herein, including conduit, wiring, panelboards, circuit breakers, relays, switches, receptacles, and other items necessary for complete and operable systems.
4. Electrical connection of equipment furnished by others as shown on the Drawings.
5. Control wiring and installation and connections of control devices as specified herein.
6. Trenching and backfill as required for electrical Work.
7. Concrete Work as specified herein.

1.2 DEFINITIONS

- A. Concealed: Hidden from sight, as in trenches, chases, hollow construction, above furred spaces, suspended 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.
- B. Exposed: Not concealed.
- C. 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, floor or ceilings, or specifically mentioned as "unfinished".
- D. Finished Spaces: Any space ordinarily visible to the visiting public, including exterior areas.

1.3 COORDINATION OF WORK

- A. Examine existing conditions as applicable. Become acquainted with Specifications and Drawings for all portions of the Project. Notify Project Manager of apparent discrepancies and of inconsistency between the Specifications and the existing conditions. Secure and follow Project Manager's instructions. The Drawings serve as working drawings only, indicating diagrammatically the general layout of the systems and their various components and equipment.

- B. Scaled and figured dimensions are approximate and are given for estimate purposes only. Carefully check and verify dimensions and sizes in order to determine if equipment and materials will fit together and if the dimensions of the assembly are compatible with the space provided. Where equipment is furnished by others, verify that dimensions and requirements for assembly are compatible with the space provided before proceeding with the roughing-in connections. Field verifications of locations shown on Drawings are necessary since actual locations, distances, mounting heights, etc., may be affected by field conditions. The right is reserved to make reasonable changes in locations of equipment or other features shown on Drawings prior to rough-in without additional cost to the Owner.
- C. Where apparatus and equipment have been indicated on the Drawings, dimensions have been taken from typical equipment of the class indicated. Carefully check the Drawings to see that the contemplated equipment will fit into the spaces provided, regardless of whether or not it may have been approved for quality and utility as an equal.
- D. Rough in all equipment, fixtures, etc., as designated on the Drawings and as specified herein. The Drawings indicate only the approximate location of rough-ins. The exact rough-in locations must be determined from large-scale certified Drawings. The Contractor shall obtain all certified rough-in information before progressing with any Work for rough-in connections.
- E. Be responsible for providing outlets and services of proper size at the required locations.
- F. Coordinate requirements of equipment furnished by others, prior to ordering and installation.

1.4 RECOGNIZED TEST LAB

- A. All equipment specified or installed under this project shall be listed by a recognized test lab and bear that label of approval.

1.5 COMPLETION DATA

- A. Submit completion data to the Project Manager in acceptable quantity and form before requesting a final inspection. Such submittal shall be corrected, amended, or completed before final acceptance of the Work.
- B. Include Record Drawings, maintenance manuals, and data; test results; control and wiring diagrams.

1.6 CUTTING, PATCHING, AND REPAIRING

- A. Cutting, patching, and framing of wood members to accommodate this Work shall be done by the Contractor and shall be in conformance with Sections 613 and 617 (F) and (K), Title 24, California Code of Regulations. All such cutting, patching and framing

shall be approved by the Project Manager.

- B. Do minor miscellaneous cutting, drilling, and patching necessary and normally required at the time of actually installing this Work. Patching shall be of the same materials, workmanship, and finish as the original or surrounding Work to the complete satisfaction of the Project Manager. Comply with Division-1 CUTTING AND PATCHING Section.
- C. Adequately inform other trades of openings and framing requirements for this Work and provide suitable instructions for establishing locations and sizes of openings or sleeves so that these may be provided in the proper location at the proper time. Concrete shall not be cut, except where approved by the Project Manager.

1.7 SIMILARITY OF MATERIALS

- A. Unless specified otherwise, fixtures, fittings, hangers, and respective type features and equipment, of a similar type or having similar operative or functional features, shall be of the same manufacturer throughout the Project.

1.8 MANUFACTURER'S DIRECTIONS

- A. Follow manufacturers' directions and recommendations in all cases where the manufacturers' equipment or articles are used for this Work. Compliance with the manufacturer's direction is a requirement for that product's listing with a recognized test lab.

1.9 VERIFICATION OF DIMENSIONS

- A. Scaled and figured dimensions are approximate only. Before proceeding with Work, carefully check and verify dimensions, etc., on architectural Drawings, and be responsible for properly fitting equipment and materials together and to the structure in spaces provided.
- B. 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 locations, routes, building obstructions, etc., and install apparatus and equipment in available locations. Install apparatus and equipment in manner and locations to avoid obstructions, preserve headroom, and keep openings and passageways clear.

1.10 IDENTIFICATION OF EQUIPMENT

- A. All electrical equipment shall be labeled, tagged, stamped, or otherwise identified in accordance with the following schedule:
 - 1. Branch Circuit Panelboards:

- a. Circuit directory shall be a two-column, 8-1/2 x 11" sheet attached to the inside of the door. Each odd numbered circuit shall be in sequence in the left column and the even numbered circuit in the right column (e.g., 1, 3, 5..., 2, 4, 6...). Each circuit shall be identified as to the use and room name(s) or area(s). Confirm room names and/or room numbers with the Project Manager prior to project completion. Circuit breaker identification shall be by permanently installed metal numbers or plastic numbers under acrylic plastic. "Paste-on" numbers will not be accepted. Refer to "Panelboards" section for additional requirements.
2. Distribution Panelboards: Identification shall be with 1" x 4" laminated, white on black, micarta nameplates on each major component, each with name and/or number of unit and other pertinent data as required. Emergency power distribution panels shall be identified with white on red micarta nameplates. Letters shall be no less than 3/8" high.
3. Circuit breakers shall be identified by number and name with 3/4" x 1-1/2" laminated micarta nameplates with 3/16" high letters mounted adjacent to circuit breaker or switch.
4. Miscellaneous equipment (electrical), such as individually mounted safety switches, starters, step-down transformers, pull boxes, junction boxes, etc., shall be identified by the use of such equipment with P-Touch labels as required.
5. In general, the installed nameplates, as herein called for shall also clearly indicate its use, area served, circuit identification, voltage and any other useful data.
6. All auxiliary systems, including communications, shall be labeled to indicate function.
7. Motor control and motor control centers shall be labeled with the identification given on drawing schedules.

1.11 ARC FLASH LABELING

- A. All panels, circuit breaker enclosures, switchboards and motor control centers shall be labeled with Arc Flash Warning Stickers.

1.12 CLOSING IN OF UNREVIEWED WORK

- A. Do not allow or cause any of this Work to be covered up or enclosed until it has been reviewed by the Project Manager. Should any of this Work be enclosed or covered up before such review, uncover the Work and make repairs with such materials as may be necessary to restore the Work and that of the other trades to its original and proper condition at no additional cost to the Owner.

1.13 SAFETY PRECAUTIONS

- A. It is intended that within the scope of this Work during construction and until final acceptance, strict attention be given to matters pertaining to public safety and to safety of the construction workers and complementing personnel; and to other health and building safety requirements as specified and indicated including, but not limited to:

Protection of openings in fire-rated construction; clearances from and/or protection of combustibles; proper securement for fixtures, equipment materials; method of performing the Work, operational and safety check of electrical devices, etc.; erection and maintenance of suitable barriers, protective devices, lights and warning signs and adequate provisions for storage and protection of Work, materials and equipment.

- B. It is understood that the responsibility for the proper attention to the above stipulations is included under this Work.

1.14 WIRING OF EQUIPMENT FURNISHED UNDER OTHER SECTIONS

- A. All electrical wiring including power wiring and control wiring (except as specified under Automatic Temperature Control), including raceways, wiring, outlet and junction boxes, and labor for installation of the wiring and equipment shall be included in this section of the Specifications.
- B. All control devices, and starters not in motor control centers, for equipment furnished under the Air Conditioning section (except as specified under Automatic Temperature Control paragraph), Plumbing section, Fire Sprinkler or Lawn Sprinkler section are to be furnished under that particular section and installed under this section.
- C. Wiring diagrams complete with all connection details shall be furnished under each respective section.
- D. Coordinate requirements and locations for all equipment prior to ordering and installation.
- E. Comply with requirements of Article 430 of the California Electrical Code.

1.15 EXCAVATION AND BACKFILL

- A. Do excavation, trenching, and backfilling required for this Work. Do shoring, pumping, or draining that is necessary to keep the excavations and trenches safe and free from water. Where possible and practical, avoid planted or paved areas, walkways, floors, and other finished surfaces. See CONDUITS Sections for depth of conduits. Remove all excess excavated materials from the site, unless otherwise directed by the Project Manager.
- B. Where required, do cutting and drilling of walls, pavements, walkways, etc., by means of cutting and drilling (coring) machines unless specifically approved otherwise. Excavation, trenching, and backfill methods and procedures shall be in strict accordance with industry standards and local requirements.
- C. Backfilling shall be done in one-foot layers, with each layer tamped before another layer is added. No stones or coarse lumps shall be laid directly on conduits.

1.16 CONCRETE

- A. Where used for structures to be provided under the contract such as bases, etc., concrete work and associated reinforcing shall be as specified under that Division.
- B. See other sections for additional requirements for underground vaults, cable ducts, etc.

1.17 PROTECTION OF EXISTING LINES

- A. Exercise special care to avoid damaging and to maintain in operation, all existing utility runs during the construction period. Also avoid damaging existing piping, conduits, or equipment that is to remain, whether or not specifically indicated on the Drawings. Existing utilities, piping, conduits, and equipment may or may not be shown on the Drawings. The Drawings only reflect information intended to suggest the probable extent and possible location of indicated runs and equipment. There may be other runs. There may be other locations. Neither the Owner nor the Project Manager represents that either has any precise knowledge as to either the full extent or exact location of equipment and runs that may fall within the building or Project Site.
- B. Execute excavation and demolition on the Site and in the building with extreme care (by hand or small tools wherever appropriate) and at the sole risk of the Contractor and the workers involved.
- C. Locate all known existing installations before proceeding with construction operations which may cause damage to such installations. The existing installations shall be kept in service where possible and damage to them shall be repaired at no increases in Contract Sum.
- D. If other structures or utilities are encountered, request Project Manager to provide direction on how to proceed with the Work.

1.18 MOUNTING

- A. Provide materials and accessories necessary to properly mount and secure equipment furnished and/or installed under the electrical Work. This includes but is not limited to such items as conduit, outlets, junction boxes, switches, relays, disconnect switches, lighting fixtures, cabinets, and transformers.
- B. Inserts and Anchors shall be:
 - 1. Furnished and installed for support of Work under this Division.
 - 2. Adjustable concrete hanger inserts installed in new concrete work as manufactured by Hilti or as approved.
 - 3. Installed in locations as approved by Project Manager.
 - 4. Expandable lead type anchors installed in existing concrete with minimum surface damage, as manufactured by Hilti.
 - 5. Toggle bolts, or "molly anchors", where installed in concrete block walls.
 - 6. Complete with 3/16" or heavier steel backup plate where used to support heavy items. Through-bolts or backup plate shall be concealed from view, except as

otherwise indicated.

- C. Mounting of equipment that is of such size as to be freestanding 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, Unistrut or as approved.
- D. Furnish and install sleeves for the installation of Work under all sections of this Division. Sleeves through floors, roof and walls shall be as described in conduit section.

1.19 MOUNTING HEIGHTS

- A. Receptacles shall be mounted no lower than 15" to the bottom of the device.
- B. Switches and lighting control stations shall be mounted no higher than 48" to the top of the device.
- C. Overcurrent devices and circuit breakers or disconnect switches shall be mounted no higher than 6 feet-7 inches.
- D. Refer to the Drawings for specific mounting heights.

1.20 ACCESSIBILITY

- A. Install all control devices or other specialties requiring reading, adjustment, inspection, repairs, removal or replacement conveniently and accessibly throughout the project.
- B. All required access doors or panels in walls and ceilings are to be furnished and installed as part of the Work under this Division.
- C. Provide doors which pierce a fire separation with the same fire rating as the separation.
- D. Refer to "Finish Schedule" for types of walls and ceiling in each area and architectural Drawings for rated wall construction.
- E. Coordinate Work of the various sections to locate specialties requiring accessibility with others to avoid unnecessary duplication of access doors.

1.21 FIRE-RATED PENETRATIONS

- A. All penetrations in fire-rated assemblies shall be accomplished using a UL listed method and materials.
- B. Fire-rated assembly penetrations shall be accomplished per details on the Drawings.

1.22 FLASHING

- A. Flash and counterflash all conduits penetrating roofing membrane.

1.23 TESTS

- A. Perform electrical tests as required or directed. Provide materials, labor, and equipment necessary for performances of these tests, and at completion of the Work perform a complete "in-service" operation of the entire electrical and power system to show compliance with the Drawings and Specifications. Replace Work showing faults under tests without additional cost to the Owner. Test system voltage at switchboards at completion of Work and provide a written report to the Project Manager.

1.24 EQUIPMENT LISTS AND MAINTENANCE MANUALS

- A. Prior to completion of job, Contractor shall compile a complete equipment list and maintenance manual. The equipment list shall include the following items for every piece of material and equipment supplied under this section of the Specifications.
 - 1. Name, model and manufacturer.
 - 2. Complete parts Drawings and list.
 - 3. Local supply for parts and replacement and telephone number.
 - 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.
- B. Maintenance manuals shall be furnished for each applicable section of the Specifications, shall be suitably bound with hard covers, and shall include all available manufacturers' operation and maintenance instructions, together with as-built Drawings and lists hereinbefore specified and other diagrams and instructions necessary to properly operate and maintain the equipment. The equipment lists and maintenance manuals shall be submitted in duplicate to 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 number of the General Contractor and all subcontractors involved in any of the Work specified herein. The maintenance manuals shall be finally provided in four copies.

1.25 CLEANING

- A. During construction on a daily basis, and upon completion of the Work, remove from the site all debris and excess materials, tools, and removed items, resulting from this Work. Clean equipment, including lighting fixtures, free of dust, dirt, grease, paint, etc.

1.26 SALVAGE

- A. Deliver salvaged equipment and material deemed salvageable by Project Manager to location designated by Project Manager. Remove other removed material and

equipment from site.

1.27 GUARANTEE

- A. Leave the entire installation in complete working order, free from defects in materials, workmanship or finish. Guarantee to repair or replace parts that may develop defects due to faulty materials, equipment, or workmanship within a period of one year after the Work is accepted by the Owner. Also, guarantee to repair or replace with like materials, other existing Work in the building damaged from or during the repair of any such defective equipment, materials, or workmanship.

1.28 INSTALLER QUALIFICATIONS

- A. Installer must have electrical certification per California Labor Code Section 3099.2.
- B. All work described in the Electrical Specifications and shown on Electrical Drawings shall be performed by California State Certified Electricians.
- C. All electrical foremen shall have a minimum of 500 hours of documented classroom training.
- D. All electrical foremen shall have a minimum of 3,000 hours of documented on-the-job training.
- E. At the time equipment submittals are made, provide copies of State Certification and training documents for electricians working on this project.

1.29 PAYMENT PROCEDURES

- A. The payment quantity of solar street lights shown in the Bid Item List will be paid at the contract unit price as a lump sum for Item No. 15 – Solar Street Light.

PART 2 - PRODUCTS

2.1 GROUNDING

- A. Grounding shall be executed in accordance with applicable codes and regulations of the State of California, California Electrical Code and local authorities having jurisdiction as well as any additional provisions specified or shown on Drawings.
- B. Grounding bushings shall be used wherever conduits are grounded. Feeder conduits to panels and air conditioners shall have grounding bushings.
- C. Grounding conductors should be located to permit, the shortest and most direct path to ground. Connections shall be readily accessible for inspection and connections shall not be permanently concealed in floors or walls.

- D. Non-current carrying metallic parts of electrical equipment and raceways shall be securely grounded to the common system ground. In all locations, ground conductors shall be run through conduits and shall be securely bonded to the conduit at the entrance and exit. The conduit for the grounding conductors shall be continuous from the point of attachment to cabinets or equipment to the grounding electrode, and shall be securely fastened to the ground clamp fittings.
- E. Ground connections to equipment shall be made with an approved type of exothermic weld or shall be bolted or clamped to equipment or conduit. Sheet metal strap types of ground clamps shall not be used. Contact surfaces shall be thoroughly cleaned and bright before connection is made so as to ensure a good metal to metal contact.
- F. Where nonmetallic conduit is used, ground shall be achieved through use of a separate, green-insulated, copper, code-size, ground conductor included in the conduit.
- G. Bonding of cold water piping system shall be achieved at the service entrance. A copper saddle shall be installed over the copper pipe at the location of the clamp to avoid damage to the pipe.

2.2 CONDUIT

A. Rigid Steel Conduit:

- 1. Rigid steel conduit shall have zinc coated exterior, zinc or enamel interior, standard weight, zinc coated couplings, locknuts and bushings and shall bear the U.L. label. Rigid conduit shall not be installed underground.
- 2. Use rigid conduit only for exposed exterior conduit runs, wherever subject to physical damage, or where specifically called for on the Drawings or required by a serving utility.
- 3. Intermediate metallic conduit (I.M.C.) may be used in lieu of rigid steel conduit.

B. Electrical Metallic Tubing:

- 1. Electrical metallic tubing (E.M.T.) shall bear the U.L. label and shall be zinc coated thinwall conduit with zinc-coated couplings and connections. "Indent" type fittings shall not be used.
- 2. E.M.T. may be used where rigid, flexible or non-metallic conduit is not required.
- 3. E.M.T. shall be used for interior dry locations. EMT shall be used where no specified conduit type is called for on the Drawings.

C. Flexible Metallic Conduit

- 1. Flexible metallic conduit shall be galvanized steel and bear the U.L. label. Fittings for flexible conduit shall be squeeze type. Screw-in connectors and other connectors that decrease the interior diameter of the conduit shall not be used unless specifically approved by the Project Manager.
- 2. Liquid-tight flexible conduit shall bear the U.L. label and be plastic jacketed moisture and oil resistant with oil and vapor tight connectors.
- 3. Use flexible conduit for final connection to equipment where vibration may injure

direct conduit connection. It may be used for indoor dry locations, for fixture whips not to exceed 72 inches and in other locations where structural conditions will not permit the use of EMT not to exceed six feet, only if approved by the Project Manager.

4. Use liquid-tight flexible conduit in lieu of flexible conduit for wet, damp, or outdoor areas or where weatherproof flexible conduit is called for on the Drawings or by code.

D. Plastic Conduit

1. Plastic conduit shall be rigid polyvinyl chloride (PVC) Underwriter's approval, Schedule 40. Connections and fittings shall be "outside" type assembled in accordance with the recommended methods of the manufacturer.
2. Underground PVC conduit shall be buried a minimum of 24 inches below grade. Where more than two conduits are installed adjacently underground, use factory made conduit spacers.
3. PVC conduit shall be used for underground conduit runs in lieu of wrapped rigid conduit except as noted otherwise on the Drawings or required by the serving utility.
4. Provide a code size ground conductor in each conduit.
5. Only braided polyethylene or similar pull rope shall be used.

2.3 OUTLET, JUNCTION, AND PULL BOXES

- A. Outlet boxes and junction boxes shall be galvanized one-piece pressed steel, knockout type. The size of each box shall be determined by the number of wires or conduits or size of conduits entering the box, but shall not be less than 4" square and 1-1/2" deep unless otherwise noted. All boxes shall be UL listed.
- B. Minimum box size for data and telephone outlets shall be 4" square and 2-1/8" deep.
- C. Single gang boxes in concrete, for fixture outlets, shall be 4-3/8" octagonal concrete boxes, 2-1/2" deep minimum.
- D. Single gang boxes in concrete, for wiring devices, shall be 3-1/2" deep, 3-3/4" long and 1-7/8" wide.
- E. Single gang outlet boxes installed in concrete or masonry walls shall be a minimum of 3-1/2" deep, 4" long and 2" wide, set flush with the wall and provided with a single gang wall plate.
- F. Install wood blocking for outlet boxes in a rigid, workmanlike manner using new material where wood studs are used. Provide rigid support to avoid twisting of outlet boxes where steel studs are used. Boxes shall be secured such that they are level and plumb.
- G. Locknuts shall be used on both sides of conduit connections to box or panel, in addition to bushing. Where a larger size opening occurs than size of conduit, use reducing washers.

- H. Exposed boxes shall be weatherproof, threaded or hub conduit with gasketed conduit cover suitable for device installed or with blank cover plate when conduit is used as a junction box. Conduit wire fill capacity shall not be exceeded.
- I. Recessed weatherproof outlets or junction boxes shall be equipped with neoprene gasketed covers.
- J. Large size junction or pull boxes shall be fabricated from code gauge sheet steel. Where located indoors, finish shall be gray enamel and covers shall be secured with screws. Where exposed to weather, they shall be weatherproof, NEMA 3R, and rain-tight and hot-dip galvanized after fabrication; also, they shall have weatherproof gaskets, flat covers and galvanized iron screws. Provide knockouts and/or threaded hubs as required for the conduit used. Boxes in finished areas shall be prime painted.
- K. Any unused, removed knockouts shall be filled with a K.O. cover.
- L. Provide bonding or grounding from metal conduit terminating in junction with concentric KO's.
- M. Install boxes and rings such that finished installation is flush with finished surface.

2.4 PLATES AND DEVICE COVERS

- A. Plates for switches, receptacles, telephone and blank outlets shall be stainless steel, Hubbell 302/304 alloy or Legrand "S" line, unless otherwise noted. Plates shall be engraved per Drawings or as covered under the Article of this Specification titled "Identification of Equipment".

2.5 FLOOR BOXES

- A. Floor boxes shall be suited for the type of flooring they are installed on.
- B. Floor boxes shall be fully adjustable or adaptable/trimmable to accommodate finished floor elevation.
- C. Covers for floor boxes shall be brass.
- D. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. **[Wiremold/Legend]**
 - 2. **[Hubbell]**
- E. Components in floor boxes shall be as specified on the Drawings.

2.6 RECEPTACLES

- A. Duplex convenience outlets shall be specification grade, backwire, three wire, NEMA #5-20R, self-grounding type, 20 ampere, 125 volt parallel slots, polarized, in white. Additional receptacles shall be as indicated on the Drawings. Receptacles shall be Hubbell #5253W.
- B. Receptacles indicated weatherproof shall have lift cover plates that are weatherproof "while in use" Hubbell/Taymac expandable flat ML450W or equal.
- C. Ground fault current interrupter receptacles shall be self-testing, Hubbell # GFR5352WST.
- D. Outdoor ground fault circuit interrupter receptacles shall be Hubbell #GFW RST 20W or equal.

2.7 LIGHTING SWITCHES

- A. Line voltage lighting switches shall be specification grade, quiet type, 20 amp. 120/277 volt A.C. white handled, unless otherwise noted. Switches shall be Hubbell #CS1221W.
- B. Dimmers shall be specification grade 20 amp, 120/277 volt, white. Specific attributes of dimmers: types, loads, configuration, shall be as shown on the drawings. Dimmers shall match the drivers in the light fixtures that they feed.
- C. A neutral conductor shall be routed to each switch and dimmer location.

2.8 WIRE AND CABLE

- A. 600 Volt Conductors:
 - 1. Conductors shall be copper and delivered to the site in their original, unbroken packages plainly marked or tagged with U.L. label, size, kind, insulation, name of manufacturer and trade name of the wire.
 - 2. Type "THWN/THHN", 600-volt insulation shall be used for all locations.
 - 3. Minimum size conductor shall be #12.
 - 4. Conductors shall be stranded.
 - 5. Ground conductors shall be bare copper or have green insulation.
 - 6. 120 volt and 277 volt circuits shall have separate neutrals.
- B. MC Luminary Cable:
 - 1. MC Luminary cable may be used for line voltage and 0-10 volt wiring between light fixtures and dimmers.
 - 2. MC Luminary cable shall be UL listed.
 - 3. MC Luminary cable shall be properly supported along its route between fixtures and dimmers.
 - 4. Manufacturers: Subject to compliance with requirements, available

manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. **[AFC]**
- b. **[Southwire]**
- c. **[General Cable]**

2.9 DISCONNECT SWITCHES

- A. Non-fusible or fusible as shown on the Drawings, heavy duty, 250 or 600 volts as required, NEMA Type 1 enclosure, except where WP is indicated or required by code, use NEMA Type 3R enclosure.

2.10 LIGHTING FIXTURES

- A. Lighting fixtures shall be of manufacture and type as specified in the Fixture Schedule, and shall have all parts and fittings necessary to completely and properly install the fixture. Fixtures of the same type shall be of one manufacturer and of identical finish and material.
- B. Lighting fixtures shall bear Underwriter's Laboratories labels. Interior light fixtures shall be on the California Energy Commission approved list. Exterior light fixtures shall be on the DLC list.
- C. Fixtures shall be furnished and installed as indicated on the Drawings, including hangers, glassware, auxiliary equipment, drivers, adapters, connectors for continuous installation, etc.
- D. Each fixture shall be wired with conductors suitable for the voltage, current and temperature to which the conductors will be subjected.
- E. If excessive driver flicker develops within 12 months after installation, the condition shall be corrected at no charge to the Owner. Flickering of the LED or failure of an LED array within 12 months of substantial completion shall also be corrected at no charge to the Owner.
- F. Proper LEDs of type, size, color temperature and wattage indicated shall be furnished and installed in each fixture and shall be manufactured by Phillips, Sylvania, Cree, Sora or Bridgelux. The Contractor shall replace LED arrays which have been burned out prior to final completion. Clean dust, dirt, fingerprints and grease from fixtures before final completion.
- G. Install trims, reflectors, lenses and diffusers with care. Wear cloth or surgical gloves when installing these to avoid leaving fingerprints.
- H. Follow manufacturer's installation instructions when installing light fixtures.

2.11 LED LAMPS

- A. Any LED lamps used shall be JA8 compliant.
- B. LED lamps shall be UL listed.
- C. LED lamps shall be tested for use in the fixtures they will be installed in.
- D. LED lamps shall not cause fixtures to overheat or lamps to prematurely fail.

2.12 PANELBOARDS

A. Power Distribution Panelboards: (Square D I-Line, no equal)

1. Interior:

- a. Shall be rated 600 VAC. Continuous main current ratings as indicated on associated schedules on Drawings not to exceed 1200 amperes maximum. Panelboard bus current ratings shall be determined by heat-rise tests conducted in accordance with UL 67.
- b. Provide UL Listed short circuit current ratings (SCCR) as indicated on the associated schedules on Drawings not to exceed the lowest interrupting capacity rating of any circuit breaker installed with a maximum of 200,000 rms symmetrical amperes. Main lug and main breaker panelboards shall be suitable for use as Service Equipment when application requirements comply with UL 67 and NEC Articles 230-F and -G.
- c. The panelboard interior shall have three flat bus bars stacked and aligned vertically with glass reinforced polyester insulators laminated between phases. The molded polyester insulators shall support and provide phase isolation to the entire length of bus.
- d. The bussing shall be fully rated with sequentially phased branch distribution. Panelboard bussing rated 100 through 600 amperes shall be plated copper. Bussing rated 800 amperes and above shall be plated copper. The entire interleaved assembly shall be contained between two (2) U-shaped steel channels, permanently secured to a galvanized steel-mounting pan by fasteners employing the use of a tamper-resistant warning label.
- e. Interior trim shall be of dead-front construction to shield user from all energized parts. Main circuit breakers through 800 amperes shall be vertically mounted. Main circuit breaker and main lug interiors shall be field convertible for top or bottom incoming feed.
- f. Equipment ground bar shall be insulated or bonded as shown on the Drawings. Ground bar shall be copper. Solid neutral shall be equipped with a full capacity grounding strap for service entrance applications. Gutter-mounted neutral will not be acceptable.
- g. Nameplates shall contain system information and catalog number or factory order number. Interior wiring diagram, neutral wiring diagram, UL Listed label, and Short Circuit Current Rating shall be provided. Leveling provisions shall be provided for flush mounted applications.
- h. Arc Flash labeling shall be provided in accordance with Section 1.18 of

these specifications.

- i. Panelboard lugs shall be tightened with a torque wrench to values listed on the equipment.

2. Molded Case Circuit Breakers - Mains and Branches:

- a. Circuit breakers shall be constructed in accordance with the following standards:

UL 489 Federal Specification W-C-375B/GEN
NEMA AB1 CSA 22.2, No. 5-M91
IEC 157-1 BS 4752

- b. Circuit breakers shall be constructed using glass reinforced polyester insulating material providing superior dielectric strength. Current-carrying components shall be completely isolated from the handle and the accessory mounting area.
- c. Circuit breakers shall have an overcenter, trip-free, toggle operating mechanism which will provide quick-make, quick-break contact action. The circuit breaker shall have common tripping of all poles.
- d. Circuit breakers shall have a push-to-trip button for maintenance and testing purposes.
- e. Circuit breaker escutcheon shall have international I/O markings, in addition to standard ON/OFF markings. Circuit breaker handle accessories shall provide provisions for locking handle in the ON or OFF position.
- f. Breaker faceplate shall indicate rated ampacity. Breaker faceplate shall indicate UL and IEC certification standards with applicable voltage systems and corresponding AIR ratings.
- g. Circuit breakers shall be factory sealed and shall have a date code on the face of the circuit breaker. Poles shall be labeled with respective phase designations.
 - 1) Circuit breakers shall be UL Listed for use with the following accessories: Shunt Trip, Under Voltage Trip, Auxiliary Switch, Alarm Switch, Ground Fault Shunt Trip, Electrical Operators, Cylinder Locks, Mechanical Lugs Kits, Compression Lugs Kits, and Handle Accessories.
- h. Lugs shall be UL Listed to accept solid or stranded copper conductors only. Lugs shall be suitable for 90° C rated wire, sized according to the 75° C temperature rating per NEC Table 310-16. Lug body shall be bolted in place; snap-in designs are not acceptable. Lugs shall be torqued with a torque wrench to the value listed on the circuit breaker.
- i. Two- and three-pole circuit breakers shall have an internal common trip crossbar to provide simultaneous tripping. Circuit breaker frame sizes above 100 amperes shall have a single magnetic trip adjustment located on the front of the breaker, which allows the user to simultaneously select the desired trip level of all poles.
- j. Standard circuit breakers up to 250 amperes at 600 VAC shall be UL Listed with HACR ratings.

k. Enclosures:

1) Type 1 Boxes:

- a) Boxes shall be galvanized steel constructed in accordance with UL 50 requirements. Zinc-coated galvanized steel will not be acceptable.
- b) Boxes shall have removable blank endwalls and interior mounting studs. Interior support bracket shall be provided for ease of interior installation.
- c) Maximum enclosure dimensions shall be 42 in. wide and 9.5 in. deep.

2) Type 1 Trim Fronts:

- a) Trim front steel shall meet strength and rigidity requirements per UL 50 standards. Shall have an ANSI 49 medium gray enamel electrodeposited over cleaned phosphatized steel.
- b) Trim front shall be [4-piece surface] [1-piece with door] [hinged 1-piece with door] available in [flush] [surface] mount. Trim front door shall have rounded corners and edges free of burrs. A clear plastic directory cardholder shall be mounted on the inside of the door.
- c) Locks shall be cylindrical tumbler type with larger enclosures requiring sliding vault locks with 3-point latching. All lock assemblies shall be keyed alike. Two (2) keys shall be provided with each lock.

3) Type 3R, 4, 4X, and 12:

- a) Enclosures shall be constructed in accordance with UL 50 requirements. Endwalls shall be welded and sealed. Enclosures shall be painted with ANSI 49 gray enamel electrodeposited over cleaned phosphatized steel.
- b) All doors shall be gasketed and be equipped with a tumbler type vault lock and two (2) additional trunk type latches. A clear plastic directory cardholder shall be mounted on the inside of door. All lock assemblies shall be keyed alike. Two (2) keys shall be provided with each lock.
- c) Maximum enclosure dimensions shall not exceed 42 in. wide and 12.95 in. deep.

B. Lighting and Appliance Panelboard: (Square D NQOD, no equal)

1. Interior:

- a. Shall be rated for 240 VAC/48 VDC maximum. Continuous main current ratings, as indicated on associated schedules, not to exceed 600 amperes maximum.
- b. Minimum short circuit current rating: As indicated on schedules in rms symmetrical amperes at 240 VAC.

- c. Provide one (1) continuous bus bar per phase. Each bus bar shall have sequentially phased branch circuit connectors suitable for plug-on or bolt-on branch circuit breakers. The bussing shall be fully rated. Panelboard bus current ratings shall be determined by heat-rise tests conducted in accordance with UL 67. Bussing rated 100-400 amperes shall be copper. Bussing rated for 600 amperes shall be copper as standard construction. Panelboards shall be suitable for use as Service Equipment when application requirements comply with UL 67 and NEC Articles 230-F and G.
- d. All current-carrying parts shall be insulated from ground and phase-to-phase by Noryl high dielectric strength thermoplastic or equivalent.
- e. Split solid neutral shall be plated and located in the mains compartment up to 225 amperes so all incoming neutral cable may be of the same length.
- f. Interior trim shall be of dead-front construction to shield user from energized parts. Dead-front trim shall have pre-formed twistouts covering unused mounting space.
- g. Nameplates shall contain system information and catalog number or factory order number. Interior wiring diagram, neutral wiring diagram, UL Listed label and short circuit current rating shall be displayed on the interior or in a booklet format.
- h. Interiors shall be field converted for top or bottom incoming feed. Main and sub-feed circuit breakers shall be vertically mounted. Main lug interiors up to 400 amperes shall be field convertible to main breaker. Interior leveling provisions shall be provided for flush mounted applications.
- i. Panelboard lugs shall be tightened with a torque wrench to values listed on the equipment.
- j. Arc Flash labeling shall be provided in accordance with Section 1.18 of these specifications.

2. Main Circuit Breaker

- a. Main circuit breakers shall have an overcenter, trip-free, toggle mechanism which will provide quick-make, quick-break contact action. Circuit breakers shall have a permanent trip unit with thermal and magnetic trip elements in each pole. Each thermal element shall be true rms sensing and be factory calibrated to operate in a 40° C ambient environment. Thermal elements shall be ambient compensating above 40° C.
- b. Two- and three-pole circuit breakers shall have common tripping of all poles. Circuit breakers frame sizes above 100 amperes shall have a single magnetic trip adjustment located on the front of the circuit breaker, which allows the user to simultaneously select the desired trip level of all poles. Circuit breakers shall have a push-to-trip button for maintenance and testing purposes.
- c. Breaker handle and faceplate shall indicate rated ampacity. Standard construction circuit breakers shall be UL Listed for reverse connection without restrictive line or load markings.
- d. Circuit breaker escutcheon shall have international I/O markings, in addition to standard ON/OFF markings. Circuit breaker handle accessories shall provide provisions for locking handle in the ON or OFF position.
- e. Lugs shall be UL Listed to accept solid or stranded copper conductors only.

Lugs shall be suitable for 90° C rated wire, sized according to the 75° C temperature rating per NEC Table 310-16. Lug body shall be bolted in place; snap-in designs are not acceptable. Lugs shall be torqued with a torque wrench to the value listed on the main circuit breaker.

3. Branch Circuit Breaker

- a. Circuit breakers shall be UL Listed with amperage ratings, interrupting ratings, and number of poles as indicated on the panelboard schedules.
- b. Molded case branch circuit breakers shall have bolt-on type bus connectors.
- c. Circuit breakers shall have an overcenter toggle mechanism which will provide quick-make, quick-break contact action. Circuit breakers shall have thermal and magnetic trip elements in each pole. Two- and three-pole circuit breakers shall have common tripping of all poles.
- d. There shall be two forms of visible trip indication. The breaker handle shall reside in a position between ON and OFF.
- e. The exposed faceplates of all branch circuit breakers shall be flush with one another.
- f. Lugs shall be UL Listed to accept solid or stranded copper conductors only. Lugs shall be suitable for 90° C rated wire, sized according to the 75° C temperature rating per NEC Table 310-16. Lugs shall be torqued with a torque wrench to the value listed on the main circuit breaker.

4. Enclosures:

- a. Type 1 Boxes:
 - 1) Boxes shall be galvanized steel constructed in accordance with UL 50 requirements. Galvanized steel will not be acceptable.
 - 2) Boxes shall have removable endwalls with knockouts located on one end. Boxes shall have welded interior mounting studs. Interior mounting brackets are not required.
 - 3) Box width shall be [20 in wide] [14 in wide] [8.625 in wide - NQOB column width only].
- b. Type 1 Fronts:
 - 1) Front shall meet strength and rigidity requirements per UL 50 standards. Fronts shall have ANSI 49 gray enamel electrodeposited over cleaned phosphatized steel.
 - 2) Fronts shall be hinged 1-piece with door. Mounting shall be as indicated on associated schedules.
- c. Type 3R, 3S, 5, and 12:
 - 1) Enclosures shall be constructed in accordance with UL 50 requirements. Enclosures shall be painted with ANSI 49 gray enamel electrodeposited over cleaned phosphatized steel.
 - 2) All doors shall be gasketed and equipped with a tumbler type vault lock and two (2) additional trunk type latches. All lock assemblies

shall be keyed alike. Two (2) keys shall be provided with each lock. A clear plastic directory cardholder shall be mounted on the inside of door.

- 3) Maximum enclosure dimensions shall not exceed 20 in. wide and 6.5 in. deep.

2.13 SURGE PROTECTIVE DEVICES (SPD) (TVSS)

- A. Surge protective devices shall be panel integrated.
- B. SPDs shall be provided and installed in the panel by the manufacturer.
- C. SPD size/rating shall be as shown on the Drawings.
- D. SPDs shall be UL listed.
- E. Where independent SPDs are used, they shall be installed adjacent to the equipment they serve. The conductor length from the circuit breaker to the SPD shall be minimized.

PART 3 - EXECUTION

3.1 INSTALLATION OF CONDUIT

A. Underground Conduit

1. Keep interior of conduit clean and clear. Clean underground conduits by pulling a mandrel through conduit run followed with a swab before pulling wire.
2. Reroute conduit from locations shown on the Drawings where it is necessary to clear obstructions.
3. Provide junction or pull boxes where required for pulling conductors due to excessive number of bends or length of conduit runs.
4. Bury underground conduit, except those under buildings, a minimum of 24 inches below finished grade. Conduits under roadways shall be a minimum of 36 inches below finished grade. Conduit runs $\frac{3}{4}$ inch and smaller in slabs shall be located above vapor barriers. Bury conduit runs larger than $\frac{3}{4}$ inch to a minimum depth of 12 inches below floor slabs.
5. Standard factory ells shall not be used in underground service conduits or other long underground runs. Field bends shall not be flattened or kinked and shall not materially reduce the internal diameter of the conduit. Bends in long underground runs shall be made in long sweeping bends. Do not bend at couplings. Approved conduit bending methods shall be used.
6. All conduit runs shall have a code size insulated grounding conductor.
7. Properly separate two or more conduits installed underground in a common concrete envelope with approved factory made conduit spacers.
8. Locate conduit stub-outs dimensionally from building or curb lines on Record Drawings.
9. Pull wires shall be installed in empty conduits including telephone conduits and

stub-outs, No. 12 AWG, type "THWN" insulated copper wire or 1/8-inch polyethylene rope shall be used.

10. Spare underground conduits shall be sealed with duct plugs that have pull tabs. Duct tape shall not be used to seal unused conduits.

B. Exposed/Concealed Conduit

1. Provide secure mounting facilities for conduits. Wire or plumbers tape shall not be used for hanging conduit. Strap shall be factory made of the one hole malleable iron or two-hole galvanized clamp type.
2. Provide expansion couplings wherever conduits cross expansion joints.
3. Run conduit at right angles or parallel to structural members, walls, floors and ceilings. Where several conduits are run together or suspended, they shall be hung on Unistrut trapezes with minimum 3/8-inch rod hangers.
4. Cut ends of conduit square and ream to remove burrs or sharp edges. Terminate conduits properly with bushings, locknuts, etc. Terminate one (1) inch and larger conduits with insulated bushings.
5. Render conduits projecting through the roofing watertight by proper flashings. Securely fasten a sheet metal cap and tighten band or storm collar to the conduits. Extend flashing a minimum of six (6) inches in all directions. Coordinate and install roof flashing for conduits to the satisfaction of the Project Manager.
6. All conduit runs shall have a code size insulated grounding conductor.
7. Pull wires shall be installed in empty conduits including telephone conduits and stub-outs, No. 12 AWG, type "THWN" insulated copper wire or 1/8-inch polyethylene rope shall be used.
8. Flexible conduit connections shall comply with NEC Section 350-22.
9. Provide Dura Block or similar support for roof-mounted conduits.

3.2 INSTALLATION OF WIRE AND CABLE

- A. Conductors shall be continuous between outlets or junction boxes and no splices shall be made except in outlet boxes, pull boxes, panelboard gutters or handholes.
- B. Joints, splices and taps No. 10 or smaller (including fixture pigtails) shall be connected with "floating spring" type connectors. No. 8 and larger shall be connected with solderless connectors of 100% electrolytic copper. Split-bolt connectors are not acceptable.
- C. Tighten pressure type lugs on panels and equipment, and then retighten 24 hours or more later after energizing. Provide written report of torque values on lugs.
- D. Oil or grease shall not be used when pulling conductors. Use U.L. approved cable lubrication only.
- E. Lace or train conductors neatly in panels, cabinets and equipment. Use plastic wire ties to route conductors at edge of enclosure away from overcurrent devices.
- F. Branch circuits shall be color coded in compliance with Section 210-5 of the California Electrical Code. Colored tape is not acceptable.

- G. All wiring, both line and low voltage, shall be installed in conduit unless otherwise noted.
- H. Conductors from different panels or from different power sources shall not be installed in the same conduit, junction box, gutter, or raceway.

3.3 TAGGING

- A. Branch circuits shall be left tagged with circuit numbers in gutters and junction boxes where unused circuits terminate.
- B. Feeder conductors shall be tagged as phase "A" or "B" or "C".
- C. The method of tagging shall be with adhesive preprinted tape numbered or lettered wrap around tags. Colored tape is not acceptable.
- D. Tagging shall be applied after wire is installed in conduit.
- E. Feeders in panel or equipment shall be tagged by phase letter in each panel or equipment.
- F. Where it is impractical to use printed markers on certain wires or cables, use blank tape with identification marked thereon with indelible pen or pencil.

3.4 COLOR CODING FOR PHASE IDENTIFICATION

- A. Color code secondary service, feeder and branch circuit conductors with factory applied color as follows:

<u>208y/120Volts</u>	<u>Phases</u>
Black	A
Red	B
Blue	C
White	Neutral
Green	Ground

3.5 DISCONNECT SWITCHES

END OF SECTION 260000

SECTION 31 1000 - SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Removing existing vegetation.
2. Clearing and grubbing.
3. Stripping and stockpiling topsoil.
4. Stripping and stockpiling rock.

1.2 DEFINITIONS

- A. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.
- B. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil," but in disturbed areas such as urban environments, the surface soil can be subsoil.
- C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil; the zone where plant roots grow.
- D. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.3 MATERIAL OWNERSHIP

- A. Except for materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.4 FIELD CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 2. Provide alternate routes around closed or obstructed trafficways if required by Owner or authorities having jurisdiction.
- B. Soil Stripping, Handling, and Stockpiling: Perform only when the soil is dry or slightly

moist.

1.5 PAYMENT PROCEDURES

- A. The payment quantity of earthwork shown in the Bid Item List will be paid for at the contract unit price per cubic yard for Item No. 17 – Loading Dock (Earthwork).
- B. The payment quantity of the retention basin shown in the Bid Item List will be paid for at the contract unit price per cubic yard for Item No. 18 – Retention Basin.
- C. The payment quantity of undeveloped land shown in the Bid Item List will be paid for at the contract unit price per square foot for Item No. 22 – Undeveloped Land.
- D. The payment quantity of the septic system shown in the Bid Item List will be paid for at the contract unit price as a lumped sum for Item No. 28 – Septic Tank.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 312000 "Earth Moving."
 - 1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.
- B. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
- C. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.

3.3 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.
 - 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
 - 2. Grind down stumps and remove roots larger than **2 inches** in diameter, obstructions, and debris to a depth of **18 inches** below exposed subgrade.
 - 3. Use only hand methods or air spade for grubbing within protection zones.
 - 4. Chip removed tree branches and dispose of off-site.
- B. 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.

3.4 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.

3.5 STOCKPILING ROCK

- A. Remove from construction area naturally formed rocks that measure more than **1 foot** across in least dimension. Do not include excavated or crushed rock.
- B. Stockpile rock away from edge of excavations without intermixing with other materials. Cover to prevent windblown debris from accumulating among rocks.
 - 1. Limit height of rock stockpiles to **36 inches**.
 - 2. Dispose of surplus rock. Surplus rock is that which exceeds quantity indicated to be stockpiled or reused.

3.6 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
- B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials, and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 31 1000

SECTION 31 2000 - EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Soil materials.
2. Accessories.

B. Related Requirements:

1. Section 311000 "Site Clearing" for site stripping, grubbing, stripping topsoil, and removal of above- and below-grade improvements and utilities.

1.2 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

E. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Bulk Excavation: Excavation more than **10 ft.** in width and more than **30 ft.** in length.
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, will be without additional compensation.

F. Fill: Soil materials used to raise existing grades.

G. Rock:

1. Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material **3/4 cu. yd.** or more in volume that exceed a standard penetration resistance of **100 blows/2 inches** when tested by a geotechnical testing agency, in accordance with ASTM D1586/D1586M.
- H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other fabricated stationary features constructed above or below the ground surface.
- I. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- J. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
- K. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.3 FIELD CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.
 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Do not commence earth-moving operations until temporary site fencing and erosion- and sedimentation-control measures specified in Section 311000 "Site Clearing" are in place.

1.4 PAYMENT PROCEDURES

- A. The payment quantity of earthwork shown in the Bid Item List will be paid for at the contract unit price per cubic yard for Item No. 17 – Loading Dock (Earthwork).
- B. The payment quantity of the retention basin shown in the Bid Item List will be paid for at the contract unit price per cubic yard for Item No. 18 – Retention Basin.
- C. The payment quantity of undeveloped land shown in the Bid Item List will be paid for at the contract unit price per square foot for Item No. 22 – Undeveloped Land.
- D. The payment quantity of the septic system shown in the Bid Item List will be paid for at the contract unit price as a lumped sum for Item No. 28 – Septic Tank.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM in accordance with ASTM D2487, or a combination of these groups; free of rock or gravel larger than **3 inches** in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT in accordance with ASTM D2487, or a combination of these groups.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 90 percent passing a **1-1/2-inch** sieve and not more than 12 percent passing a **No. 200** sieve.
- E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 95 percent passing a **1-1/2-inch** sieve and not more than 8 percent passing a **No. 200** sieve.
- F. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; except with 100 percent passing a **1-inch** sieve and not more than 8 percent passing a **No. 200** sieve.
- G. Sand: ASTM C33/C33M; fine aggregate.

2.2 ACCESSORIES

- A. Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, **6 inches** wide and **4 mils** thick, continuously inscribed with a description of the utility; colored as follows:
 - 1. Red: Electric.
 - 2. Yellow: Gas, oil, steam, and dangerous materials.
 - 3. Orange: Telephone and other communications.
 - 4. Blue: Water systems.
 - 5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.
- B. Protect and maintain erosion and sedimentation controls during earth-moving operations.
- C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
 - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.3 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.4 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
 - 1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
- B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to **12 inches** higher than top of pipe or conduit unless otherwise indicated.
 - 1. Clearance: **12 inches** each side of pipe or conduit.
- C. Trench Bottoms:
 - 1. Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove

projecting stones and sharp objects along trench subgrade.

- a. For pipes and conduit less than **6 inches** in nominal diameter, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
 - b. For pipes and conduit **6 inches** or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe or conduit circumference. Fill depressions with tamped sand backfill.
 - c. For flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support conduit on an undisturbed subgrade.
 - d. Excavate trenches **6 inches** deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
2. Excavate trenches **4 inches** deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells of pipe.
 - a. Excavate trenches **6 inches** deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.5 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.6 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
 2. Surveying locations of underground utilities for Record Documents.
 3. Testing and inspecting underground utilities.
 4. Removing concrete formwork.
 5. Removing trash and debris.
 6. Removing temporary shoring, bracing, and sheeting.
 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.7 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.

- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- C. Trenches under Footings: Backfill trenches excavated under footings and within **18 inches** of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Section 033000 "Cast-in-Place Concrete."
- D. Backfill voids with satisfactory soil while removing shoring and bracing.
- E. Initial Backfill:
 - 1. Soil Backfill: Place and compact initial backfill of satisfactory soil, free of particles larger than Insert dimension in any dimension, to a height of **12 inches** over the pipe or conduit.
 - a. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- F. Final Backfill:
 - 1. Soil Backfill: Place and compact final backfill of satisfactory soil to final subgrade elevation.
- G. Warning Tape: Install warning tape directly above utilities, **12 inches** below finished grade, except **6 inches** below subgrade under pavements and slabs.

3.8 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
 - 1. Under grass and planted areas, use satisfactory soil material.
 - 2. Under walks and pavements, use satisfactory soil material.
 - 3. Under steps and ramps, use engineered fill.
 - 4. Under building slabs, use engineered fill.
 - 5. Under footings and foundations, use engineered fill.
- C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.9 GRADING

- A. Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations

indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:
1. Turf or Unpaved Areas: Plus or minus **1 inch**.
 2. Walks: Plus or minus **1 inch**.
 3. Pavements: Plus or minus **1/2 inch**.
- C. Grading inside Building Lines: Finish subgrade to a tolerance of **1/2 inch** when tested with a **10-foot** straightedge.

3.10 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.11 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 31 2000

SECTION 32 1216 - ASPHALT PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Hot-mix asphalt paving.
2. Asphalt surface treatments.

B. Related Requirements:

1. Section 321313 "Concrete Paving" for concrete pavement and for separate concrete curbs, gutters, and driveway aprons.
2. Section 321373 "Concrete Paving Joint Sealants" for joint sealants and fillers at pavement terminations.

1.2 ACTION SUBMITTALS

- A. Product Data: Include technical data and tested physical and performance properties.

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by authorities having jurisdiction or the DOT of state in which Project is located.

1.4 FIELD CONDITIONS

- A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:

1. Prime Coat: Minimum surface temperature of **60 deg F**.
2. Tack Coat: Minimum surface temperature of **60 deg F**.
3. Slurry Coat: Comply with weather limitations in ASTM D3910.
4. Asphalt Base Course : Minimum surface temperature of **40 deg F** and rising at time of placement.
5. Asphalt Surface Course: Minimum surface temperature of **60 deg F** at time of placement.

PART 2 - PRODUCTS

2.1 AGGREGATES

- A. General: Use materials and gradations that have performed satisfactorily in previous installations.
- B. Coarse Aggregate: ASTM D692/D692M, sound; angular crushed stone, crushed gravel, or cured, crushed blast-furnace slag.
- C. Fine Aggregate: ASTM D1073, sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.
 - 1. For hot-mix asphalt, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.

2.2 ASPHALT MATERIALS

- A. Asphalt Binder: ASTM D6373 binder designation PG 64-16.
- B. Water: Potable.

2.3 AUXILIARY MATERIALS

- A. Sand: ASTM D1073, Grade No. 2 or No. 3.
- B. Joint Sealant: ASTM D6690, Type I, hot-applied, single-component, polymer-modified bituminous sealant.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that subgrade is dry and in suitable condition to begin paving.
- B. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protection: Provide protective materials, procedures, and worker training to prevent asphalt materials from spilling, coating, or building up on curbs, driveway aprons, manholes, and other surfaces adjacent to the Work.
- B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated

subgrades.

1. Completely proof-roll subgrade in one direction . Limit vehicle speed to **3 mph**.
2. Proof-roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than **15 tons**.
3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

3.3 SURFACE PREPARATION

- A. Ensure that prepared subgrade has been proof-rolled and is ready to receive paving. Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces.

3.4 HOT-MIX ASPHALT PLACEMENT

- A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand in areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
 1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.
 2. Place hot-mix asphalt surface course in single lift.
 3. Spread mix at a minimum temperature of **250 deg F**.
 4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
 5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.
 - B. Place paving in consecutive strips not less than **10 feet** wide unless infill edge strips of a lesser width are required.
 1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Overlap mix placement about **1 to 1-1/2 inches** from strip to strip to ensure proper compaction of mix along longitudinal joints.
 2. Complete a section of asphalt base course before placing asphalt surface course.
 - C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.
- ### 3.5 JOINTS
- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.

1. Clean contact surfaces and apply tack coat to joints.
2. Offset longitudinal joints, in successive courses, a minimum of **6 inches**.
3. Offset transverse joints, in successive courses, a minimum of **24 inches**.
4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method in accordance with AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."
5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
6. Compact asphalt at joints to a density within 2 percent of specified course density.

3.6 COMPACTION

- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.
 1. Complete compaction before mix temperature cools to **185 deg F**.
- B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.
- C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
 1. Average Density, Marshall Test Method: 96 percent of reference laboratory density in accordance with ASTM D6927, but not less than 94 percent or greater than 100 percent.
- D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.
- F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.
- G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.7 INSTALLATION TOLERANCES

- A. Pavement Thickness: Compact each course to produce thickness indicated within the following tolerances:
 - 1. Base Course : Plus or minus **1/2 inch**.
 - 2. Surface Course: Plus **1/4 inch**, no minus.
- B. Pavement Surface Smoothness: Compact each course to produce surface smoothness within the following tolerances as determined by using a **10-foot** straightedge applied transversely or longitudinally to paved areas:
 - 1. Base Course : **1/4 inch**.
 - 2. Surface Course: **1/8 inch**.

END OF SECTION 32 1216

SECTION 32 1313 - CONCRETE PAVING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes concrete paving including the following:
 - 1. Driveways.
 - 2. Parking lots.
 - 3. Curbs and gutters.
 - 4. Walks.
- B. Related Requirements:
 - 1. Section 033000 "Cast-in-Place Concrete" for general building applications of concrete.
 - 2. Section 321373 "Concrete Paving Joint Sealants" for joint sealants in expansion and contraction joints within concrete paving and in joints between concrete paving and asphalt paving or adjacent construction.
 - 3. Section 321713 "Parking Bumpers."
 - 4. Section 321716 "Manufactured Traffic-Calming Devices."
 - 5. Section 321723 "Pavement Markings."
 - 6. Section 321726 "Tactile Warning Surfacing" for detectable warning mats.

1.2 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash, slag cement, and other pozzolans.
- B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 QUALITY ASSURANCE

- A. Stamped Detectable Warning Installer Qualifications: An employer of workers trained and approved by manufacturer of stamped concrete paving systems.
- B. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

1.5 FIELD CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.
- B. Cold-Weather Concrete Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:
 - 1. When air temperature has fallen to or is expected to fall below **40 deg F**, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than **50 deg F** and not more than **80 deg F** at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.
- C. Hot-Weather Concrete Placement: Comply with **ACI 301** and as follows when hot-weather conditions exist:
 - 1. Cool ingredients before mixing to maintain concrete temperature below **90 deg F** at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.

1.6 PAYMENT PROCEDURES

- A. The payment quantity of minor concrete shown in the Bid Item List for curb and gutter will be paid for at the contract unit price per linear foot for Item No. 10 - Minor Concrete (Curb and Gutter).
- B. The payment quantity of minor concrete shown in the Bid Item List for sidewalks will be paid for at the contract unit price per linear foot for Item No. 11 - Minor Concrete (Sidewalk).

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with **ACI 301** unless otherwise indicated.

2.2 FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.

- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.3 CONCRETE MATERIALS

- A. Cementitious Materials: Use the following cementitious materials, of same type, brand, and source throughout Project:
 - 1. Portland Cement: ASTM C150/C150M, gray portland cement Type I.
 - 2. Fly Ash: ASTM C618, Class F.
 - 3. Slag Cement: ASTM C989/C989M, Grade 100 or 120.
- B. Normal-Weight Aggregates: ASTM C33/C33M, Class 4S, uniformly graded. Provide aggregates from a single source .
 - 1. Maximum Coarse-Aggregate Size: **3/4 inch** nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: Potable and complying with ASTM C94/C94M.

2.4 CURING MATERIALS

- A. Moisture-Retaining Cover: ASTM C171, polyethylene film or white burlap-polyethylene sheet.
- B. Water: Potable.

2.5 RELATED MATERIALS

- A. Joint Fillers: ASTM D1751, asphalt-saturated cellulosic fiber in preformed strips.
- B. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.

2.6 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to **ACI 301**, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.
 - 1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
 - 2. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that comply with or exceed requirements.

B. Cementitious Materials:

1. Fly Ash or Pozzolan: 25 percent.

C. Concrete Mixtures: Normal-weight concrete.

1. Compressive Strength (28 Days): **3000 psi**.
2. Maximum W/C Ratio at Point of Placement: 0.50.
3. Slump Limit: **4 inches**, plus or minus **1 inch**.

2.7 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C94/C94M . Furnish batch certificates for each batch discharged and used in the Work.

1. When air temperature is between **85 and 90 deg F**, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above **90 deg F**, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
 - 1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.
 - 1. Butt Joints: Use bonding agent at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
 - 1. Locate expansion joints at intervals of 20 feet unless otherwise indicated.
 - 2. Extend joint fillers full width and depth of joint.
 - 3. Terminate joint filler not less than **1/2 inch** or more than **1 inch** below finished surface if joint sealant is indicated.
 - 4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
 - 5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
 - 6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows :
 - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a **1/4-inch** radius. Repeat grooving of contraction joints after applying surface finishes.
 - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut **1/8-inch-** wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
- E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a **1/4-inch** radius. Repeat tooling of edges after applying surface finishes.

3.5 CONCRETE PLACEMENT

- A. Before placing concrete, inspect and complete formwork installation and items to be embedded or cast-in.
- B. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- C. Comply with **ACI 301** requirements for measuring, mixing, transporting, and placing concrete.
- D. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.
- E. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- F. Consolidate concrete according to **ACI 301** by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
 - 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating joint devices.
- G. Screed paving surface with a straightedge and strike off.
- H. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleedwater appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
- I. Curbs and Gutters: Use design mixture for automatic machine placement. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing.

3.6 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
 - 1. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface, perpendicular to line of traffic, to provide a uniform, fine-line texture.

3.7 INSTALLATION OF DETECTABLE WARNINGS

- A. Stamped Detectable Warnings: Install stamped detectable warnings as part of a continuous concrete paving placement and according to stamp-mat manufacturer's written instructions.
1. Before using stamp mats, verify that the vent holes are unobstructed.
 2. Apply liquid release agent to the concrete surface and the stamp mat.
 3. Stamping: While initially finished concrete is plastic, accurately align and place stamp mats in sequence. Uniformly load, gently vibrate, and press mats into concrete to produce imprint pattern on concrete surface. Load and tamp mats directly perpendicular to the stamp-mat surface to prevent distortion in shape of domes. Press and tamp until mortar begins to come through all of the vent holes. Gently remove stamp mats.
 4. Trimming: After 24 hours, cut off the tips of mortar formed by the vent holes.
 5. Remove residual release agent according to manufacturer's written instructions, but no fewer than three days after stamping concrete. High-pressure-wash surface and joint patterns, taking care not to damage stamped concrete. Control, collect, and legally dispose of runoff.

3.8 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- D. Curing Methods: Cure concrete by moisture-retaining-cover curing as follows:
1. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least **12 inches**, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period, using cover material and waterproof tape.

3.9 PAVING TOLERANCES

- A. Comply with tolerances in **ACI 117** and as follows:
1. Elevation: **3/4 inch**.
 2. Thickness: Plus **3/8 inch**, minus **1/4 inch**.
 3. Surface: Gap below **10-feet-** long; unlevelled straightedge not to exceed **1/2 inch**.
 4. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: **1/2 inch per 12 inches** of tie bar.
 5. Lateral Alignment and Spacing of Dowels: **1 inch**.
 6. Vertical Alignment of Dowels: **1/4 inch**.

7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: **1/4 inch per 12 inches** of dowel.
8. Joint Spacing: **3 inches**.
9. Contraction Joint Depth: Plus **1/4 inch**, no minus.
10. Joint Width: Plus **1/8 inch**, no minus.

3.10 REPAIR AND PROTECTION

- A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.
- B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive.
- C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 32 1313

SECTION 32 1373 - CONCRETE PAVING JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cold-applied joint sealants.
2. Hot-applied joint sealants.
3. Joint-sealant backer materials.
4. Primers.

B. Related Requirements:

1. Section 079200 "Joint Sealants" for sealing nontraffic and traffic joints in locations not specified in this Section.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Concrete pavement joint sealants.
2. Joint-sealant backer materials.

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Installers: Entity that employs installers and supervisors who are trained and approved by manufacturer.

1.4 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain joint sealants from single manufacturer for each sealant type.

2.2 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backer materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

2.3 COLD-APPLIED JOINT SEALANTS

- A. Single-Component, Self-Leveling, Silicone Joint Sealant: ASTM D5893/D5893M, Type SL.

2.4 HOT-APPLIED JOINT SEALANTS

- A. Hot-Applied, Single-Component Joint Sealant, Type I: ASTM D6690.

2.5 JOINT-SEALANT BACKER MATERIALS

- A. Joint-Sealant Backer Materials: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by joint-sealant manufacturer, based on field experience and laboratory testing.
- B. Round Backer Rods for Cold-Applied Joint Sealants: ASTM D5249, Type 3, of diameter and density required to control joint-sealant depth and prevent bottom-side adhesion of sealant.

2.6 PRIMERS

- A. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions

affecting joint-sealant performance.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Before installing joint sealants, clean out joints immediately to comply with joint-sealant manufacturer's written instructions.
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

3.3 INSTALLATION OF JOINT SEALANTS

- A. Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.
- B. Joint-Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions.
- C. Install joint-sealant backers to support joint sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of joint-sealant backer materials.
 - 2. Do not stretch, twist, puncture, or tear joint-sealant backer materials.
 - 3. Remove absorbent joint-sealant backer materials that have become wet before sealant application and replace them with dry materials.
- D. Install joint sealants immediately following backer material installation, using proven techniques that comply with the following:
 - 1. Place joint sealants so they fully contact joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Joint Sealants: Immediately after joint-sealant application and before skinning or curing begins, tool sealants in accordance with the following requirements to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint:
 - 1. Remove excess joint sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.
- F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions unless otherwise indicated.

3.4 CLEANING AND PROTECTION

- A. Clean off excess joint sealant as the Work progresses, by methods and with cleaning materials approved in writing by joint-sealant manufacturers.
- B. Protect joint sealants, during and after curing period, from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations in repaired areas are indistinguishable from the original work.

3.5 PAVING-JOINT-SEALANT SCHEDULE

- A. Joints within Concrete Paving:
 - 1. Joint Location:
 - a. Expansion and isolation joints in concrete paving.
 - b. Contraction joints in concrete paving.
 - c. Other joints as indicated.
 - 2. Joint Sealant: Single-component, self-leveling, silicone joint sealant.
 - 3. Joint-Sealant Color: Manufacturer's standard.
- B. Joints within Concrete Paving and Between Concrete and Asphalt Paving:
 - 1. Joint Location:
 - a. Joints between concrete and asphalt paving.
 - b. Joints between concrete curbs and asphalt paving.
 - c. Other joints as indicated.
 - 2. Joint Sealant: Hot-applied, single-component joint sealant.
 - 3. Joint-Sealant Color: Manufacturer's standard.

END OF SECTION 32 1373

SECTION 32 1713 - PARKING BUMPERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Precast concrete wheel stops.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Precast concrete wheel stops.

PART 2 - PRODUCTS

2.1 PARKING BUMPERS

- A. Precast Concrete Wheel Stops: Precast, steel-reinforced, air-entrained concrete; **4000-psi** minimum compressive strength; manufacturer's standard height and width by 48 inches long. Provide chamfered corners and a minimum of two factory-formed or -drilled vertical holes through wheel stop for anchoring to substrate.

1. Source Limitations: Obtain wheel stops from single source from single manufacturer.
2. Surface Appearance: Smooth, free of pockets, sand streaks, honeycombs, and other obvious defects. Corners shall be uniform, straight, and sharp.
3. Mounting Hardware: Galvanized-steel spike or dowel, **1/2-inch** diameter, **14-inch** minimum length.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that pavement is in suitable condition to begin installation in accordance with manufacturer's written instructions.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install wheel stops in accordance with manufacturer's written instructions unless otherwise indicated.
- B. Securely anchor wheel stops to substrate with hardware in each preformed vertical hole in wheel stop as recommended in writing by manufacturer. Recess head of hardware beneath top of wheel stop.

END OF SECTION 32 1713

SECTION 32 1716 - MANUFACTURED TRAFFIC-CALMING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Speed bumps.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Speed bumps.

PART 2 - PRODUCTS

2.1 SPEED BUMPS

A. Speed Bumps: Solid, integrally colored, preformed recycled rubber; UV stabilized. Provide factory-formed or -drilled vertical holes for anchoring to substrate.

1. Source Limitations: Obtain speed bumps from single source from single manufacturer.
2. Size: 2 inches high by 10 inches wide by 72 inches long; with tapered, square, or rounded ends.
3. Color: Black.
4. Embedded Markings: Molded-in, yellow reflective markings, permanently inset in exposed surface.
5. Mounting Hardware: Galvanized-steel lag screw, shield, and washers; 1/2-inch diameter, 8-inch minimum length.
6. Adhesive: As recommended in writing by speed bump manufacturer to permanently adhere speed bump to substrate.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that pavement is in suitable condition to begin installation according to manufacturer's written instructions.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install manufactured traffic-calming devices according to manufacturer's written instructions unless otherwise indicated.
- B. Securely anchor devices to substrate with hardware spaced as recommended in writing by manufacturer for heavy traffic. Recess head of hardware beneath top surface of device.

END OF SECTION 32 1716

SECTION 32 1723 - PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Painted markings applied to asphalt paving.
2. Painted markings applied to concrete surfaces.

1.2 ACTION SUBMITTALS

A. Product Data: Include technical data and tested physical and performance properties.

1. Pavement-marking paint, acrylic.

1.3 FIELD CONDITIONS

- A. Environmental Limitations: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of **55 deg F** for water-based materials, and not exceeding **95 deg F**.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and the 2022 California Building Code, Volume 1.

2.2 PAVEMENT-MARKING PAINT

- A. Source Limitations: Obtain pavement-marking paints from single source from single manufacturer.
- B. Pavement-Marking Paint, Acrylic: Acrylic, waterborne emulsion, lead and chromate free, ready mixed, complying with FS TT-P-1952F, Type II, with drying time of less than 45 minutes.
1. Color: White.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that pavement-marking substrate is dry and in suitable condition to begin pavement marking in accordance with manufacturer's written instructions.
- B. Proceed with pavement marking only after unsatisfactory conditions have been corrected.

3.2 PAVEMENT MARKING

- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.
- B. Allow asphalt paving or concrete surfaces to age for a minimum of 7 days before starting pavement marking.
- C. Sweep and clean surface to eliminate loose material and dust.
- D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of **15 mils**.
 - 1. Apply graphic symbols and lettering with paint-resistant, die-cut stencils, firmly secured to asphalt paving or concrete surface. Mask an extended area beyond edges of each stencil to prevent paint application beyond stencil. Apply paint so that it cannot run beneath stencil.

3.3 PROTECTING AND CLEANING

- A. Protect pavement markings from damage and wear during remainder of construction period.
- B. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 32 1723

SECTION 32 1726 - TACTILE WARNING SURFACING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Detectable warning mats.

B. Related Requirements:

1. Section 321313 "Concrete Paving" for concrete walkways serving as substrates for tactile warning surfacing.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For tactile warning surfacing, to include in maintenance manuals.

1.4 PROJECT CONDITIONS

- A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing.
- B. Weather Limitations for Adhesive Application:
1. Apply adhesive only when ambient temperature is above **50 deg F** and when temperature has not been below **35 deg F** for 12 hours immediately before application. Do not apply when substrate is wet or contains excess moisture.

1.5 PAYMENT PROCEDURES

- A. The payment quantity of detectable warning mats shown in the Bid Item List will be paid for at the contract price per square foot for Item No. 25 – Truncated Domes.

PART 2 - PRODUCTS

2.1 TACTILE WARNING SURFACING, GENERAL

- A. Accessibility Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities for tactile warning surfaces.
 - 1. For tactile warning surfaces composed of multiple units, provide units that when installed provide consistent side-to-side and end-to-end dome spacing that complies with requirements.
- B. Source Limitations: Obtain each type of tactile warning surfacing from single source with resources to provide materials and products of consistent quality in appearance and physical properties.

2.2 DETECTABLE WARNING MATS

- A. Surface-Applied Detectable Warning Mats: Accessible truncated-dome detectable warning resilient mats, UV resistant, manufactured for adhering to existing concrete walkway surfaces, with slip-resistant surface treatment on domes, field of mat, and beveled outside edges.
 - 1. Material: Modified rubber compound, UV resistant.
 - 2. Color: As selected by Architect from manufacturer's full range.
 - 3. Shapes and Sizes:
 - a. Rectangular panel, **24 by 36 inches**.
 - 4. Dome Spacing and Configuration: **2.35-inch** spacing, in manufacturer's standard pattern.
 - 5. Mounting: Adhered to pavement surface with adhesive and fastened with fasteners.

2.3 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of tactile warning surfaces, noncorrosive and compatible with each material joined, and complying with the following:
 - 1. Furnish Type 304 stainless-steel fasteners for exterior use.
 - 2. Fastener Heads: For nonstructural connections, use flathead or oval countersunk screws and bolts with tamper-resistant heads, colored to match tile.
- B. Adhesive: As recommended by manufacturer for adhering tactile warning surfacing unit to pavement.
- C. Sealant: As recommended by manufacturer for sealing perimeter of tactile warning

surfacing unit.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that pavement is in suitable condition to begin installation according to manufacturer's written instructions. Verify that installation of tactile warning surfacing will comply with accessibility requirements upon completion.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF TACTILE WARNING SURFACING

- A. General: Prepare substrate and install tactile warning surfacing according to manufacturer's written instructions unless otherwise indicated.
- B. Place tactile warning surfacing units in dimensions and orientation indicated. Comply with location requirements of AASHTO MP 12.

3.3 INSTALLATION OF DETECTABLE WARNING MATS

- A. Lay out detectable warning mats as indicated and mark concrete pavement at edges of mats.
- B. Prepare existing paving surface by grinding and cleaning as recommended by manufacturer.
- C. Apply adhesive to back of mat in amounts and pattern recommended by manufacturer, and set mat in place. Firmly seat mat in adhesive bed, eliminating air pockets and establishing full adhesion to pavement. If necessary, temporarily apply weight to mat to ensure full contact with adhesive.
- D. Install anchor devices through face of mat and into pavement using anchors located as recommended by manufacturer. Set heads of anchors flush with mat surface.
- E. Mask mat perimeter and adjacent concrete, and apply sealant in continuous bead around perimeter of mat.
- F. Remove masking, adhesive, excess sealant, and soil from exposed surfaces of detectable warning mat and surrounding concrete pavement using cleaning agents recommended in writing by manufacturer.
- G. Protect installed mat from traffic until adhesive has set.

3.4 CLEANING AND PROTECTION

- A. Remove and replace tactile warning surfacing that is broken or damaged or does not comply with requirements in this Section. Remove in complete sections from joint to joint unless otherwise approved by Architect. Replace using tactile warning surfacing installation methods acceptable to Architect.
- B. Protect tactile warning surfacing from damage and maintain free of stains, discoloration, dirt, and other foreign material.

END OF SECTION 32 1726

SECTION 32 3113 - CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Chain-link fence framework.
2. Chain-link fence fabric.
3. Chain-link fittings.
4. Chain-link swing gates.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for cast-in-place concrete for post footings .

1.2 ACTION SUBMITTALS

A. Product Data:

1. For each type of product.
 - a. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
 - b. Fence and gate posts, rails, and fittings.
 - c. Chain-link fabric, reinforcements, gate types, hardware, and attachments.
 - d. Accessories: Privacy slats.
 - e. Gates and hardware.

1.3 FIELD CONDITIONS

- A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

PART 2 - PRODUCTS

2.1 CHAIN-LINK FENCES, GENERAL

- A. CLFMI Publications: Comply with the CLFMI Product Manual unless modified by requirements in the Contract Documents.

- B. Chain-Link Fence and Gate Assemblies: Include materials applicable for a complete assembly of application types, consisting of commercial, industrial, and security chain-link fences and gates.

1. Source Limitations: Obtain chain-link fence and gate components from single source or manufacturer.

2.2 CHAIN-LINK FENCE FRAMEWORK

- A. Posts and Rails <Insert drawing designation>: ASTM F1043 for framework, including rails, braces, and line; terminal; and corner posts. Provide members with minimum dimensions and wall thicknesses in accordance with ASTM F1043 based on the following:

1. Fence Height: As indicated on Drawings.
2. Light-Industrial-Strength Material: Group IC-L, round steel pipe, electric-resistance-welded pipe.
 - a. Line Post: 1.9 inches in diameter.
3. Horizontal Framework Members: top rails in accordance with ASTM F1043.
4. Metallic Coating for Steel Framework:
 - a. Type A: Not less than minimum 2.0 oz./sq. ft. average zinc coating in accordance with ASTM A123/A123M or 4.0 oz./sq. ft. zinc coating in accordance with ASTM A653/A653M.

2.3 CHAIN-LINK FENCE FABRIC

- A. General: Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist in accordance with "CLFMI Product Manual" and requirements indicated below:

1. Fabric Height: As indicated on Drawings.
2. Steel Wire for Fabric: Wire diameter of 0.120 inch.
 - a. Mesh Size: 2 inches.
 - b. Zinc-Coated Fabric: ASTM A392, Type II, Class 1, 1.2 oz./sq. ft. with zinc coating applied before weaving.
3. Selvage: Twisted top and knuckled bottom.

2.4 CHAIN-LINK FITTINGS

- A. Provide fittings in accordance with ASTM F626.
- B. Post Caps: Provide for each post.

1. Provide line post caps with loop to receive tension wire or top rail.
- C. Rail and Brace Ends: For each gate, corner, pull, and end post.
- D. Rail Fittings: Provide the following:
 1. Top Rail Sleeves: Pressed-steel or round-steel tubing not less than **6 inches** long.
 2. Rail Clamps: Line and corner boulevard clamps for connecting bottom rails to posts.
- E. Tension and Brace Bands: Pressed steel.
- F. Tension Bars: Steel, length not less than **2 inches** shorter than full height of chain-link fabric. Provide one bar for each gate and end post, and two for each corner and pull post, unless fabric is integrally woven into post.
- G. Tie Wires, Clips, and Fasteners: In accordance with ASTM F626.
 1. Standard Round Wire Ties: For attaching chain-link fabric to posts, rails, and frames, in accordance with the following:
 - a. Hot-Dip Galvanized Steel: **0.148-inch**- diameter wire .
- H. Finish:
 1. Metallic Coating for Pressed Steel or Cast Iron: Not less than **1.2 oz./sq. ft.** of zinc.
 2. Aluminum: Mill finish.

2.5 ACCESSORIES

- A. Privacy Slats:
 1. Tubular Polyethylene Slats: Minimum **0.023-inch**-thick tubular polyethylene, manufactured for chain-link fences from virgin polyethylene with UV inhibitor, sized to fit mesh specified for direction indicated, with vandal-resistant fasteners and lock strips.
 2. Color: As selected by Architect from manufacturer's full range.
- B. Touch-up Paint: Liquid polymer for field coating with polymer coated fencing components as recommended by manufacturer.

2.6 GROUT AND ANCHORING CEMENT

- A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout, recommended in writing by manufacturer, for exterior applications.

- B. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating, and that is recommended in writing by manufacturer for exterior applications.

2.7 CONCRETE

- A. Concrete Post Footings: Minimum 28-day compressive strength of **2500 psi**.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting performance of the Work.
 - 1. Do not begin installation before final grading is completed unless otherwise permitted by Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of **500 feet** or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 INSTALLATION OF CHAIN-LINK FENCES

- A. Install chain-link fencing in accordance with ASTM F567 and more stringent requirements specified.
 - 1. Install fencing on established boundary lines inside property line.
- B. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.
- C. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.
 - 1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
 - 2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.

- a. Concealed Concrete: Place top of concrete **2 inches** below grade to allow covering with surface material.
 - D. Tension Wire: Install in accordance with ASTM F567, maintaining plumb position and alignment of fence posts. Pull wire taut, without sags. Fasten fabric to tension wire with **0.120-inch**- diameter hog rings of same material and finish as fabric wire, spaced a maximum of **24 inches** o.c. Install tension wire in locations indicated before stretching fabric. Provide horizontal tension wire at the following locations:
 1. Extended along bottom of fence fabric. Install top tension wire through post cap loops. Install bottom tension wire within **6 inches** of bottom of fabric and tie to each post with not less than same diameter and type of wire.
 - E. Top Rail: Install in accordance with ASTM F567, maintaining plumb position and alignment of fence posts. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended in writing by fencing manufacturer.
 - F. Chain-Link Fabric: Apply fabric to inside of enclosing framework. Leave **2-inch** bottom clearance between finish grade or surface and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.
 - G. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at one end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric in accordance with ASTM F626. Bend ends of wire to minimize hazard to individuals and clothing.
 1. Maximum Spacing: Tie fabric to line posts at **12 inches** o.c. and to braces at **24 inches** o.c.
 - H. Fasteners: Install nuts for tension bands and carriage bolts on the side of fence opposite the fabric side.
 - I. Privacy Slats: Install slats in direction indicated, securely locked in place.
 1. Vertically.
- 3.4 ADJUSTING
- A. Gates: Adjust gates 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. Lubricate hardware and other moving parts.

END OF SECTION 32 3113

SECTION 32 3119 - DECORATIVE METAL FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Decorative steel fences.
2. Swing gates.
3. Horizontal-slide gates.
4. Gate operators.

B. Related Requirements:

1. Division 26 Sections for electrical service and connections for system disconnect switches and powered devices including, but not limited to, motor operators, controls, and limit switches.

1.2 ACTION SUBMITTALS

A. Product Data:

1. For each type of product.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For gate operators to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 DECORATIVE STEEL FENCES

A. Decorative Steel Fence Assembly: Fences made from steel tubing bars and shapes, hot-dip galvanized.

B. Posts: Square steel tubing.

1. Line Posts: 2-1/2 by 2-1/2 inches with 1/8-inch wall thickness.
2. End and Corner Posts: 2-1/2 by 2-1/2 inches with 1/8-inch wall thickness.
3. Swing Gate Posts: 4 by 4 inches with 3/16-inch wall thickness.
4. Horizontal-Slide Gate Post, Openings Wider than 12 Ft. (3.7 m): 4 by 4 inches with 3/16-inch wall thickness.

- C. Post Caps: Formed from steel sheet and hot-dip galvanized after forming.
- D. Rails:
 - 1. Steel Tube Rails: Square steel tubing 1 by 1 inches with **1/8-inch** wall thickness.
- E. Pickets: **3/4-inch-** square steel bars.
 - 1. Picket Placement: Extend pickets beyond top rail as indicated on Drawings and press flat and trim to produce spear point shape.
 - 2. Picket Spacing: **4 inches** clear, maximum.
- F. Fasteners: Stainless steel carriage bolts and nuts.
- G. Fabrication:
 - 1. Assemble fences into sections by welding pickets to rails.
 - a. Fabricate sections with clips welded to rails for field fastening to posts.
 - b. Drill posts and clips for fasteners before finishing to maximum extent possible.
- H. Finish exposed welds to comply with NOMMA Guideline 1, Finish #4 - good-quality, uniform undressed weld with minimal splatter.
- I. Galvanizing: For items other than hardware that are indicated to be galvanized, hot-dip galvanize to comply with ASTM A123/A123M. For hardware items, hot-dip galvanize to comply with ASTM A153/A153M.
 - 1. Hot-dip galvanize posts and rails.
 - 2. Hot-dip galvanize rail and picket assemblies after fabrication.
- J. Finish for Metallic-Coated-Steel Items: High-performance coating.

2.2 SWING GATES

- A. Gate Configuration: As indicated on Drawings.
- B. Gate Frame Height: As indicated on Drawings.
- C. Gate Opening Width: As indicated on Drawings.
- D. Gate Type: Pedestrian gate system.
- E. Galvanized-Steel Frames and Bracing: Fabricate members from square tubes **1-1/2 by 1-1/2 inches** formed from **0.108-inch** nominal-thickness, metallic-coated steel sheet or formed from **0.105-inch** nominal-thickness steel sheet and hot-dip galvanized after fabrication.
- F. Frame Corner Construction: Welded.

- G. Hardware: Latches permitting operation from both sides of gate, hinges, and keepers for each gate leaf more than **5 ft.** wide. Provide center gate stops for pairs of gates.
- H. Hinges: BHMA A156.1, Grade 1, suitable for exterior use.
 - 1. Function: 39 - Full surface, triple weight, antifriction bearing.
 - 2. Material: Wrought steel, forged steel, cast steel, or malleable iron; galvanized.
- I. Exit Hardware: BHMA A156.3, Grade 1, Type 1 (rim exit device), with push-pad-actuating bar, suitable for exterior use.
 - 1. Function: 08 - Entrance by lever. Key locks or unlocks lever.
 - 2. Mounting Channel: Bent-plate channel formed from **1/8-inch-** thick steel plate. Channel spans gate frame. Exit device is mounted on channel web, recessed between flanges, with flanges extending **1/8 inch** beyond push-pad surface.
- J. Finish exposed welds to comply with NOMMA Guideline 1, Finish #4 - good-quality, uniform undressed weld with minimal splatter.
- K. Galvanizing: For items other than hardware that are indicated to be galvanized, hot-dip galvanize to comply with ASTM A123/A123M. For hardware items, hot-dip galvanize to comply with ASTM A153/A153M.
- L. Metallic-Coated-Steel Finish: High-performance coating.

2.3 HORIZONTAL-SLIDE GATES

- A. Gate Configuration: Single leaf for vehicle assembly.
 - 1. Type:
 - a. Groundtrack slide.
- B. Gate Frame Height: As indicated on Drawings.
- C. Gate Opening Width: As indicated on Drawings.
- D. Automated vehicular gates are to comply with ASTM F2200, Class II.
- E. Galvanized-Steel Frames and Bracing: Fabricate members from square tubing.
 - 1. Frame Members: Square tubes **2-1/2 by 2-1/2 inches** formed from **0.108-inch** nominal-thickness, metallic-coated steel sheet or formed from **0.105-inch** nominal-thickness steel sheet and hot-dip galvanized after fabrication.
 - 2. Bracing Members: Square tubes **1-1/2 by 1-1/2 inches** formed from **0.108-inch** nominal-thickness, metallic-coated steel sheet or formed from **0.105-inch** nominal-thickness steel sheet and hot-dip galvanized after fabrication.
- F. Frame Corner Construction:

1. Welded frame.
- G. Hardware: Latches permitting operation from both sides of gate, roller assemblies and stops fabricated from galvanized steel.
- H. Finish exposed welds to comply with NOMMA Guideline 1, Finish #4 - good-quality, uniform undressed weld with minimal splatter.
- I. Galvanizing: For items other than hardware that are indicated to be galvanized, hot-dip galvanize to comply with ASTM A123/A123M. For hardware items, hot-dip galvanize to comply with ASTM A153/A153M.
- J. Metallic-Coated-Steel Finish: High-performance coating.

2.4 GATE OPERATORS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. **[Amazing Gates of America LLC]**
 2. **[AutoGate, Inc.]**
 3. **[Begley Automated Gate Systems]**
 4. **[Byan Systems, Inc.]**
 5. **[CAME Americas Automation LLC]**
 6. **[DoorKing, Inc]**
 7. **[Eagle Access Control Systems, Inc.]**
 8. **[FAAC USA]**
 9. **[Gates That Open, LLC]**
 10. **[HySecurity Gate, Inc.]**
 11. **[Liftmaster; The Chamberlain Group, Inc.]**
 12. **[Nice USA; Nice North America; Nice group]**
 13. **[TORXUN Inc.]**
 14. **[Tymetal Corp.; The Fort Miller Group, Inc.]**
 15. **[USAutomatic Inc.]**
 16. **[Viking Access Systems LLC; FAAC International Inc.; FAAC SpA]**
- B. Gate Operator Components: Provide factory-assembled automatic operating system designed for gate size, type, weight, and operation frequency. Provide operation control system with characteristics suitable for Project conditions, with remote-control stations, safety devices, and weatherproof enclosures; coordinate electrical requirements with building electrical system.
 1. Design operator so that motor may be removed without disturbing limit-switch adjustment and without affecting auxiliary emergency operator.
 2. Provide ASTM F2200-listed automated vehicular gates.
- C. Comply with NFPA 70.
- D. Vehicle-Sensing System: System includes automatic closing timer with adjustable time

delay and presence detector designed to open and close gate. System includes electronic detector with adjustable detection patterns, adjustable sensitivity and frequency settings, and panel indicator light designed to detect presence or transit of a vehicle over an embedded loop of wire and to emit a signal that activates the gate operator. Consult detection system manufacturer's written recommendations for number of loops consisting of multiple strands of wire, number of turns, loop size, and method of placement, and indicate locations on Drawings.

- E. Obstruction-Detection Devices: Provide each motorized gate with automatic safety sensor(s). Activation of sensor(s) causes operator to immediately function as follows:

1. Action: Reverse gate in both opening and closing cycles, and hold until clear of obstruction.

- F. Accessories:

1. Fire box.
2. Instructional, Safety, and Warning Labels and Signs: Manufacturer's standard for components and features specified.

2.5 STEEL AND IRON MATERIALS

- A. Plates, Shapes, and Bars: ASTM A36/A36M.
- B. Tubing: ASTM A500/A500M, cold-formed steel tubing.
- C. Galvanized-Steel Sheet: ASTM A653/A653M, structural quality, **Grade 50**, with **G90** coating.

2.6 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for metal alloy welded.
- B. Concrete: Normal-weight, air-entrained, ready-mix concrete complying with requirements in Section 033000 "Cast-in-Place Concrete" with a minimum 28-day compressive strength of **3000 psi**, **3-inch** slump, and **1-inch** maximum aggregate size.
- C. Nonshrink Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M and specifically recommended in writing by manufacturer for exterior applications.

2.7 METALLIC-COATED-STEEL FINISHES

- A. Galvanized Finish: Clean welds, mechanical connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.
- B. Surface Preparation: Clean surfaces of oil and other contaminants. Use cleaning

methods that do not leave residue. After cleaning, apply a conversion coating compatible with the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas and apply galvanizing repair paint, complying with SSPC-Paint 20, to comply with ASTM A780/A780M.

- C. Powder Coating: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat finish consisting of epoxy prime coat and TGIC polyester topcoat to a minimum dry film thickness of **2 mils**. Comply with coating manufacturer's written instructions to achieve a minimum total dry film thickness of **4 mils**.
 - 1. Color and Gloss: As selected by Architect from manufacturer's full range.
 - 2. Comply with surface finish testing requirements in ASTM F2408.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, construction layout, and other conditions affecting performance of the Work.
- B. Do not begin installation before final grading is completed unless otherwise permitted by Architect.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of **500 ft.** or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.
 - 1. Construction layout and field engineering are specified in Section 017300 "Execution."

3.3 INSTALLATION OF DECORATIVE FENCES

- A. Install fences in accordance with manufacturer's written instructions.
- B. Install fences by setting posts as indicated on Drawings and fastening rails to posts.
- C. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.
 - 1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
 - 2. Posts Set in Concrete: Extend post to within **6 inches** of specified excavation depth, but not closer than **3 inches** to bottom of concrete.

3. Space posts uniformly at **6 ft.** o.c.

3.4 INSTALLATION OF GATES

- A. Install gates in accordance with manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

3.5 INSTALLATION OF GATE OPERATORS

- A. General: Install gate operators in accordance with manufacturer's written instructions, aligned and true to fence line and grade.
- B. Excavation: Hand-excavate holes for concrete bases in firm, undisturbed soil to dimensions and depths and at locations as required by gate operator component manufacturer's written instructions and as indicated on Drawings.
- C. Concrete Bases: Cast-in-place or precast concrete, depth not less than **12 inches**, dimensioned and reinforced in accordance with gate operator component manufacturer's written instructions and as indicated on Drawings.
- D. Vehicle-Sensing System: bury and seal wire loop in accordance with manufacturer's written instructions. Connect to equipment operated by detector.
- E. Comply with NFPA 70 and manufacturer's written instructions for grounding of electric-powered motors, controls, and other devices.

3.6 ADJUSTING

- A. Gates: Adjust gates 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. Automatic Gate Operators: Energize circuits to electrical equipment and devices. Adjust operators, controls, safety devices, and limit switches.
 1. Hydraulic Operators: Purge operating system, adjust pressure and fluid levels, and check for leaks.
 2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Lubricate hardware, gate operators, and other moving parts.

Skarphol/Frank Associates
7005

Household Hazardous Waste
Facility
Bakersfield, California

END OF SECTION 32 3119

SECTION 32 3300 - SITE FURNISHINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Bicycle racks.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For site furnishings to include in maintenance manuals.

1.4 PAYMENT PROCEDURES

- A. The payment quantity of monument signage listed shown in the Bid Item List will be paid for at the contract price per each item furnished for Item No. 23 – Monument Signage.
- B. The payment quantity of directional signage listed shown in the Bid Item List will be paid for at the contract price per each item furnished for Item No. 24 – Directional Signage.

PART 2 - PRODUCTS

2.1 BICYCLE RACKS

A. Bicycle Rack Construction:

1. Frame: Galvanized steel.
 - a. Pipe OD: Not less than **2-3/8 inches**.
2. Style: Double-side parking.
 - a. Capacity: Designed to accommodate no fewer than two bicycles.
3. Accessories: Base covers for each pipe and tubing anchored end.

4. Installation Method: Surface flange anchored at finished grade to substrate indicated.

B. Steel Finish: Galvanized.

1. Color: As indicated by manufacturer's designation.

2.2 MATERIALS

A. Steel and Iron: Free of surface blemishes and complying with the following:

1. Plates, Shapes, and Bars: ASTM A36/A36M.
2. Steel Pipe: Standard-weight steel pipe complying with ASTM A53/A53M, or electric-resistance-welded pipe complying with ASTM A135/A135M.
3. Tubing: Cold-formed steel tubing complying with ASTM A500/A500M.
4. Mechanical Tubing: Cold-rolled, electric-resistance-welded carbon or alloy steel tubing complying with ASTM A513/A513M, or steel tubing fabricated from steel complying with ASTM A1011/A1011M and complying with dimensional tolerances in ASTM A500/A500M; zinc coated internally and externally.
5. Sheet: Commercial steel sheet complying with ASTM A1011/A1011M.

B. Anchors, Fasteners, Fittings, and Hardware: Manufacturer's standard, corrosion-resistant-coated or noncorrodible materials; commercial quality.

C. Galvanizing: Where indicated for steel and iron components, provide the following protective zinc coating applied to components after fabrication:

1. Hot-Dip Galvanizing: According to ASTM A123/A123M, ASTM A153/A153M, or ASTM A924/A924M.

2.3 FABRICATION

A. Metal Components:

B. Form to required shapes and sizes with true, consistent curves, lines, and angles. Separate metals from dissimilar materials to prevent electrolytic action.

C. Pipes and Tubes: Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of handrail and railing components.

D. Factory Assembly: Factory assemble components to greatest extent possible to minimize field assembly. Clearly mark units for assembly in the field.

2.4 GENERAL FINISH REQUIREMENTS

A. Appearance of Finished Work: Noticeable variations in same piece are unacceptable.

Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.5 STEEL AND GALVANIZED-STEEL FINISHES

- A. Powder-Coat Finish: Manufacturer's standard polyester, powder-coat finish complying with finish manufacturer's written instructions for surface preparation, including pretreatment, application, baking, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 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 of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- 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 at locations indicated on Drawings.

END OF SECTION 32 3300

SECTION 32 8400 - PLANTING IRRIGATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide all labor, materials, transportation, and services necessary to furnish and install the irrigation system as shown on the drawings and described herein.

1.2 QUALITY ASSURANCE

- A. Qualifications:

- 1. The Contractor and its on-site job superintendent shall have regularly engaged and specialized, for the preceding five years, in the installation of irrigation systems of similar scope, size and complexity as the system being installed under this contract.

- B. Manufacturer's Directions:

- 1. Manufacturer's directions and detailed drawings shall be followed in all cases where the manufacturers of articles used in this Contract furnish directions covering points not shown in the Drawings and Specifications.

- C. Explanation of Drawings:

- 1. Due to the scale of the Drawings, it is not possible to indicate all offsets, fittings, sleeves, etc., which may be required. The Contractor shall carefully investigate the structural and finished conditions affecting all of his work and plan his work accordingly, furnishing such fittings, etc., as may be required to meet such conditions. Drawings are generally diagrammatic and indicative of the work to be installed. The work shall be installed in such a manner as to avoid conflicts between the irrigation system, planting, underground utilities, above ground utilities and architectural features.
 - 2. Work called for on the Drawings by notes or details shall be furnished and installed whether or not specifically mentioned in the Specifications.
 - 3. The Contractor shall not willfully install the irrigation system as shown on the Drawings when it is obvious in the field that obstructions, grade differences, or discrepancies in area dimensions exist that might not have been considered in engineering. Such obstructions or differences should be brought to the attention of the Owner's Authorized Representative. In the event this notification is not performed, the Contractor shall assume full responsibility for any revision necessary.

- D. Protection of Work and Materials

- 1. Contractor shall protect its work and work of others for the duration of the

Contract. Contractor shall protect pipes and fittings from direct sunlight, and avoid undue bending and any concentrated external loading. Pipe or fittings that have been damaged shall not be used.

2. Contractor shall exercise extreme care in excavating and working near utilities. Damage to utilities that are caused by Contractor's operation shall be the Contractor's responsibility.
3. Contractor shall take necessary precautions to protect site conditions and plant material. Should damage be incurred, Contractor shall repair damage to its original condition or furnish and install equal replacements.

E. Correction of Work

1. Discrepancies or unsatisfactory work shall be corrected by Contractor. The correction of work shall be finished with a reasonable period mutually agreed upon between Owner and Contractor.

F. Materials

1. Use only new materials of brands and types noted on the Drawings, specified herein.

1.3 ACTION SUBMITTALS

A. Material list:

1. The Contractor shall furnish the articles, equipment, materials, or processes specified by name in the Drawings and Specifications. No substitution will be allowed without prior written approval by the Owner's Authorized Representative.
2. Complete material list shall be submitted prior to performing any work. Material list shall include the manufacturer, model number, and description of all materials and equipment to be used.
3. Although manufacturer and other information may be different, the following is a guide to proper submittal format:

Item	Manufacturer	Model Number	Description
	Pacific Plastics	Main line piping per Specification	PVC Class 315 with solvent welded joints for sizes 2" and larger and PVC Schedule 40 with solvent welded for sizes 1-1/2" and smaller.
	Paige Electric	Irrigation Control wire	# 14 UF UL approved for control wire and # 12 UF UL approved for common wire.
	Lasco	Slo-Close	Schedule 80 PVC Ball valves 3" and smaller.
	Rain Bird	1806-SAM-PRS	6" pop-up spray head

with Rain Bird "MPR"
nozzles.
Etc.

Etc.

Etc.

4. Irrigation submittal must be specific and complete with a full description of product use. All items must be listed and should include solvent/primer, wire, wire connectors, valve boxes, etc. No copies of manufacturer's literature (catalog cuts) are required as submittal information.
5. The Contractor may submit substitutions for equipment and materials listed on the Irrigation Drawings by following procedures as outlined in Section 1.07 of the Irrigation Specifications.
6. Equipment or materials installed or furnished without prior approval of the Owner's Authorized Representative may be rejected and the Contractor may be required to remove such materials from the site at his own expense.
7. Approval of any item, alternative or substitute, indicates only that the product or products apparently meet the requirements of the Drawings and Specifications on the basis of the information or samples submitted.
8. Manufacturer's warranties shall not relieve the Contractor of his liability under the guarantee. Such warranties shall only supplement the guarantee.

B. Record drawings:

1. At the final walk through and before the start of plant establishment, the Contractor shall provide a complete set of irrigation red lined set of "as-built" record drawings to the irrigation consultant of record or the designated Owner's Authorized Representative for review and approval.
2. After review and approval of the red lined set of "as-built" record drawings, the Contractor's "as-built" information shall be transferred to AutoCAD electronic "Record Drawing" files by the irrigation consultant of record or the designated Owner's Authorized Representative.
3. The Contractors' preparation of irrigation red lined "as-built" record drawings shall include the following:
 - a. The Contractor shall provide and keep up-to-date a complete record set of plain paper prints which shall be corrected daily, showing changes from the original Drawings and Specifications and shall show the installed locations, sizes, and kinds of equipment. Prints for this purpose may be obtained from the Owner's Authorized Representative. This set of drawings shall be kept on the site and shall be used only as a record set.
 - b. These irrigation red lined "as-built" record drawings shall also serve as work progress sheets and shall be the basis for measurement and payment for work completed. These drawings shall be available at all times for review by the consultant and shall be kept in a location designated by the Owner's Authorized Representative.
 - c. The Contractor shall daily make neat and legible red lined notations on the record drawing progress sheets as the work proceeds, showing the work as actually installed. For example, should a piece of equipment be installed in a location that does not match the plan, the Contractor must indicate the equipment that has been relocated in a graphic manner. The relocated equipment symbol shall match the original symbols as indicated

in the irrigation legend. The relocated equipment and dimensions will then be transferred to the original record drawing plan at the proper time.

- d. The Contractor shall accurately record on one (1) set of record drawings all changes to the work constituting departures from the original approved drawings, including but not limited to work by Change Order, clarifications made via letters of Instruction, and Requests for Information. The changes and dimensions shall be recorded in a legible and workmanlike manner to the satisfaction of the Owner Authorized Representative.
 - e. The Contractor shall dimension from two (2) permanent points of reference, such as building corners, sidewalk edges, road intersections, etc., the location of the following items:
 - 1) Connection to existing water lines.
 - 2) Connection to existing electrical power.
 - 3) Gate valves.
 - 4) Routing of sprinkler pressure lines (dimension max. 100' along routing and at each change of direction).
 - 5) Electric control valves.
 - 6) Routing of control wiring and flow sensor cable.
 - 7) Quick coupling valves.
 - 8) Other related equipment as directed by the Owner's Authorized Representative.
- 4. In the event that Contractor provided redlined "as-built" information is missing, is not legible, or does not fit within the drawing parameters when the redlined "as-built" information is being transferred to AutoCAD electronic "Record Drawing" files by the irrigation consultant of record or the designated Owner's Authorized Representative, the Contractor shall be required to provide updated information at no cost to the Owner.
 - 5. All dimensioning shown on drawings shall be minimum 1/10-inch in size when reduced to minimum controller chart size of 11" x 17". The "record drawings" shall show the locations and depths of all items listed above and any other related equipment as directed by the Owner.
 - 6. Final record drawing submittal shall include two sets of black-line bond plots along with one digital file on CD-ROM of the irrigation record drawings in AutoCAD and PDF formats. When completed, the plots and CD-ROM shall be submitted to the landscape Architect who shall turnover the items to the Owner prior to final acceptance of the irrigation system by the Owner.

C. Controller charts:

- 1. Once the AutoCAD electronic "Record Drawing" files have been completed controller charts shall be prepared by the irrigation consultant of record or the designated Owner's Authorized Representative.
- 2. The controller chart deliverable package shall include:
 - a. One composite chart that shows the entire area controlled by each automatic controller. It shall be 11" X 17" in size or other approved size. It shall be prepared in AutoCAD format in the same manner as record drawings except that dimensions will not be required on the composite

- controller chart drawing.
 - b. Controller charts with dimensions for each sheet of the irrigation construction document package and shall be 11" X 17" in size or other approved size and shall be prepared in AutoCAD format in the same manner as record drawings. The legend sheet will be required as a part of the controller chart submittal, however the detail sheets will not be required.
3. The charts are to be a reduced drawing of the actual installed system. However, in the event the controller sequence is not legible when the drawing is reduced, it shall be enlarged to a size that will be readable when reduced. All dimensioning shown on the controller chart shall be minimum 1/10-inch in size.
 4. The chart shall be a plain paper print. A different color shall be used to indicate the entire landscape area of coverage for each station's control valve.
 5. When completed and approved, the chart shall be hermetically sealed between two (2) pieces of plastic, each piece being a minimum 10 mils with one-half inch (1/2") of the laminated plastic extending beyond the edge of the controller chart and shall have rounded corners. Provide two (2) charts for each controller.
 6. When completed the charts shall be submitted to the landscape Architect who shall turn over the charts to the Owner prior to final acceptance of the irrigation system by the Owner. Include the controller charts in AutoCAD and PDF formats files as part of the record drawing CD-ROM.

D. Operation and Maintenance Manuals:

1. Prepare and deliver to the Owner's Authorized Representative within ten (10) calendar days prior to completion of construction, two (2) hard-cover, three-ring binders containing the following information:
 - a. Index sheet which states Contractor's name, address, and telephone number, and which lists each installed equipment and material item, including names and addresses of manufacturers' local representatives.
 - b. Catalog and parts sheets on every material and equipment item installed under this Contract.
 - c. Complete operating and maintenance instructions on all major equipment.
 - d. Guarantee statement.
 - e. Manufacturer/Distributor installation certification letter for each controller installed under this contract.
 - f. Completed local water district irrigation "Approval" forms for water usage.
 - g. Completed Irrigation Guarantee Statement.
 - h. Southern California Edison billing information.
 - i. Local water district billing and water meter information.
 - j. Acceptance document signed by Owner's authorized representative.
2. In addition to the above-mentioned maintenance manuals, provide the Owner's maintenance personnel with instructions for major equipment and show evidence in writing to the Owner's Authorized Representative prior to start of landscape maintenance that this service has been rendered.

E. Contractor Furnished Equipment:

1. Supply as a part of this contract the following:
 - a. Operation and maintenance manuals.
 - b. Irrigation controller certification letter from an Authorized Hunter irrigation controller Distributor for each controller installed under this contract.
 - c. Two (2) keys for each irrigation controller.
 - d. One (1) set of special tools required for removing, disassembling and adjusting each type of sprinkler and valve supplied on this project.
 - e. A minimum of one (1) five-foot key for operation of gate valves. Provide one (1) key for each type of operating device (2" operating nut, cross handle, etc.).
 - f. Two (2) quick coupler keys and matching hose swivel for each type of quick coupling valve installed.
 - g. Irrigation controller manuals.
 - h. Color-coded controller charts laminated between 2 pieces of 10 mil plastic – Provide two charts for each irrigation controller.
 - i. Two plain paper copies of record drawing irrigation plans.
 - j. Completed local water district irrigation "Approval" forms for water usage.
 - k. Completed Irrigation Guarantee Statement.
 - l. Southern California Edison billing information.
 - m. Local water district billing and water meter information.
 - n. Acceptance document to be signed by Owner's authorized representative.
2. The above-mentioned equipment shall be turned over to the Owner prior to start of landscape maintenance. Before landscape maintenance and final observation to start can occur, evidence that the Owner has received these items must be shown to the Owner's Authorized Representative. Refer to "TURNOVER, AND ACCEPTANCE FORM" portion of these specifications for additional information.

F. Checklist:

1. Provide the Owner with the following checklist information at the end of each segment of the project. This checklist shall be completed prior to start of maintenance.
 - a. Plumbing permits obtained: If none required, so state.
 - b. Material approvals. By who approved and date.
 - c. Pressure line tests: By who approved and date.
 - d. Manufacturer's warranties, if required: Recipient and date.
 - e. Written guarantee: Recipient and date.
 - f. Lowering of heads in lawn areas: If not complete, so state and include anticipated completion date.
 - g. Install anti-drain valve protection as required to prevent low head drainage.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. sHandling of PVC Pipe and Fittings: The Contractor is cautioned to exercise care in handling, loading, unloading, and storing PVC pipe and fittings. PVC pipe shall be

transported in a vehicle, which allows the length of pipe to lie flat so as not to subject it to undue bending or a concentrated external load at any point. Any section of pipe that has been dented or damaged will be discarded, and if installed, shall be replaced with new piping.

1.5 QUALIFICATION OF IRRIGATION PERSONNEL

- A. Contractor and on site field superintendent shall have the following minimum qualifications:
 - 1. Not less than five (5) years continuous experience in installation of commercial irrigation systems.
 - 2. Upon Owner's request, supply a list of references listing successfully completed commercial irrigation systems.
 - 3. Provide at least one person who can speak, read and write English. This person shall be present at all times during the execution of the work and who shall be thoroughly familiar with the type of materials being installed, the material manufacturer's recommended methods of installation and who shall direct all work performed.

1.6 SUBSTITUTIONS

- A. If the Contractor wishes to substitute any equipment or materials for the equipment or materials listed on the Drawings and Specifications, provide the following information to the Owner's Authorized Representative for review:
 - 1. Provide a statement indicating the reason for making the substitution. Use a separate sheet of paper for each item to be substituted.
 - 2. Provide descriptive catalog literature, performance charts and flow charts for each item to be substituted.
 - 3. Provide the amount of cost savings if the substituted item is approved.
- B. The Owner's Authorized Representative shall have the sole responsibility in accepting or rejecting any substituted item as an approved equal to the equipment and materials listed on the Drawings and Specifications.

1.7 PROJECT CONDITIONS

- A. Coordinate Work with that of other trades, all underground improvements, the location and planting of specimen trees and other planting material. Verify location of all planting material that requires excavations 24 inches in diameter and larger with Owner's Authorized Representative prior to installation of main line piping.
- B. Provide temporary irrigation to maintain installed plant material prior to permanent irrigation where required.

1.8 GUARANTEE

- A. The guarantee for the irrigation system shall be made in accordance with the attached form. The General Conditions and Supplementary Conditions of these Specifications shall be filed with the Owner prior to acceptance of the irrigation system.
- B. A copy of the guarantee form shall be included in the operations and maintenance manual.
- C. The guarantee form shall be re-typed onto the Contractor's letterhead and shall contain the following information:

GUARANTEE FOR IRRIGATION SYSTEM

We hereby guarantee that the irrigation system we have furnished and installed is free from defects in materials and workmanship, and the work has been completed in accordance with the Drawings and Specifications, ordinary wear and tear, unusual abuse, or neglect excepted. We agree to repair or replace any defects in material or workmanship which may develop during the period of one (1) year from date of acceptance and also to repair or replace any damage resulting from the repairing or replacing of such defects at no additional costs to the Owner. We shall make such repairs or replacements within a reasonable time, as determined by the Owner, after receipt of written notice. In the event of our failure to make such repairs or replacements within a reasonable time after receipt of written notice from the Owner, we authorize the Owner to proceed to have said repairs or replacements made at our expense and we will pay the costs and charges therefore upon demand.

PROJECT NAME: _____

PROJECT LOCATION: _____

SIGNED BY:

—

CONTRACTORS ADDRESS:

CONTRACTOR'S PHONE NO.: _____

DATE OF ACCEPTANCE: _____

TURNOVER TO OWNER

The following checklist, turnover and acceptance forms shall be re-typed onto the Contractor's letterhead. The form shall be completed by the contractor and shall contain the all of the information shown on this sample checklist form and turned over to the Owner prior to start of maintenance:

TURNOVER AND ACCEPTANCE FORM

PROJECT NAME: _____

PROJECT LOCATION: _____

-

TURNOVER ITEMS:

- ☐ Operation and maintenance manuals.
- ☐ Irrigation controller certification letter from the Authorized Hunter Distributor for each controller installed under this contract.
- ☐ Two (2) keys for each irrigation controller.
- ☐ One (1) set of special tools required for removing, disassembling and adjusting each type of sprinkler and valve.
- ☐ A minimum of one (1) five-foot key for operation of each type of gate valve.
- ☐ Two (2) quick coupler keys and matching hose swivel for each type of quick coupling valve.
- ☐ Irrigation controller manuals.
- ☐ Two copies of 11" x 17" color-coded controller charts laminated between two (2) pieces of 10 mil plastic for a total of 20 mil thickness – Provide two charts for each controller.
- ☐ Two sets of plain paper copy prints of irrigation record drawings.
- ☐ One (1) digital file on CD-ROM of the irrigation record drawings and controller charts in PDF format.
- ☐ Completed local water district irrigation "Approval" forms for water usage.
- ☐ Completed Irrigation Guarantee Statement.
- ☐ Southern California Edison billing information.
- ☐ Local water district billing and water meter information.

DELIVERED BY:

ACCEPTED BY:

Name of Contractor

Owner

Name of Contractor's Authorized Representative

Owner

Signature Contractor's Authorized Representative

Owner

Date of Deliverance to Owner

Owner

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Use only new materials of brands and types noted on drawings, specified herein, or approved equals.
- B. PVC Pressure Main Line Pipe and Fittings: (Use purple pipe for irrigation systems carrying recycled water and white pipe for irrigation systems carrying domestic water)
 - 1. Pressure main line piping for sizes two inches (2") and larger shall be PVC Class 315.
 - 2. Class 315 PVC pipe shall be made from an NSF approved Type I, Grade I, PVC compound conforming to ASTM resin specification D1784. Pipe must meet requirements as set forth in Federal Specification PS22-70, with an appropriate standard dimension (S.D.R.) (Solvent-weld Pipe).
 - 3. Pressure main line piping for sizes one and one-half inches (1-1/2") and smaller shall be Schedule 40 PVC with solvent welded joints.
 - 4. Schedule 40 PVC pipe shall be made from NSF approved Type I, Grade I PVC compound conforming to ASTM resin specification D1785. Pipe must meet requirements as set forth in Federal Specification PS-21-70.
 - 5. PVC solvent-weld fittings shall be Schedule 40 PVC, 1-2, II-I NSF approved conforming to ASTM test procedure D2466.
 - 6. Solvent cement and primer for PVC solvent-weld pipe and fittings shall be of type and installation methods prescribed by the manufacturer.
 - 7. PVC pipe must bear the following markings:
 - a. Manufacturer's name
 - b. Nominal pipe size
 - c. Schedule or class
 - d. Pressure rating in P.S.I.
 - e. NSF (National Sanitation Foundation) approval
 - f. Date of extrusion
 - 8. Fittings shall bear the manufacturer's name or trademark, material designation, size, applicable I.P.S. schedule and NSF seal of approval.
- C. PVC Non-Pressure Lateral Line Pipe and Fittings: (Use purple colored pipe for irrigation system carrying recycled water and white pipe for irrigation system carrying domestic water)
 - 1. Non-pressure buried lateral line piping shall be Schedule 40 PVC with solvent-

weld joints when installed in on-site planting areas and PVC when installed within on-site maintained City Right-of-Way planting areas.

2. Non-pressure lateral line piping installed under paved areas shall be PVC with solvent welded joints.
3. Pipe shall be made from NSF approved, Type I, Grade II PVC compound conforming to ASTM resin specification D1784. Pipe must meet requirements set forth in Federal Specification PS-22-70 with an appropriate standard dimension ratio.
4. Except as noted in paragraphs 1, 2, and 3 of this section (2.01C), all requirements for non-pressure lateral line pipe and fittings shall be the same as for solvent-weld pressure main line pipe and fittings as set forth in section 2.01B of these Specifications.

D. Brass Pipe and Fittings:

1. Where indicated on the Drawings, use red brass threaded pipe conforming to Federal Specification #WW-P-351.
2. Fittings shall be red brass conforming to Federal Specification #WW-P-460.

E. Copper Pipe and Fittings:

1. Pipe: Type K, hard tempered
2. Fittings: wrought copper, solder joint type
3. Joints shall be soldered with silver solder, 45% silver, 15% copper, 16% zinc, 24% cadmium, solidus at 1125o F. and liquidus at 1145o F.

F. Galvanized Pipe and Fittings:

1. Where indicated on the Drawings, use galvanized steel pipe ASA Schedule 40 mild steel threaded pipe.
2. Fittings shall be medium galvanized threaded beaded malleable iron. Galvanized couplings may be merchant coupling.
3. Galvanized pipe and fittings installed below grade shall be painted with two (2) coats of Koppers #50 bitumastic.

G. Ball Valves / Butterfly Valves:

1. Ball valves 3" and smaller shall meet the following requirements:
 - a. Manual ball valves shall be PVC w/EPDM O-Rings and socket end connectors.
 - b. Manual ball valves shall have thermoplastic gear driven operating nut rotates 360° to achieve a 90° turn of the ball.
 - c. Manual ball valves shall be Lasco Slo-Close full block true union ball valves
2. Ball valves shall be installed per installation details.

H. Quick Coupling Valve:

1. Quick coupling valves shall have a brass, two-piece body designed for working pressure of 150 P.S.I.

2. Quick coupling valve shall be operable with a quick coupler key. Key size and type shall be as shown on the Drawings.

I. Master Valve:

1. Pressure regulating master valves shall be Superior 3100 series 3100xxxPRS with Superior Solenoid for sizes 1"-3" where xxx equals valve size.
2. Master valve shall be used for potable water systems and shall have 24 volt normally open (energize to close) solenoid operation.
3. Assemblies two inches (2") and larger shall be flanged with stainless steel nuts and bolts. Assemblies one and one-half inches (1-1/2") and smaller shall be threaded.
4. Ball valves one inch to three inches (1" to 3") shall be Lasco Slo-Close full block true union PVC ball valves.
5. Install entire assembly within a Carson Model #24 series deep plastic vault and plastic bolt-down cover as follows:

Assembly Size	Model No.	Inside Vault Size (LxWxD)
a. 1-1/2"	2448	51" x 27" x 30"
b. 2"	2448	51" x 27" x 30"
c. 2-1/2"	2448	51" x 27" x 30"
d. 3"	2460	63" x 27" x 30"

J. Reverse Pressure Backflow Prevention Device:

1. Reverse Pressure Backflow Prevention Device shall be Febco 825Y, size as shown on the Drawings.
2. Backflow Prevention Device shall be installed with a Polar Barrier Blanket.

K. Check Valve:

1. Swing check valves two inches (2") and smaller shall be of high impact PVC Type II material with an EDPM swing gate, no internal metal parts and connect with both threaded and slip-fit models. Swing check valves shall be model KSC series as manufactured by King Bros. or approved equal.
2. 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 draw out from four (4) to 32 feet of head. Anti-drain valves shall be Hunter HCV or approved equal.

L. Control Wiring:

1. Wire requirements are as follows:
 - a. Unless otherwise noted, connections between an irrigation controller and its corresponding electric control valves shall be made with direct burial copper wire AWG-U.F. 600 volt.
 - b. Master valve control and common wires shall be installed within 1-1/2 schedule 40 PVC conduit along with flow sensor cable. Conduit shall be gray in color. Wires shall be a different color than the control, common and spare wires used for the associated irrigation controller.

- c. When more than one (1) controller is installed at the same location, pilot wires shall be a different color wire for each irrigation controller. Common wires shall be white with a different color stripe for each irrigation controller. Spare wires shall be a different color than control and common wires.
 - d. Install in accordance with valve manufacturer's specifications and wire chart. In no case shall wire size be less than #14 AWG. Common wire size shall be no less than #12 AWG.
- 2. Wiring shall occupy the same trench and shall be installed along the same route as pressure supply or lateral lines wherever possible.
 - 3. Where more than one (1) wire is placed in a trench, the wiring shall be taped together at intervals of ten (10) feet.
 - 4. An expansion curl shall be provided within three (3) feet of each wire connection. Expansion curl shall be of sufficient length at each splice connection at each electric control valve, so that in case of repair, the valve bonnet may be brought to the surface without disconnecting the control wires. Control wires shall be laid loosely in trench without stress or stretching wire conductors.
 - 5. Control wire connection splices shall be made with 3M "DBY" direct bury splice kits or approved equal. Make only one (1) splice with each splice kit.
 - 6. Field splices between the irrigation controller and electric control valves will not be allowed without prior approval of the Owner's Authorized Representative.
 - 7. Two (2) continuous spare control wires shall be installed with the mainline from the controller enclosure to the ends of the mainline in every direction. A common wire shall be extended to the location where the spare wires terminate. Terminate spare wires within separate standard rectangular box or within a control valve box as designated on the drawings.

M. Weather Based Irrigation Controller Assembly:

- 1. Weather based irrigation controller(s) shall be of size and type shown on the Drawings.
 - a. Manual Operation features shall include:
 - 1) Controller shall be capable of allowing user to manually start stations for supplemental irrigation, for system testing and for system troubleshooting and repair.
 - 2) Controller shall be capable of manual operation of individual valve stations or all stations from one (1) to nine (9) hours and 59-minutes in one (1) minute increments.
 - b. Electrical Requirements:
 - 1) Transformer input: 120 VAC

N. Electric Control Valve:

- 1. Electric control valves shall be the same size and type shown on the Drawings.
- 2. Electric control valves shall have a manual flow adjustment.
- 3. Provide and install one (1) control valve box for each electric control valve.

O. Valve Box:

1. Valve boxes shall be black in color. Purple lids and purple tags to be provided for non-potable systems.
2. Use ten-inch by ten and one-quarter inch (10" x 10-1/4") round box for all gate valves, Carson Industries #910-12B with black bolt-down cover or approved equal. Extension sleeve shall be PVC with minimum size of six inches (6").
3. Use nine and one-half inch by sixteen-inch by eleven-inch (9-1/2" x 16" x 11") rectangular box for all electric control valves and ball valves, Carson Industries #1419-12B with black bolt-down cover or approved equal.
4. Use ten-inch (10") diameter x ten and one-quarter inch (10-1/4") deep round plastic valve box for all quick coupling valves, Carson Industries #910-12B with black bolt-down cover or approved equal.

P. Sprinkler Head:

1. Sprinkler heads shall be of the same size, type, and deliver the same rate of precipitation with the diameter (or radius) of throw, pressure, and discharge as shown on the Drawings and/or as specified herein.
2. Spray heads shall have a screw adjustment.
3. Riser units shall be fabricated in accordance with the installation details.
4. Riser nipples for all sprinkler heads shall be the same size as the riser opening in the sprinkler body.
5. Sprinkler heads of the same type shall be by the same manufacturer.

Q. Dripline:

1. Dripline heads shall be of the same size, type, and deliver the same rate of precipitation with the diameter (or radius) of throw, pressure, and discharge as shown on the Drawings and/or as specified herein.
2. Install air relief valve at highest point.
3. Fittings shall be utilized in accordance with the installation details
4. Install 6" soil staples every 3'-5' of tubing, plus two on each tee, elbow, or cross.
5. Dripline of the same type shall be by the same manufacturer.

R. Identification Tag:

1. I.D. tags for electric control valves shall be manufactured from Polyurethane Behr Desopan. Use Christy's standard tag hot-stamped with black letters on yellow background. Tags for electric control valves shall be numbered to match programming shown on the Drawings. Provide one (1) tag for each electric control valve.
2. I.D. tags for quick coupling valves shall be manufactured from Polyurethane Behr Desopan.
3. Special order tags from T. Christy Enterprises, 655 East Ball Road, Anaheim, CA 92805. Phone (714) 507-3300 and Fax (714) 507-3310.

S. Flow sensor and flow transmitter.

1. An irrigation main-line flow sensor shall be installed in accordance with Drawings and manufacturer's installation instructions. See Drawings for location.

- Contractor shall be responsible for the installation, hook-ups, materials, components, connections, etc., of the flow sensors, flow transmitter and pulse decoders for the complete automatic operation of the system.
2. Install as recommended by the manufacturer and as detailed.
 3. The flow sensor cable shall be a two-conductor of ICEA class B, 16 AWG, 7 strand, conforming to ASTM B-3 and B-8, aluminum shielded with drain wire, and shall have a jacket of 0.050 in. thick sunlight- and moisture-resistant PVC by Paige Electric Corp. (Product #P7162D).
 4. Flow sensor cable may be extended to a maximum distance of 2000 ft. from the location of the assembly to which it is connected. Wire shall be installed in a one and one-half inch (1-1/2") UL-listed Schedule 40 PVC conduit gray in color.
 5. Provide a separate flow sensor cable from each flow sensor to its respective designated controller. Run flow sensor cables within one and one-half inch (1-1/2") PVC Schedule 40 conduit. Refer to sensor cable, communication cable conduit, and communication cable pull boxes specified elsewhere for additional information.
 6. Control and common wires for the master valve immediately upstream from flow sensor shall be installed with different color wires.
 7. Splices shall be performed in a 3M "DBY" direct bury splice kit. Make only one (1) splice with each connector.

T. Flow Sensor Cable Conduit:

1. As a part of this Contract, the Contractor shall provide and install a flow sensor cable conduit that will be used for the future installation of communication cable(s).
2. Flow sensor cable conduit shall be Schedule 40 PVC with solvent welded joints and unless otherwise noted on the Drawings, shall be one and one-half inch (1-1/2") in size, with one-quarter inch (1/4") nylon pull rope installed within entire length of conduit. Flow sensor cable conduit shall be gray in color.
3. Except as noted in paragraph number two (above) of this section, all requirements for flow sensor cable conduit and fittings shall be the same as for solvent-weld pressure main line pipe and fittings as set forth in Section 2.1 B of these Specifications.
4. Sweep ells shall be fabricated standard electrical type PVC schedule 40 long sweep elbows. Cap sweep ell with tri-plug with the ring for securing nylon pull rope.
5. The flow sensor cable conduit shall be installed where indicated on the Drawings and shall be routed, wherever possible, with the irrigation pressure main line piping. Provide 24-inch minimum cover over all flow sensor cable conduits. Provide six-inch (6") minimum separation between communication cable conduit and irrigation pressure main line piping.
6. Pull boxes shall be located a minimum of two hundred (200) feet on center, at each irrigation controller location, and at each change of direction. Use 11-3/4" x 17" x 11" rectangular box for all pull boxes, Carson Industries #1419-12B with black bolt-down cover or approved equal. Cover shall be marked "Irrigation Control Cable." Refer to the Drawings for additional information.

U. Miscellaneous Irrigation Equipment:

1. Refer to the Drawings for sizes and types of miscellaneous irrigation equipment.
2. Miscellaneous irrigation equipment shall be as specified or approved equal.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

- A. Before work is commenced, schedule a pre-construction meeting with Owner, General Contractor, and Landscape Architect to discuss general details of the work.
- B. Verify dimensions and grades at job site before work is commenced.
- C. During the progress of the work, a competent superintendent and any assistants necessary shall be on site, all satisfactory to Owner. The superintendent shall not be changed, except with consent of Owner, unless that person proves unsatisfactory and ceases to be employed. The superintendent shall represent the Contractor in its absence and all directions given to the superintendent shall be as binding as if given to Contractor.
- D. Work indicated or noted on Drawings shall be provided whether or not specifically mentioned in the Specifications.
- E. If there are ambiguities between Drawings and Specifications, and specific interpretation or clarification is not issued prior to bidding, the interpretation or clarification will be made only by Owner, and Contractor shall comply with the decisions. In the event the installation contradicts the directions given, the installation shall be corrected by Contractor at no additional cost to Owner.
- F. Layout of sprinkler lines shown on Drawings is diagrammatic. Location of sprinkler equipment is contingent upon and subject to integration with all other underground utilities. Contractor shall employ all data contained in the Contract Documents and shall verify this information at the construction site to confirm the manner by which it relates to the installation.
- G. Coordinate the installation of all sprinkler materials, including pipe, with the landscape Drawings to avoid conflict with the trees, shrubs, or other planting material.
- H. Do not proceed with the installation of the sprinkler system when it is apparent that obstructions or grade differences exist or if conflicts in construction details, legend, or specific notes are discovered. All such obstructions, conflicts, or discrepancies shall be brought to the attention of Owner's Authorized Representative.
- I. Replace, or repair to the satisfaction of Owner, all existing paving disturbed during the course of this work. New paving shall be the same type, strength, texture, finish, and be equal in every way to the material removed.
- J. Owner reserves the right to make temporary repairs as necessary to keep equipment in operating condition without voiding Contractor's guarantee or relieving Contractor of its responsibilities during the guarantee shall not be allowed.

- K. Sprinkler heads will require installation of anti-drain devices to prevent low head drainage.
- L. Coordinate the installation of all sprinkler materials, including pipe, with the landscape Drawings to avoid conflict with the trees or other planting.

3.2 OBSERVATION OF SITE CONDITIONS

- A. Scaled dimensions are approximate. The Contractor shall check and verify all size dimensions and receive approval from the Owner's Authorized Representative prior to proceeding with work under this Section.
- B. Exercise extreme care in excavating and working near existing utilities. The Contractor shall be responsible for damages to utilities, which are caused by his operations or neglect. Check existing utilities drawings for existing utility locations.
- C. Coordinate installation of sprinkler irrigation materials including pipe, so there shall be NO interference with utilities or other construction or difficulty in planting trees, shrubs, and ground covers.
- D. The Contractor shall carefully check all grades to satisfy itself that he may safely proceed before starting work on the irrigation system. Any discrepancies between the drawings and actual site conditions shall be brought to the attention of the owner prior to proceeding with the work.

3.3 PREPARATION

- A. Physical Layout:
 - 1. Prior to installation, the Contractor shall stake out all pressure supply lines, routing and location of sprinkler heads.
 - 2. Layouts shall be reviewed by the Owner's Authorized Representative prior to installation.
- B. Water Supply:
 - 1. The irrigation system shall be connected to water supply point(s) of connection as indicated on the Drawings.
 - 2. Connections shall be made at the approximate location(s) shown on the Drawings. The Contractor is responsible for minor changes caused by actual site conditions.
- C. Electrical Supply:
 - 1. Electrical connections for any and all irrigation controllers shall be made to electrical point(s) of connection as indicated on the Drawings.
 - 2. Connections shall be made at the approximate location(s) shown on the Drawings. The Contractor is responsible for minor changes caused by actual site conditions.

3.4 INSTALLATION

A. Trenching:

1. Dig trenches straight and support pipe continuously on bottom of trench. Lay pipe to an even grade. Trenching excavation shall follow layout indicated on the Drawings and as noted.
2. Provide for a minimum of eighteen (18) inches cover for all pressure supply lines of two and one-half inch (2 ½") nominal diameter or smaller.
3. Provide for a minimum of twenty-four inches (24") cover for all pressure supply lines of three-inch (3") nominal diameter or larger.
4. Provide for a minimum of twelve inches (12") for all non-pressure lines.
5. Provide for a minimum cover of eighteen inches (18") for all control wiring.
6. Provide for a minimum cover of eighteen inches (18") for all communication cable conduits.

B. Backfilling:

1. The trenches shall not be backfilled until all required tests are performed. Trenches shall be carefully backfilled with the excavated materials approved for backfilling, consisting of earth, loam, sandy clay, sand, or other approved materials, free from large clods of earth or stones. Backfill shall be mechanically compacted in landscaped areas to a dry density equal to adjacent undisturbed soil in planting areas. Backfill will conform to adjacent grades without dips, sunken areas, humps or other surface irregularities.
2. A fine granular material backfill will be initially placed on all lines. No foreign matter larger than one-half inch (1/2") in size will be permitted in the initial backfill.
3. Flooding of trenches will be permitted only with approval of the Owner's Authorized Representative.
4. If settlement occurs and necessitates adjustments in pipe, valves, sprinkler heads, lawn, plantings, or other installed work, the Contractor shall make all required adjustments without cost to the Owner.

C. Trenching and Backfill Under Paving:

1. Trenches located under areas where paving, asphaltic concrete, or concrete will be installed, shall be backfilled with sand (a layer six inches [6"] below the pipe and three inches [3"] above the pipe) and compacted in layers to 95% compaction, using manual or mechanical tamping devices. Trenches for piping shall be compacted to equal the compaction of the existing adjacent undisturbed soil and shall be left in a firm unyielding condition. Trenches shall be left flush with the adjoining grade. The Contractor shall set in place; cap and pressure test all piping under paving prior to the paving work.
2. Generally, piping under existing walks is done by jacking, boring, or hydraulic driving, but where any cutting or breaking of sidewalks and/or concrete is necessary, it shall be done and replaced by the Contractor as a part of the Contract cost. Permission to cut or break sidewalks and/or concrete shall be obtained from the Owner's Authorized Representative. No hydraulic driving will be permitted under concrete paving.

3. Provide for a minimum cover of eighteen inches (18") between the top of the pipe and the bottom of the aggregate base for all pressure and non-pressure piping installed under asphaltic concrete paving.

D. PVC Pipe and Fittings:

1. Install PVC pipe and fittings in accordance with manufacturer's recommendations.
2. Install sprinkler head on PVC pipe as indicated on Drawings.
3. Prepare all solvent-welded joints with manufacturer's primer prior to applying solvent.
 - a. Allow solvent-welded joints at least 15 minutes set-up/curing time before moving or handling.
 - b. Partially center load pipe in trenches to prevent arching and shifting when water pressure is on.
 - c. Do not permit water in pipe until a period of at least four (4) hours has elapsed for solvent-weld setting and curing, unless recommended otherwise by solvent manufacturer.
4. Attach pipe identification tape directly to pipe as specified in SBWR regulations, where color-impregnated and stenciled pipe is not utilized.
5. Do backfilling when pipe is cool.
 - a. Pipe can be cooled by operating the system for a short time before backfill, or by backfilling in the early part of the morning before the heat of the day.
6. Curing:
 - a. When the temperature is above 80°F., allow solvent-welded joints at least 24 hours during the time before water is introduced under pressure.
 - b. When temperature is below 80°F., follow manufacturer's recommendations.

E. Assemblies:

1. Routing of sprinkler irrigation lines as indicated on the Drawings is diagrammatic. Install lines (and various assemblies) in such a manner as to conform to the details per the Drawings.
2. Install NO multiple assemblies in plastic lines. Provide each assembly with its own outlet.
3. Install all assemblies specified herein in accordance with respective detail. In absence of detail drawings or Specifications pertaining to specific items required to complete work, perform such work in accordance with best standard practice with prior approval of Owner's Authorized Representative.
4. PVC pipe and fittings shall be thoroughly cleaned of dirt, dust, and moisture before installation. Installation and solvent welding methods shall be as recommended by the pipe and fitting manufacturer.
5. On PVC to metal connections, the Contractor shall work the metal connections first. Teflon tape or approved equal, shall be used on all threaded PVC to PVC, and on all threaded PVC to metal joints. Light wrench pressure is all that is required. Where threaded PVC connections are required, use threaded PVC

adapters into which the pipe may be welded.

F. Conduit and Sleeves:

1. Coordination: Sleeving shall be considered existing only when installed under another contract. For all other installations, provide materials and coordinate conduit and sleeve installation with other trades as required to facilitate smooth construction sequence.
2. Conduit: Furnish and install conduit where control wires pass under or through walls, walks and paving. Conduits to be of adequate size to accommodate retrieval for repair of wiring and shall extend 12 inches beyond edges of walls and pavement.
3. Sleeving: Install sleeves for all pipes passing through or under walks and paving as shown on the Drawings. Sleeving to be of adequate size to accommodate retrieval of wiring or piping for repair and shall extend 12 inches beyond edges of paving or other construction.

G. Line Clearance:

1. All lines shall have a minimum clearance of six inches (6") from each other and from lines of other trades. Parallel lines shall not be installed directly over one another.

H. Irrigation Controller Enclosure Assembly:

1. Install Irrigation Controller Enclosure Assembly per drawings and per manufacturer's instructions and recommendations. Electric control valves shall be connected to controller in numerical sequence as shown on the Drawings.

I. Final location of irrigation controller enclosure assemblies shall be approved by the Owner's Authorized Representative prior to installation. High Voltage Wiring for Automatic Controller:

1. Unless otherwise noted on the Drawings, the 120 VAC electrical power to each irrigation controller location is to be furnished by others. The final electrical hook-up shall be the responsibility of the Contractor.
2. Electrical work shall conform to local codes, ordinances, and union authorities having jurisdiction.

J. Electric Control Valves and master valves:

1. Install electric control valves and master valves where shown on the Drawings. Where grouped together with other valve boxes, allow at least twelve inches (12") between adjacent valve boxes.
2. Provide identification tags to electric control valves. Electric control valves shall be connected to controller in numerical sequence as shown on the Drawings.
3. Each valve number shall be heat branded on valve box cover with one and one-half inch (1½") tall letters. Master valve box covers shall be heat branded with the controller assignment. Branding unit available from Hydroscape Products, Inc., phone number (714) 639-1850.

K. Quick Coupling Valves

1. Locate and install quick coupling valves as indicated in the drawings.

L. Ball Valves

1. Locate and install ball valves as indicated in the drawings.

M. Check Valves

1. Locate and install check valves of the size and type as indicated in the drawings.
2. Provide and install additional check valves as directed by the Owner's Authorized Representative to prevent and minimize low head drainage after shut down of irrigation system.

N. Flushing of System:

1. After all new sprinkler pipelines and risers are in place and connected, all necessary diversion work has been completed, and prior to installation of sprinkler heads, the control valves shall be opened and full head of water used to flush out the system.
2. Sprinkler heads shall be installed only after flushing of the system has been accomplished to the complete satisfaction of the Owner's Authorized Representative.

O. Sprinkler Heads:

1. Install the sprinkler heads as designated on the Drawings. Sprinkler heads to be installed in this work shall be equivalent in all respects to those itemized.
2. Spacing of heads shall not exceed the maximum indicated on the Drawings. In no case shall the spacing exceed the maximum recommended by the manufacturer.
3. Sprinkler heads shall be set perpendicular to finish grade of the area to be irrigated unless otherwise designated on the plans.

P. Drip:

1. Install the Dripline as designated on the Drawings. Dripline to be installed in this work shall be equivalent in all respects to those itemized.
2. Spacing of Dripline shall not exceed the maximum indicated on the Drawings. In no case shall the spacing exceed the maximum recommended by the manufacturer.
3. Dripline laterals shall follow the contours of the slope unless otherwise designated on the plans

3.5 TEMPORARY REPAIRS

- A. The Owner reserves the right to make temporary repairs as necessary to keep the irrigation system equipment in operating condition. The exercise of this right by the Owner shall not relieve the Contractor of his responsibilities under the terms of the

guarantee as herein specified.

3.6 FIELD QUALITY CONTROL

A. Adjustment of the System:

1. The Contractor shall flush and adjust all sprinkler heads for optimum performance and to prevent overspray onto walks, roadways, and buildings as much as possible.
2. If it is determined that adjustments in the irrigation equipment will provide proper and more adequate coverage, the Contractor shall make such adjustments prior to planting. Adjustments may also include changes in nozzle sizes and degrees of arc as required.
3. Lowering raised sprinkler heads by the Contractor shall be accomplished within ten (10) days after notification by the Owner.
4. Sprinkler heads shall be set perpendicular to finished grades unless otherwise designated on the Drawings.

B. Testing of the Irrigation System:

1. The Contractor shall request the presence of the Owner's Authorized Representative in writing at least 48 hours in advance of testing.
2. Test all pressure lines under hydrostatic pressure of 150 pounds per square inch and prove watertight. Pipe shall be center loaded with all pipe joints exposed during the pressure test.

C. Note: Testing of pressure main lines shall occur prior to installation of the electric control valves.

1. Piping under paved areas shall be tested under hydrostatic pressure of 150 pounds per square inch and proven watertight prior to paving.
2. Sustain pressure in lines for not less than two (2) hours. If leaks develop, replace joints and repeat test until entire system is proven watertight.
3. Hydrostatic tests shall be made only in the presence of the Owner's Authorized Representative. No pipe shall be backfilled until it has been observed, tested, and approved in writing.
4. Furnish necessary force pump and all other test equipment.
5. When the irrigation system is completed, perform a coverage test in the presence of the Owner's Authorized Representative to determine if the water coverage for planting areas is complete and adequate. Furnish all materials and perform all work required to correct any inadequacies of coverage due to deviations from the Drawings, or where the system has been willfully installed as indicated on the Drawings when it is obviously inadequate, without bringing this to the attention of the Owner's Authorized Representative. This test shall be accomplished before any ground cover is planted.
6. Upon completion of each phase of work, the entire system shall be tested and adjusted to meet site requirements. The contractor shall provide an irrigation water schedule for plant establishment as well as any subsequent schedule changes for review and approval by owner. Approval of irrigation schedule

indicates only that the schedule submitted apparently meets the scheduling requirements of plant materials on the basis of the information submitted. Any adjustments to the schedule based on plants actual water needs or changes in weather conditions shall be the responsibility of the contractor.

3.7 MAINTENANCE

- A. The entire irrigation system shall be under full automatic operation for a period of seven (7) days prior to any planting.
- B. The Owner's Authorized Representative reserves the right to waive or shorten the operation period.

3.8 CLEAN-UP

- A. Clean up shall be made as each portion of work progresses. Refuse and excess dirt shall be removed from the site, all walks and paving shall be broomed or washed down, and any damage occurring to the work of others shall be repaired to original conditions.

3.9 FINAL SITE OBSERVATION PRIOR TO ACCEPTANCE

- A. The Contractor shall operate each system in its entirety for the Owner's Authorized Representative at time of final observation. Any items deemed not acceptable by the Owner's Authorized Representative shall be reworked to the complete satisfaction of the Owner's Authorized Representative.
- B. The Contractor shall show evidence to the Owner's Authorized Representative that the Owner has received all accessories, charts, record drawings, and equipment as required before final site observation can occur.

3.10 SITE OBSERVATION SCHEDULE

- A. The Contractor shall be responsible for notifying the Owner's Authorized Representative in advance for the following observation meetings, according to the time indicated:
 - 1. Pre-Job Conference – seven (7) days
 - 2. Pressure supply line installation and testing - 48 hours
 - 3. Irrigation controller installation - 48 hours
 - 4. Irrigation controller activation and scheduling - 48 hours
 - 5. Control wire installation - 48 hours
 - 6. Lateral line and sprinkler installation - 48 hours
 - 7. Point of connection installation – 48 hours
 - 8. Master Valve, basket strainer and flow sensor installation – 48 hours
 - 9. Flow sensor conduit installation – 48 hours
 - 10. Coverage test - 48 hours

11. Final site observation – seven (7) days

- B. When site observations have been conducted by a party other than the Owner's Authorized Representative, show evidence in writing of when and by whom these observations were made.
- C. Prior to walking irrigation system with Owner's Authorized Representative, the Contractor shall pre-walk irrigation system with its own crew to ensure compliance with plans and specifications. The Contractor shall observe those items shown on the construction observation check list below and initial and date that the all items observed are in accordance with plans and specifications. This list shall be presented to the Owner's Authorized Representative prior to the final irrigation walkthrough with the Owner's Authorized Representative.

END OF SECTION 32 8400

SECTION 32 9300 - PLANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Contractor to furnish all labor, material, equipment, and services required to install all landscape planting, as indicated on the approved drawings and as specified herein, and shall perform all other incidental work necessary to carry out the intent of this specification and drawings including the following:
 - 1. Fine grading, soil preparation, planting of trees, shrubs, vines, ground covers and turf, guying and staking trees, and weed abatement.
 - 2. Establishment/Maintenance Period.
 - 3. Provide guarantee.

1.2 AGRONOMIC SOILS REPORT (ON GRADE CONDITION)

- A. After completion of rough grading and prior to soil preparation, the Contractor shall at Contractor's own cost provide the testing of planting at an independent agronomic soils testing laboratory, (member of the California Association of Agricultural Labs) or approved equal agricultural soils testing laboratory shall conform to Section B. Agronomic Testing Laboratory Criteria approved by Owner. Representative soil samples shall be taken in the field and a written report shall be prepared by the agronomist and shall include recommendations for soil amendments and application rates for soil preparation pre-plant fertilization, planting backfill mix, hydromulch slurry and auger hole requirements, and post-maintenance fertilization program.
- B. Agronomic Testing Lab Criteria:
 - 1. Methodology: Must include pH measurement in the Saturation Extract, Electrical Conductivity of the Saturation Extract and Sodium Adsorption Ratio of the Saturation extract. The approved procedures include:

pH	Method 21
Saturation Extract	Method 2
Sodium Adsorption Ratio	Method 20b
 - 2. Approved Methods:
 - a. The "American Society of Agronomy" as published in the Methods of Soil Analysis, "Methods of the United States Salinity Laboratory" as published in the Agricultural Handbook Number 60 entitled "Diagnosis and Improvement of Saline and Alkali soils."
 - b. Base Saturation – Methods 18 and 20 of Agricultural Handbook Number 60.
 - c. Cation Exchange Capacity – Methods 18 and 20 of Agricultural handbook

Number 60.

- d. Mehlich III testing method is not suitable for alkaline soils and therefore is not an acceptable testing method for Southern California.
 - e. The approved methods are those cited by the Council On Soil Testing and Plant Analysis and those methods currently published by Soil Science Society of America Manuals, Communications in Soil Science and Plant Analysis, Soils Science and Soil Science Society of America Journal
 - f. Approved methods for phosphorus are Bray P1, Bray P2, Olsen P, DTPA, ammonium acetate, and ammonium bicarbonate-DTPA.
 - g. Approved methods for boron are hot water extract and ammonium bicarbonate- DTPA extract.
- 3. The following nutrients and elements must be determined with an American Society of Agronomy or Soil Science Society of America approved extraction method. Interpretation data must be given citing concentrations which are considered to be low, medium and high for boron, magnesium, manganese, molybdenum, phosphorus, potassium sodium and sulfur.
 - 4. The saturation extract must be analyzed for calcium, magnesium, sodium, boron, chloride, phosphorus, nitrate and sulfate
 - 5. The presence of calcium carbonate and/ or magnesium carbonate must be determined.
 - 6. The presence of exchangeable ammonium, exchangeable hydrogen, base saturation, exchangeable potassium, calcium, magnesium, and sodium must be determined.
 - 7. Soil Texture: (gravel, sand, silt and clay) and percent gravel must be determined.
 - 8. Determine organic matter content by the measurement of organic carbon. The quality of the organic matter shall be determined by measuring organic carbon and total nitrogen.
 - 9. Interpretation of nutrition deficiencies or excesses and potential toxicities must be determined.
 - 10. Water Infiltration Rate: Method 34b of Agricultural Handbook Number 60.
- C. Test results and recommendations shall be approved by the Landscape Architect and Owner prior to soil preparation to concur with recommendations shown herein.
 - D. Soil tests shall be performed after soil preparation to confirm that soil preparation was performed in compliance with pre-plant soils report and specifications.
- 1.3 PATHOLOGY TESTING LABORATORY
- A. Fruit Growers Laboratory, Inc.

9415 W. Goshen Avenue

Visalia, CA 93291

Telephone 559-734-9473

www.fglinc.com; or approved equal

1.4 SUBSTITUTIONS

- A. Specific reference to manufacturers' names and products specified in this section are used as standards; this implies no right to substitute other materials or methods without written approval from the Owner and/or Landscape Architect.
- B. Installation and warranty of any approved substitution shall be contractor's responsibility. Any changes required for installation or any approved substitution must be made to the satisfaction of the Owner without additional cost to the Owner. Approval by the Owner and/or Landscape Architect of substituted equipment and/or dimension drawings does not waive these requirements.

1.5 SUBMITTALS

- A. Prior to installation, the Contractor shall submit to the Owner and Landscape Architect two (2) copies of manufacturers' literature, receipts of sale, and laboratory analytical data for the following items:

- 1. Agronomic Soil Report
- 2. Organic Amendments
- 3. Topsoil
- 4. Commercial Fertilizer
- 5. Mulch
- 6. Erosion Control Fabric
- 7. Tree Photos with a Person for Scale
- 8. Plant Photos with a Person or Ruler for Scale
- 9. Pre-emergent Weed Control
- 10. Hydroseeding Work Sheets
- 11. Decomposed Granite
- 12. Drainage Materials
- 13. Tree Staking Materials
- 14. Root Barriers
- 15. Tree Sump Materials
- 16. Vine Espalier Materials
- 17. Sand

The above list may not be all inclusive. The Landscape Contractor is to conform to the plans and specifications.

- B. Refer to Irrigation specifications for additional submittal requirements.

1.6 PRODUCT HANDLING AND STORAGE

- A. Contractor shall furnish standard products in manufacturer's standard containers bearing original labels showing quantity, analysis, and name of manufacturer.
- B. Contractor shall notify Landscape Architect two (2) days prior to delivery of plant material and submit itemization of plants in each delivery. Included in the itemization shall be the plant variety, quantities and size of material. Landscape Contractor shall

provide plant delivery orders to Owner and/or Landscape Architect prior to delivery.

- C. Storage and Handling: Except as otherwise permitted, store materials off-ground and protected from damage. Contractor shall be responsible for maintenance tasks after plant material has been secured, including watering, fertilization, pruning, spraying, weeding, and boxing as required.
 - 1. Protect plants from sun or drying winds. Protect and maintain plants that cannot be planted immediately upon delivery.
 - 2. Do not drop plant materials.
 - 3. Do not pick up container plant material by stems or trunks.

1.7 CLEAN-UP

- A. Upon completion of each phase of work under this section, the Contractor shall clean up and remove from the area all unused materials and debris resulting from the performance of the work. The site shall be left in a broom-clean condition, and wash down all paved areas within the project site. Leave walks in a clean and safe condition.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

- A. All plants shall be of the size, variety, age and condition as shown on the drawings and as specified here.
- B. Quality - Plants shall be in accordance with the California State Department of Agriculture's regulation for nursery inspections, rules, and grading. All plants shall have a normal habit of growth and shall be sound, healthy, vigorous, and free of insect infestations, plant diseases, sun scales, fresh abrasions of the bark, or other objectionable disfigurements. Tree trunks shall be sturdy and well 'hardened' off. All plants shall have normally well-developed branch structure, and vigorous and fibrous root systems which are not root or pot bound. In the event of disagreement as to condition of root system, the root condition of the plants furnished by the Contractor in containers will be determined by removal or earth from the roots of not less than two (2) plants of each species or variety. Where container grown plants are from several sources, the roots of not less than two (2) plants of each species or variety from each source will be inspected. In case the sample plants inspected are found to be defective, the Landscape Architect reserves the right to reject the entire lot or lots of plants represented by the defective samples.
- C. Plants shall be measured when branches are in their normal upright position. Height and spread dimensions specified refer to main body of plant and not branch tip to tip. Caliper measurement shall be taken at a point on the trunk three (3) feet above natural ground line. If a range of size is given, no plant shall be less than the minimum size and not less than 40 percent of the plants shall be as large as the maximum size specified. The measurements specified are the minimum size acceptable and are the measurements after pruning, where pruning is required. Plants that meet the

measurements specified, but do not possess a normal balance between height and spread, shall be rejected.

- D. Plants shall be nursery grown in accordance with good horticultural practices under climatic conditions similar to those of project for at least two (2) years unless otherwise specifically authorized by the Owner and/or Landscape Architect. All plants shall be heavy, symmetrical, tightly knit, so trained or favored in development and appearance as to be in form, number of branches, compactness and symmetry.
- E. All plants shall meet the specifications of federal, state, and county laws requiring inspection for plant diseases and insect control. All inspection certificates required by law shall accompany each shipment, invoice, or order for stock; and when such plants arrive at the site, the certificates shall be delivered to the Landscape Architect.
- F. Plants shall be true to species and variety in accordance with the American Association of Nurserymen Standards.
- G. Plants shall not be pruned before delivery. Trees which have damaged or crooked leaders, or multiple leaders, unless specified, will be rejected. Trees with abrasions of the bark, sun scalds, disfiguring knots, or fresh cuts of limbs over 3/4 inch which have not completely callused will be rejected.
- H. Plants not conforming to the requirements herein specified will be considered defective and such plants, whether in place or not, will be marked as rejected. Contractor shall immediately remove rejected plants from the premises and replace with new acceptable plants at his expense.
- I. There shall be no substitutions of plants or sizes for those listed on the accompanying plans except with the approval of the Landscape Architect.
- J. Container stock shall have grown in the containers in which delivered for at least six (6) months, but not over two (2) years. Samples shall show no root-bound conditions. Container plants that have cracked or broken balls of earth when taken from container will be rejected by the Landscape Architect.

2.2 TOPSOIL (ON GRADE CONDITION)

- A. Soil to be used as planting medium for the project shall be fertile, well-drained, or uniform quality, free of stones or one (1) inch in diameter, sticks, oils, chemicals, plaster, concrete, and other deleterious materials.
- B. Imported topsoil shall be from sources approved by the Owner and/or Landscape Architect which meet the standards specified above.
- C. The Contractor shall provide for the testing of proposed topsoil by an Owner approved certified agronomic soils testing laboratory and shall submit soils analysis, recommendations and topsoil sample to the Owner and/or Landscape Architect for approval. Import topsoil shall not be delivered to the site prior to Owner and/or Landscape Architect's approval. The Owner and/or Landscape Architect may request additional testing of imported topsoil at the site to determine conformance to the

approved report. Rejected topsoil shall be removed at no cost to the Owner.

- D. If stockpiling is requested, locations and amounts of stockpile shall be approved by the Owner and/or Landscape Architect.

2.3 SOIL AMENDMENTS AND FERTILIZER

- A. Provide standard, approved and first-grade quality materials, in prime condition when installed and accepted.
- B. Deliver commercially processed and packaged material and manufacturer's guaranteed analysis. Supply a sample of all supplied materials accompanied by analytical data from an approved laboratory source illustrating compliance, or bearing the manufacturer's guaranteed analysis to the Landscape Architect.
- C. Organic Compost Amendment
 - 1. "Washed Steer Manure" from EarthWorks, 951-538-3321 www.ewsa.com ; or approved equal.
 - 2. "Forest Floor Humus" from Aguinaga Fertilizer Company, 949-751-9706 or 949-751-9715
 - 3. www.aguinagagreen.com ; or approved equal.
- D. Acid-Loving Plant Material Soil Mix
 - 1. "Azalea/ Camellia Mix" or "Acid Spot Mix" for other acid-loving plant materials than Azaleas and Camellias from EarthWorks, 951-538-3321 www.ewsa.com ; or approved equal.
 - 2. "Propagation Mix" from Aguinaga Fertilizer Company, 949-751-9706 or 949-751-9715 www.aguinagagreen.com; or approved equal.
- E. Soil Amendments:
 - 1. Soil sulfur - Agricultural grade sulfur containing minimum of 99 percent sulfur (expressed as elemental).
 - 2. Iron sulfate - 20 percent iron (expressed at metallic iron), derived from ferric and ferrous sulfate, ten (10) percent sulfur (expressed as elemental).
 - 3. Calcium carbonate - 95 percent lime as derived from oyster shells.
 - 4. Gypsum - Agricultural grade product containing 90 percent minimum calcium sulfate.
 - 5. Dolomite lime - Agricultural grade mineral soil conditioner containing 35 percent minimum magnesium carbonate and 49 percent minimum calcium carbonate, 100 passing No. 65 sieve provide Kaiser Colomite 65 AG or other approved.
 - 6. Fine sand - Clean, natural fine sand free from deleterious material, weed seed, clay balls, or rock with minimum of 95 percent passing a No. 4 sieve and maximum of ten (10) percent passing a No. 100 Sieve.
- F. Fertilizer:
 - 1. Fertilizer shall be pellet or granular form consisting of the percentage by weight

of nitrogen, phosphoric acid and potash as recommended by the approved agronomic report. Planting fertilizer shall be mixed by the commercial fertilizer supplier.

2. Plant tablets shall be slow-release type with potential acidity of not more than five (5) percent by weight.

2.4 PESTICIDES AND HERBICIDES

- A. All chemicals used for weed control shall be registered by the State of California Department of Food and Agriculture and the Environmental Protection Agency with registration identification on the label. Label shall be at job site at all times.
- B. All chemicals shall be applied as per registered label instruction and manufacturer's recommendations.
- C. Chemicals requiring a licensed applicator must be applied by persons registered with the County of Kern Department of Agriculture's Commissioner's Office as possessing a current, valid, qualified pest control applicator's license.
- D. The use of any restricted materials is forbidden unless a special use permit is obtained from the County of Kern Department of Agriculture.
- E. The non selective, translocative herbicide shall be "Round-Up" or approved equal.
- F. The pre-emergent weed control shall be Ronstar-G, Treflan, Eptam, Surflan or approved equal.

2.5 STAKING MATERIALS

- A. Wood Stakes: Shall be straight grained lodge pole pine free of knots, splits, cracks, or disfigurements. Stakes shall be three (3) inch minimum nominal size in diameter for 36-inch diameter and smaller and a minimum of 12 feet in length, or as required by tree height. Stakes shall have a ten (10) inch tapered driving point and chamfered top, untreated, natural wood color, as manufactured by: C & E Lumber Company of Pomona, CA (714) 626-3591; or approved equal.
- B. Cinch Ties: Supports for double staking shall be cinch ties per detail as shown in the Drawings. Cinch ties shall be 32-inch black cinch type; two double cinch ties per tree; V.I.T. Products,

760-480-6702.
- C. Double Stakes (Wood) and cinch ties per above shall be used for all trees 36" box and smaller other than Cupressus, Tristania and Eucalyptus species.
- D. Tristania and Eucalyptus trees smaller than 24" box shall be doubled staked (wood) with cinch ties per above.
- E. Cupressus trees smaller than 24" box shall be single staked (wood) with double cinch

ties.

- F. Cupressus, Tristania and Eucalyptus 24" box and larger trees shall be steel staked with ties per below.
1. Galvanized Steel Stakes: Steel Stake: 1 ½" diameter x 21 – feet long schedule 40 metal stakes (24- 36" box), and ½" diameter x 10.5 – feet long schedule 40 metal stakes (5-15 Gal.) galvanized, with two coats of matte black paint. Two ¼" holes are drilled through the stake for tie attachment. First hole 24 – inches from top of the stake and the second hole is 36 – inches from the top. No metal caps. Specify two segments: first segment 6" above finish grade with threaded union. Supplier: Sullivan & Mann Lumber Company 714-665-2460; or approved equal.
 2. Hose & Wire Ties by V.I. T. Product, HW36 wire length 36 – inch for 24 – inch and 36 – inch box trees. Wire can be trimmed if necessary. Supplier: Sullivan & Mann Lumber Company, 714-665- 2460; or V.I.T. Products, 760-480-6702; or approved equal.
 3. Trees shall be staked per the details as shown in the Drawings.
- G. Landscape areas maintained by the City shall have trees staked per the City standards.

2.6 ROOT CONTROL BARRIERS

- A. Root Control Barriers: Century Products Root Barrier Rolls; www.centuryrootbarrier.com; or approved equal.
1. Refer to root control barrier detail in Landscape Drawings for additional information on specific tree types not to receive root control barrier.
- B. City Maintained Root Control Barriers:
1. Shall be provided as indicated on the plans, as required in the local governing agency (ies) tree planting guideline, and as specified herein.
 2. Root control barriers shall be constructed of injection molded copolymer polypropylene with 50 percent post-consumer recycled plastic and UV inhibitors as manufactured by Deep Root Products or approved equal.
 3. Barriers shall be a minimum of 18-inch depth and .08-inch thick when installed adjacent to sidewalk, 24-inch depth and .08-inch thick when installed adjacent to curb. Barriers shall be linear, according to the approved plan and per local governing agency (ies) standard details.
 4. Root control barriers shall be linear.
 5. Refer to Root Control Barrier detail in landscape drawings for additional information on specific tree types not to receive root control barrier.

2.7 DRAINAGE MATERIAL AND TREE SUMP

- A. PVC Pipe: ASTM D3034, SDR-35 perforated pipe, 4" dia.
- B. Filter Fabric Sock: "Mirafi 140 N" as manufactured by Mirafi, Inc. of Charlotte, NC

28224. 800- 438-1855; or approved equal.

- C. Drain Cap: NDS, 4" round grate (Part No. 11), black color.
- D. Sub-drainage and Sumps: Sub-drainage and sumps required for all specimen field dug palms and trees.

2.8 TOP DRESS MULCH

- A. Organic recycled chipped wood in the shade of "Dark Brown" color. Mulch size "1/2 inch to 1 1/2 inch.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Prior to the work in this section, examine previously installed work from other trades and verify that such work is complete and as required, to the point where this installation may commence properly.
- B. Perform actual planting only during those periods when weather and soil conditions are suitable and in accordance with locally accepted practice.

3.2 PLANTING LAYOUT

- A. Confirm location and depth of underground utilities and obstructions. If underground structures or utility lines are encountered in the excavation of planting areas, other locations for tree planting shall be approved by the Landscape Architect.
- B. Landscape Contractor shall flag/stake all tree locations in the field for review and approval by the Landscape Architect and/ or Owner prior to excavation. In addition, all trees will be 'faced' and located while in containers. Method of staking of trees can be by marking paint, 18" wood stakes or 10' lodge pole pines as requested by the Owner or Landscape Architect.
- C. All planting layout and staking shall be accurately made in accordance with the plans. All trees shall be a minimum of three (3) feet from local government agency (ies) maintenance limit line.
- D. Plant locations including shrubs shall be approved by the Owner and/or Landscape Architect prior to excavation and may be subject to spacing and distances required by local governing agency (ies) standards.
 - 1. Use color coded wire flags for each species of plant material or mark with line locations of plants and outline of planting beds on ground.
 - 2. Do not begin excavation until plant locations and plant beds are reviewed by Landscape Architect.

- E. The Irrigation system shall be operational prior to planting.
- F. Field Samples: Prior to planting, prepare one plant pit with standpipe, gravel, filter fabric, and root barriers for each tree size to be reviewed by the Landscape Architect.
 - 1. Do not cover standpipes.
- G. Protection: Protect previously installed work and materials that may be affected by work of this Section.
 - 1. Provide safeguards and exercise caution against damage or defacement of existing site improvements.
 - 2. Repair damage resulting from landscape planting operations and return the area to previous condition.
- H. Do not commence planting until acceptance of soil preparation.

3.3 FINISH GRADING

- A. All grading and mounding with the exception of final planting shall be completed prior to soil preparation.
- B. Planting areas shall be free of all weeds (plants not specified in planting areas), stones, stumps, roots, or other debris one (1) inch in diameter and greater.
- C. Soil shall be graded to a smooth and even surface conforming to required finish grade. Finish grade adjacent to walks, paved areas, curbs, manholes, clean-outs, valve boxes, and similar features shall be one (1) inch below the surface in turf and two (2) inches below in ground cover/shrub areas. Grades between such features shall be carefully sustained and blended to eliminate abrupt changes.
- D. Planting areas to receive sod shall sustain a finish grade of such depth that the top of installed sod shall be flush with finish surfaces (walks, paved areas, etc.).
- E. Contractor shall allow for soil amendments when establishing sub-grade elevations. All planting areas shall have a finish grade conforming to approved plans and specifications after full settlement has occurred.
- F. All planting areas adjacent to buildings shall be graded to drain away from the building at a minimum of two (2) percent slope, for a minimum of five (5) feet horizontal distance.

3.4 SOIL PREPARATION

- A. Clearing of Debris: Clear all planting areas of stones one (1) inch in diameter and larger, weeds, debris and other extraneous materials prior to soil preparation.
- B. Cultivation: Rip both directions of all planting areas to a minimum of twelve inches immediately prior to amending existing soil, if determined necessary due to existing site

conditions and/or soils reports.

- C. Rototill to reduce soil clods to a maximum diameter of one (1) inch in the top six (6) inches.
- D. Spread and thoroughly incorporate amendments to a six (6) inch depth.
- E. Mixing of Backfill Mix: Thoroughly mix the required amendment components with suitable native topsoil in stockpiles on site according to specified rates from the approved agronomic soils tests. Use stockpiled backfill mix to backfill trees and shrubs.
- F. Planting areas with slopes 2:1 and steeper shall not be soil prepared unless directed by Landscape Architect.
- G. Soil areas shall be compacted and settled by application of heavy irrigation to a depth of 12 inches.
- H. If leaching is recommended in the agronomic soils report, the following process shall be followed: After the irrigation system installation is complete, the prepared soil shall be leached to reduce alkalinity, salinity, magnesium, sodium and chlorine. The pH shall be reduced to less than eight (8) and the salinity reduced to less than 3 milliohm/cm. The soil shall be tested weekly until the soil has been deemed suitable for planting. The Contractor is responsible for containing on-site all water required to perform the leaching. Water from the leaching activity shall not be discharged directly into the storm drain system.
- I. Planting shall not commence until the completion of the leaching process.
- J. Contractor shall not work under muddy conditions.

3.5 PLANTING OF TREES, SHRUBS, AND VINES

- A. General:
 - 1. Excavation for planting shall include the stripping and stocking of all acceptable topsoil encountered within the areas to be excavated for trenches, tree holes, plant pits, and planting beds.
 - 2. Excess soil generated from the planting holes and not used as backfill or in establishing the final grades shall be removed from the site.
 - a. Do not allow excess soil removed from planting pits to alter established grades.
 - 3. Plant Pits: Install trees and shrubs in round pits with vertical sides having widths equal to twice the diameters, and depths equal to the heights of the root balls. Scarify sides and bottom of plant pits.
 - 4. Protect areas from excessive compaction when trucking plants or other materials to planting site.
 - 5. Can Removal:

- a. Cut cans on two sides with an acceptable can cutter. Do not injure the rootball. Do not cut cans with spade or ax.
 - b. Carefully remove plants from cans without injury or damage to rootball.
 - c. After removing plant, superficially cut edge roots with knife on three sides.
 - d. For plants with sensitive roots, place can intact in plant pit 1-1/2 times the size of a standard plant pit. Insert blades of sharp, needle-nose shears into a drain hole and cut the can bottom away. Remove bottom from pit. Follow with a cut down one side of the can from top to bottom. Repeat cut on opposite side. Fill plant pit with prepared plant pit mixture. Carefully remove the detached pieces.
6. Box Removal:
 - a. Remove bottom of plant boxes before planting.
 - b. Remove sides of box without damage to rootball after positioning plant and partially backfilling.
7. Setting Larger Plants:
 - a. Center plants and set on native soil that has been puddled settled.
 - b. Set plants with the top of root ball 2 inches above finish grade and rotated to give the best appearance in relationship to adjacent structures or surroundings.
 - c. Face plants with fullest growth into prevailing wind.
 - d. Use appropriate backfill mix to continue filling plant pits. Set plants plumb. Brace rigidly in position until backfill mix has been tamped solidly around rootball. When 3/4 of the pit is backfilled, water thoroughly, saturating the rootball. Continue filling pit to finish grade with backfill mix.
 - e. Planting pit shall be backfilled with soil conditioner and organic amendment, per cubic yard, per the agronomic soils report:
 - 1) Planting Tablets:

1-gallon plant	-	1 tablet.
5-gallon plant	-	3 tablets.
15-gallon plant	-	5 tablets.
24-inch box tree	-	7 tablets.
30-inch box tree	-	7 tablets.
36-inch box tree	-	8 tablets.
42-inch box tree	-	8 tablets.
48-inch box & larger	-	12 tablets.
 - 2) 5 parts rock-free native soil.
 - 3) 1 part organic amendment.
 - f. When the plant pit is filled, form saucer berm around plants with backfill material sufficient to hold 2 inches of water. Remove the berm prior to dressing.
 - g. Apply root hormone at the rate recommended by the manufacturer. Tree balls shall be set before application of root hormone, and shall be mulched immediately after application of root hormone into the root ball.

- h. Water plants immediately after planting.
- 8. Provide approved on-site or approved imported top soil as necessary for raised planters and bring soil up to required finish grades.
- 9. Staking: Immediately after planting, stake 15-gallon and 24-inch box trees as indicated on Contract Drawings. One tree of each size shall be staked and reviewed by Architect prior to continued staking.
 - a. Install anchor system in accordance with manufacturer's instructions.
- 10. Mulching: Spread mulch 2" inches thick in planters and areas that do not exceed 30 percent slope.
- 11. Pruning: Pruning shall be limited to the minimum necessary to remove injured twigs and branches and to compensate for loss of roots during transplanting, but never to exceed one-third of the branching structure. Upon review by the Landscape Architect, pruning may be performed before delivery of plant, but not before plants have been reviewed. Cuts over three-quarter-inch in diameter shall be painted with tree wound paint.

3.6 GROUND COVERS

- A. Ground cover plants shall not be allowed to dry out before or while being planted. Roots shall not be exposed to the air except while actually being placed in the ground. Wilted plants will not be accepted.
- B. Plant ground covers in straight rows evenly spaced, and at intervals required by drawings, use triangular spacing.
- C. Plant each rooted plant with its proportionate amount of flat soil. Immediately water after planting until entire area is soaked to full depth of each hole.
- D. Protect plants from damage and trampling at all times.
- E. In all shrub and groundcover areas, apply minimum two (2) inch layer of forest floor bark mulch (0-2" sieve size) per Aguinaga Fertilizer Company, Inc. or approved equal. Contractor shall submit sample to landscape Architect for approval.

3.7 WATERING

- A. Watering to commence immediately after completion of job and to continue at a rate necessary to keep area moist without drying out or puddling. Normally irrigating ONCE AN HOUR for a short duration and continuing this procedure each and every day light hour, seven (7) days a week will be sufficient. This continual moist condition to prevail each and every day until seeds are well rooted. After the rooting stage is completed, irrigation should still continue on the basis of at least once or twice a day until turf is well established.
- B. Immediately after planting, apply water to each tree, shrub and ground cover by means of a hose. Apply water in a moderate stream in the planting hole until the material

about the roots is completely saturated from the bottom of the hole to the top of the ground.

- C. Water plants which cannot be watered efficiently with the existing water system by means of a hose. Contractor is responsible for proper watering of all plant material.
- D. Apply water in sufficient quantities, and as often as seasonal conditions require, and keep the ground wet at all times, well below the root system of grass and planting. Do not cause erosion damage in watering slopes.

3.8 LANDSCAPE WALKS AND PROJECT ACCEPTANCE

- A. Tree Location Walk: will flag/stake location of all trees to be planted in current phase. In addition, all trees to be 'faced' and located while in containers.
 - 1. Attendees: Landscape Architect, Installing Landscape Contractor.
- B. Planting Walk: will include review of installed tree and shrub material. This walk will be completed prior to installation of mulch or top dressing.
 - 1. Attendees: Landscape Architect, General Contractor, Installing Landscape Contractor
- C. Pre-Maintenance Walk/Irrigation Coverage Test: IT shall be the responsibility of the General Contractor to establish the Pre-Maintenance Walk and Irrigation Coverage Test. The date of the beginning of the ninety (90) day Maintenance Period will be established based on the successful completion of the irrigation walk. The walk shall cover irrigation coverage, functionality and color-coded controller chart (11" x 17" – color copy) provided by the landscape contractor. The Landscape Architect will generate the punch list.
 - 1. Attendees: GC, Installing Landscape Contractor and Landscape Architect.
- D. 75 Day Maintenance Walk: It shall be the responsibility of the General Contractor to establish the 75 Day Maintenance Walk. This walk will review the items from the Pre-Maintenance Walk punch list and verify these items have been completed. The Landscape Architect will generate the punch list.
 - 1. Attendees: Installing Landscape Contractor, General Contractor,
 - 2. On-Site Property Manager, Landscape Maintenance Contractor and Landscape Architect.
- E. 90 Day Final Acceptance: It shall be the responsibility of the General Contractor to establish the 90 Day Maintenance Walk. This walk will review all items from the 75-day Maintenance Walk punch list and ensure these items have been completed.
 - 1. Attendees: Landscape Maintenance Contractor, Installing Landscape General Contractor, and Landscape Architect.
 - 2. General Contractor to document final acceptance.

- F. Final Project Turnover: It shall be the responsibility of the General Contractor to establish the Final Project Turnover date.
1. Attendees: Landscape Maintenance Contractor and Landscape Contractor and General Contractor.
 2. GC to document final acceptance.
 3. The installing Landscape Contractor shall include the following items, but not limited to: Controller charts (11x17 – color laminated), quick coupler keys, controller operation manuals, special tools required to adjust, install, disassemble, or remove any sprinkler or valves supplied on the project where applicable and other pertinent information at final turnover.
 4. Landscape contractor shall provide a letter of guarantee for the completed landscape installation to the General Contractor.

END OF SECTION 32 8400